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

April 26, 2000

EA 00-108

Mr. J. V. Parrish (Mail Drop 1023)
Chief Executive Officer
Energy Northwest
P.O. Box 968
Richland, Washington 99352-0968

SUBJECT: NRC INSPECTION REPORT NO. 50-397/00-06

Dear Mr. Parrish:

This refers to the inspection conducted on February 29 through March 16, 2000, at the WNP-2 facility. This inspection encompassed a safety system engineering inspection focused on the safety-related heating, ventilating, and air conditioning systems and a review of the 10 CFR 50.59 safety evaluation program.

We concluded that your engineering program was satisfactorily maintaining the operability of the heating, ventilating, and air conditioning systems and that the safety evaluation program was adequate.

The NRC has determined that six Severity Level IV violations of NRC requirements occurred. These 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 these 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 WNP-2 facility.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and 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,

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

Docket No.: 50-397
License No.: NPF-21

Enclosure:
NRC Inspection Report No.
50-397/00-06

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	50-397
License No.:	NPF-21
Report No.:	50-397/00-06
Licensee:	Energy Northwest
Facility:	WNP-2
Location:	Richland, Washington
Dates:	February 29 through March 16, 2000
Team Leader:	M. Runyan, Senior Reactor Inspector Engineering and Maintenance Branch
Inspectors:	C. Clark, Reactor Inspector Engineering and Maintenance Branch P. Goldberg, Reactor Inspector Engineering and Maintenance Branch W. McNeill, Reactor Inspector Engineering and Maintenance Branch
Accompanying Personnel:	R. Quirk, Consultant J. del Mazo, Consultant
Approved By:	Dr. Dale A. Powers, Acting Chief Engineering and Maintenance Branch Division of Reactor Safety

ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

WNP-2
NRC Inspection Report No. 50-397/00-06

A team of 4 NRC inspectors and 2 contractors conducted a 2-week inspection under Inspection Procedure 93809 to evaluate the safety-related portions of the heating, ventilation, and air conditioning systems at WNP-2. Additionally, Inspection Procedure 37001 was used to evaluate the 10 CFR 50.59 safety evaluation program.

Engineering

- A violation of 10 CFR Part 50, Appendix B, Criterion III, was identified for an important error made in a design calculation affecting the prediction of design-basis temperatures in many safety-related rooms. 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 is in the licensee's corrective action program as Problem Evaluation Request 200-0466 (Section E1.1.2).

- The team identified a number of errors and discrepancies in design calculations that indicated a lack of attention to detail in the preparation of calculations. There was also an indication of a lack of rigor in supporting some design assumptions (Section E1.1.2).

- A violation of 10 CFR Part 50, Appendix B, Criterion III (second example), was identified concerning suction piping associated with a residual heat removal pump that was not insulated, although design calculations assumed that this piping was insulated. 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 Problem Evaluation Request 200-0410 (Section E1.1.4).

- The licensee did not have a documented engineering basis for the lubrication schedule of 19 selected fan/fan motor assemblies. Based on equipment history and a vibration program to monitor motor performance, this concern did not affect the operability of the affected units, but demonstrated the lack of a rigorous justification for lubrication practices (Section E1.1.5).

- A violation of 10 CFR Part 50, Appendix B, Criterion XI, was identified concerning the failure to perform periodic tests to verify that Division III electrical components would operate during limiting degraded grid conditions. 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 Problem Evaluation Request 200-0498 (Section E1.2.2).

- The normal system alignment with standby service water lined up to one train of control room coolers, control room chilled water lined up to the other train, and neither being in automatic was an undeclared operator work-around reflecting a less than optimal control process (Section E1.2.2).

- A violation of 10 CFR 50.71(e) was identified for an incorrect final safety analysis description of the high pressure core spray pump control circuit. 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 Problem Evaluation Request 200-0489 (Section E1.2.2).

- The licensee failed to have instrument uncertainty calculations or analyses for local standby service water flow indicators that were used to support technical specification system test acceptance criteria (Section E1.2.2).

- A violation of 10 CFR Part 50, Appendix B, Criterion VII, was identified for the failure to ensure that procured control room digital recorders met minimum humidity requirements noted in the procurement specification. 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 Problem Evaluation Request 200-0492 (Section E1.2.3).

- A violation of 10 CFR Part 50, Appendix B, Criterion V, was identified for the failure to initiate a problem evaluation request to properly document and correct a flow sensor that was falsely indicating the presence of fluid flow in a stagnant run of piping. 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 Problem Evaluation Request 200-0483 (Section E1.2.4).

- Selected 10 CFR 50.59 safety evaluations were comprehensive and of good quality.

- Two examples of a violation of 10 CFR 50.59(b)(1) were identified involving screenings that incorrectly concluded that a full safety evaluation was not required. 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 is in the licensee's corrective action program as Problem Evaluation Requests 200-0456 and 200-0537 (Section E2.1).

- A violation of 10 CFR Part 50, Appendix B, Criterion V (second example), was identified for an inadequate surveillance test procedure associated with the control room chiller. 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 Problem Evaluation Request 200-0481 (Section E2.3).

- The team noted that two problem evaluation requests were inaccurate or narrowly focused (Section E2.3).

Report Details

Summary of Plant Status

The plant was operated at full power during the inspection.

III. Engineering

E1 Conduct of Engineering (93809)

E1.1 Heating, Ventilating, and Air Conditioning Mechanical System

E1.1.1 System Description

Control Room Heating, Ventilating, and Air Conditioning System

The plant has two 100 percent capacity heating, ventilation, and air conditioning (HVAC) trains, one in normal use and one in standby, each composed of an emergency filter unit and a centrifugal fan discharging through an air handling unit. Both trains share a common outside air intake and distribution duct. Each air handling unit consists of two filters in series, two cooling coils in series (normal and emergency), and an electric heater. The normal cooling coil is supplied with chilled water from the radwaste chilled water system. The emergency cooling coil is supplied by either the emergency chilled water system or by the standby service water system. The main control room is maintained at 75°+/- 3°F dry-bulb temperature under normal conditions. In the event of an emergency, the control room can be maintained below 85°F by using chilled water or below 104°F by using standby service water.

Cable Spreading Room Heating, Ventilating, and Air Conditioning System

The plant has two 100 percent capacity cable room air handling units that supply recirculated and fresh air to the remote shutdown and cable spreading rooms. Each unit consists of a filter, one emergency cooling coil supplied by the standby service water system, one normal cooling coil supplied by the radwaste chilled water system, and one centrifugal fan. Normally one air handling unit operates continuously on a 100 percent recirculation mode maintaining the cable spreading room and remote shutdown room at approximately 80°F.

Critical Switchgear Air Handling Units

The plant has two separate air handling units that have different capacities due to heat load differences between the two sets of rooms. They supply recirculated and fresh air to the electrical rooms and normally operate continuously during all modes of operation. Each unit consists of a roughing filter, an emergency cooling coil supplied by the standby service water system, a normal cooling coil supplied by either the radwaste building chilled water system or the plant service water system (normally isolated), an electric heater, and a centrifugal fan. Temperatures in the HVAC equipment rooms are limited to a range of 55°F to 104°F during normal operation and below equipment operability limits during all emergency modes of operation. Electric heaters are provided in the ducts supplying air to the battery rooms to maintain the temperature in those rooms above 60°F.

Control Room Emergency Chillers

The plant has two 100 percent capacity emergency chillers located in a common room. Each unit is a vendor package consisting of a compressor, evaporator, and condenser. The purpose of the control room emergency chillers is to provide control room emergency chilled water cooling to the control room when radwaste chilled water (normal source) is not available. The chillers are capable of maintaining the control room temperature at 75 +/- 3°F.

Diesel Generator Heating, Ventilating, and Air Conditioning

Each of the three diesel generator rooms is serviced by a separate “push-pull” ventilation system. The function of the systems is to maintain suitable temperatures within the rooms for equipment operation. Each system is designed as an engineered safety feature system and is powered from the respective diesel generator that it serves. There are two air handling units in each diesel generator room comprised of a fan and a cooling coil. In addition, there is a main exhaust fan in each of the three diesel rooms. The smaller unit is normally running to maintain suitable temperatures in the room and it has a cooling coil supplied by standby service water and an electric heater. When a diesel generator is started, the larger air handling unit and the main exhaust fan automatically start and standby service water is supplied to the cooling coils in both air handling units.

Standby Service Water Pumphouse Heating, Ventilating, and Air Conditioning

The plant has two standby service water pump houses each served by a separate HVAC system. Each system consists of a room cooler unit composed of a sheet metal cabinet containing a direct-drive centrifugal fan and a cooling coil supplied by standby service water and a separate centrifugal supply fan with inlet dampers. The room cooler unit is normally in standby and operates only when the pump is started. The supply ventilation fan in both pump rooms operates automatically when required to maintain the room temperature between 60°F and 80°F. There are also four 10 kW electric unit heaters in each pump house to prevent room temperature from dropping below 40°F.

Reactor Building Emergency Heating, Ventilating, and Air Conditioning System

All equipment located within the Seismic Category I reactor building that requires a controlled environment to operate, and which must operate in the event of a loss-of-coolant accident, is enclosed in individual equipment rooms. These rooms are normally heated and ventilated by the reactor building HVAC system; however, under emergency conditions, the rooms are automatically cooled by recirculation of room air through their respective room coolers. The ambient temperature in these rooms is maintained below the equipment operability limits during all emergency modes of operation. Each room cooler is comprised of a direct-drive fan and a cooling coil supplied by the standby service water system. The room coolers are electrically interlocked with the pumps they serve and will start when the pump starts.

Standby Gas Treatment System

The standby gas treatment system is designed to maintain a pressure of -0.25 inches water or lower in the reactor building. This negative pressure is designed to limit the post-accident airborne radioactive release from the secondary containment to within the guidelines of 10 CFR Part 100. The standby gas treatment system has two 100 percent capacity trains, each train consisting of a moisture separator, two electric heating coils, a pre-filter, a high efficiency particulate air filter, two charcoal beds in series, and another high efficiency particulate air filter.

E1.1.2 Design Review

a. Inspection Scope

The team reviewed mechanical calculations, drawings, procedures, licensing and design basis information, other related documentation, and the as-installed plant equipment configurations to ascertain the consistency and accuracy of design information pertaining to the safety-related mechanical HVAC systems.

b. Observations and Findings

The team identified a number of minor errors and discrepancies in design calculations that indicated a lack of attention to detail. There was also an indication of a lack of rigor in supporting some design assumptions. The team identified other errors in design calculations, as discussed below:

Calculation ME-02-92-43, “Room Temperature Calculation for DG Building, Reactor Building, Radwaste Building and Service Water Pumphouse Under Design Basis Accident Conditions,” Revision 5

Revision 5 to this calculation was issued to use a +/- 10 percent uncertainty in the air flows through the subject air coolers. The results of this calculation were used extensively by lower-tier calculations. The calculation determined parametric graphs for the different rooms depicting room temperatures as a function of cooling coil efficiency and standby service water flow using either 90 or 110 percent air flow through the cooling coils depending on which one of these provides the more conservative result. In Appendix D to the calculation, coil manufacturer’s graphs were used to determine the heat transfer capabilities of the cooling coils based on coil face velocity (air flow/coil face area). However, 100 percent of the air flows were used to determine the coil face velocities instead of applying the +/- 10 percent uncertainty factor. Using 100 percent of the air flows resulted in a higher (nonconservative) heat transfer rate for the coil and a corresponding lower room temperature. This error affected all of the calculated room temperatures in the plant.

The licensee performed a sensitivity analysis and determined that, in correcting this mistake, the predicted limiting room temperatures increased by a range of 0.1 to 1.0°F, but that none of the rooms went above their design equipment operability limit. The licensee issued Calculation Modification Record 00-0289 to correct the heat exchanger coefficients. Although operability was not challenged, the team considered this error to be an important oversight in the development of the HVAC analyses.

10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, that measures shall provide for verifying or checking the adequacy of design by various methods. In this instance, these measures failed to identify and correct a fundamental error in the use of vendor air flows that affected a large number of HVAC calculations. This issue was identified as an example of a violation of 10 CFR Part 50, Appendix B, Criterion III. This Severity Level IV violation is being treated as a noncited violation (50-397/0006-01), consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as Problem Evaluation Request (PER) 200-0466.

Calculation NE-02-94-19, "HVAC - Control Room Emergency Chiller System," Revision 0

This calculation provided the secondary containment drawdown analysis to determine the time to reach –0.25 inches negative water pressure in the secondary containment post-loss-of-coolant accident using the standby gas treatment system. The calculation referenced Calculation ME-02-92-43, Revision 3, for heat load inputs, and even though Calculation Modification Record-96-0211 evaluated the changes caused by Revision 4 to Calculation ME-02-92-43, there was no current evaluation for the most recently issued Revision 5 changes.

This calculation (NE-02-94-19, Revision 0) was under review by the Office of Nuclear Reactor Regulation because it identified that the negative pressure could not be attained as early as that prescribed in the design bases. The licensee had applied for a technical specification amendment request to address this matter. The licensee's representative stated that the issue of consistency to the latest revision of Calculation ME-02-92-43 will be evaluated for its impact on the adequacy of the application.

Design Requirement Compliance Documentation

For the design-basis situation, when only standby service water is available to the control room cooling coils (chilled water is not available), the licensee did not have documentation demonstrating that the post-accident control room temperature and relative humidity values in the control room were commensurate with the operator's comfort and long-time occupancy requirements of 10 CFR Part 50, Appendix A, General Design Criterion 19, "Control Room."

Final Safety Analysis Report, Section 9.4.1.2.1, states that during emergency conditions, control room chilled water or standby service water is supplied to the air handling units for cooling. The control room can be maintained below 85°F by the control room chilled water, or standby service water can be used to maintain less than

104°F (shedding of nonessential loads may be required under some conditions). The environmental qualification temperature limit for control room equipment was 104°F, whereas, 85° F equivalent temperature was required for control room personnel habitability. The equivalent temperature is an index of relative comfort determined by successive comparisons of different combinations of temperature, humidity, and air movement. The numerical value of the equivalent temperature, for any given condition, is fixed by the temperature of slowly moving saturated air, which gives an immediate sensation of warmth or coolness. The equivalent temperature is determined by referring measured dry bulb temperature, wet bulb temperature, and air velocity to a chart.

The licensee's representative provided a copy of PER 290-399 that included a justification for continued operation and a 10 CFR 50.59 evaluation. The PER evaluated the consequences of having Control Room Chiller CCH-CR-1A out-of-service for repairs for approximately 90 days and assuming a single active failure for Chiller CCH-CR-1B during the design basis accident. The justification for continued operation stated that "the control room emergency chillers are not required for a safe shutdown of the plant" and that "the emergency control room chillers have only an indirect safety-related function." Therefore, to comply with the Final Safety Analysis Report commitment, the standby service water system alone is required to limit the control room temperature to 104°F for equipment operability and 85°F equivalent temperature for control room personnel habitability. The licensee's representative could not produce any design basis documentation to show that the service water system alone could maintain the control room temperature within the 85°F equivalent temperatures as committed to in the Final Safety Analysis Report.

The 10 CFR 50.59 evaluation attached to PER 290-399 stated, "The 85°F limit is an arbitrary limit that needs to be related to humidity levels to be a realistic indicator of human tolerance to high temperature environments." The package contained excerpts of NUREG/CR-3788, SAND84-0978, "A Review of Regulatory Requirements Governing Control Room Habitability Systems." Section 7.0 (b) of this document stated that "Maximum permissible CR accident temperature limits should be based on a specific criterion, such as the equivalent temperature, as given in the charts of Industrial Ventilation." Additionally, "The equivalent temperature of 85°F corresponds approximately to the highest value that can be tolerated in daily work by healthy, acclimated men wearing warm weather clothing and doing light, sedentary activities during the summer season." The 10 CFR 50.59 evaluation provided a chart from Industrial Ventilation, 14th Edition, that determined a control room effective temperature of 82°F for an outside ambient temperature of 102°F dry bulb and 67°F wet bulb (15 percent relative humidity). The licensee concluded that the margin of safety for control room personnel performance was not affected by the loss of both divisions of the emergency control room chiller.

However, the current summer design conditions were 105° F dry bulb and 71°F wet bulb (Final Safety Analysis Report, page 9.4-2) and there was no design basis documentation showing that the Final Safety Analysis Report commitment was met. The licensee's representative agreed to develop design basis documentation showing compliance with the 85°F equivalent temperature stated in the Final Safety Analysis Report.

The team determined that no actual technical concern existed because there appeared to be ample margin for standby service water alone to be able to maintain an 85°F equivalent temperature in the control room. The team categorized this issue as an observation that the licensee's engineering staff did not rigorously support an assumption made within a design document.

c. Conclusions

A noncited violation of 10 CFR Part 50, Appendix B, Criterion III, was identified for an important error made in a design calculation affecting the prediction of design-basis temperatures in many safety-related rooms.

A number of minor errors and discrepancies in design calculations the that team identified indicated a lack of attention to detail. There was also an indication of a lack of rigor in supporting some design assumptions.

E1.1.3 Modifications

a. Inspection Scope

The team reviewed Plant Modifications 96-0133-0, “Flow Orifice to Reduce/Eliminate the Cavitation Downstream from Flow Elements SW-FE-1A/B,” approved April 23, 1997; and 95-0135-0, “Standby Service Water Pump SW-M-P/1B Vibration Reduction,” approved May 23, 1995.

b. Observation and Findings

The team did not identify any discrepancies associated with these modifications.

c. Conclusions

The licensee adequately processed two modifications reviewed by the team.

E1.1.4 Walkdowns

a. Inspection Scope

Team members participated in a walkdown of the Emergency Cable Air Handling Unit DMA AH-51, the Emergency Diesel Generator Normal Cooling Unit DMA AH-22, Emergency Cooling Unit DMA AH-21, the High Pressure Core Spray Diesel Room Emergency Cooling Unit DMA AH-31, the Residual Heat Removal 2C pump room coolers, Control Room Exhaust Fan WEA-FN-51, the control room emergency chillers room, and both service water pump rooms.

b. Observations and Findings

The team noted that each vertical standby service water pump had a splashguard installed inside the pump casing openings next to the pump shaft. The installation looked temporary in nature, consisting of a rectangular plastic plate located inside the opening and hung with bailing wire connected to various places outside the pump casing. This configuration is discussed further in Section E2.2 of this report.

The team observed large bore piping in Residual Heat Removal Pump Room A that was not insulated and questioned if this configuration was consistent with heat load calculations. Calculation ME-02-92-43, which calculated the heat load for this room, assumed that all high energy piping was insulated regardless of size. The licensee's representative found that the 24-inch diameter residual heat removal piping should have been insulated from the pipe suction up to the intersection with the 18-inch shutdown cooling supply piping. In response to the team's finding, the licensee's representative prepared Calculation Modification Record 00-267, dated March 2, 2000, to Calculation ME-02-92-43 to evaluate the impact the uninsulated pipe would have on the predicted design basis accident room temperature. The predicted temperature increased from 143 to 148°F. However, this was less than the maximum room design temperature of 150°F. The licensee initiated PER 200-0410 to investigate the missing insulation, but was not able (at least initially) to determine when the insulation was removed or how long the pipe was not insulated. The licensee's staff walked down the two other residual heat removal pump rooms and determined that no insulation was missing in these rooms. A work request was generated to re-insulate the Residual Heat Removal Pump A suction piping. The licensee initiated two additional corrective actions, to inspect additional areas of the plant to ensure that no other insulation was missing and to re-investigate the reasons for the missing insulation.

10 CFR Part 50, Appendix B, Criterion III, requires, in part, that design changes, including field changes, shall be subject to design control measures commensurate with those applied to the original design and be approved by the organization that performed the original design. The team determined that the removal of insulation in the Residual Heat Removal Pump Room A was a defacto design change that was not subject to measures commensurate with those applied in the original design, in that no analysis was available to demonstrate that the temperature of the Residual Heat Removal Pump Room A, as configured, would remain below the design temperature of the room. This failure constituted a second example of a violation of 10 CFR Part 50, Appendix B, Criterion III. This Severity Level IV violation is being treated as a noncited violation (50-397/0006-01), consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee's corrective action program under PER 200-0410.

c. Conclusions

A noncited violation of 10 CFR Part 50, Appendix B, Criterion III, was identified concerning suction piping associated with a residual heat removal pump that was not insulated, although design calculations assumed that this piping was insulated.

E1.1.5 Maintenance

a. Inspection Scope

The team reviewed a sample of maintenance programs and procedures implemented for HVAC mechanical equipment to ensure vendor instructions and recommendations were being appropriately implemented in the licensee's maintenance activities.

b. Observations and Findings

The team sampled contractor/vendor information (documents and manuals) identified as applicable to 38 selected fan/coil cooling units to determine the vendor-recommended lubrication instructions for the fan and fan motor assemblies installed in the selected fan/coil units. The team noted that vendor information document "67-00, 73, for H. K. Port Fan/Coil Cooling Units RRA-FC-1, 2, 3 , 4, 5, 6," associated with the reactor building emergency fan coil units, contained the following specific lubrication instructions:

- Page 7-1, Subsection 7.4, "Relubrication Intervals," states, in part, "Frequency of regreasing will vary, depending on the duty hours of operation, temperature and atmospheric dirt and chemical conditions. The minimum interval is six (6) months, which would apply to stand-by service or eight (8) hours per day operation at 135° F maximum ambient temperatures and fairly clean conditions."

- Page 8-4, Subsection 8.4, "Motor Lubrication," states, in part, "Relubrication Period - For relubrication period, follow instructions plate on motor. If no plate is provided, relubricate per page 7-1, 7.4."

When the team inquired if the lubrication instructions provided in the applicable vendor information had been implemented in the maintenance program documents or procedures, the HVAC system engineers stated that this was not the case, and provided the following information:

- The system engineers considered that the vendor lubrication instructions were recommendations only, not mandatory requirements. The fan and fan motor bearings installed in the identified HVAC mechanical equipment were relubricated in accordance with a scheduled lubrication frequency identified in the scheduled maintenance system data base and "skill of the craft."

- The original bearings in a majority of the selected 38 fan and fan motor assemblies had been replaced with newly installed double-sealed bearings. Bearing manufacturers considered the doubled-sealed bearings to be permanently lubricated; therefore, the site maintenance programs had not implemented any lubrication activities for installed doubled-sealed bearings.

- Instead of relubricating some fan and fan motor bearings, the bearings were monitored via a vibration program. When certain vibrations were noted, technicians, by skill of the craft, would relubricate the bearings. The team noted that the system engineers could not provide any procedures that implemented relubrication of fan and fan motor bearings based on identification of a vibration problem, and by the time bearing vibration was detected, the bearing could have experienced damage.

- A review of the equipment history record data base for the 38 selected fan/coil cooling units did not identify any documented operational failure of an associated fan and fan motor assembly as a result of improper bearing lubrication.

The team requested the system engineers to identify actual lubrication activities, instructions, and frequencies performed on the selected 38 fan and fan motor assemblies over the last 3 years. The system engineers reviewed the scheduled maintenance system computerized data base and identified the scheduled lubrication frequencies for each of the 38 selected fan/coil cooling units. For each of the applicable fan and fan motor bearing assemblies, the system engineers provided the team with a documented comparison between the lubrication frequencies identified in the scheduled maintenance system computerized data base and the applicable vendor information.

During the above review, the system engineers found that Fan Unit WMA-FN-52B had been incorrectly retired from the licensee's scheduled maintenance system data base in 1994. The applicable system engineer for Fan Unit WMA-FN-52B reviewed actual maintenance records and determined there were no operational concerns. The system engineer placed Fan Unit WMA-FA-52B back into the scheduled maintenance system data base to ensure needed maintenance activities were performed.

After reviewing the system engineers' comparison between contractor/vendor lubrication instructions and the scheduled maintenance system data base scheduled lubrication activities, the team found that the bearings for 19 fans and the associated fan motors had not been lubricated at a frequency in accordance with the frequency identified in the vendor-supplied instructions.

The team requested copies of the licensee's documentation for the engineering basis for substitution of a bearing vibration monitoring program in place of performing periodic lubrication of the identified fan and fan motor bearings. The team also requested the engineering basis for the currently scheduled lubrication frequencies implemented via the scheduled maintenance system.

The system engineers identified that they could not locate the requested documentation and that additional engineering followup actions would be required to obtain this information. On March 16, 2000, the system engineers noted that followup actions to identify the engineering basis for the above team-requested information would occur as part of the actions to be implemented for the following two plant tracking log entries:

- A163382 - Summary: “Develop a resource-loaded plan with actions and due dates for development of the preventative maintenance basis,” scheduled due date of March 20, 2000. After the inspection, this due date was extended to September 20, 2000.

- A163383 - Summary: “Using the results of the equipment reliability analysis being performed by system engineers, develop a basis for preventative task and frequencies,” scheduled due date of March 03, 2001.

c. Conclusions

The licensee did not have a documented engineering basis for the lubrication schedule of 19 selected fan and fan motor assemblies. Based on equipment history and a vibration program to monitor fan and motor performance, this concern did not affect the operability of the affected units, but demonstrated the lack of a rigorous justification for lubrication practices.

E1.2 Heating, Ventilating, and Air Conditioning Electrical and Instrumentation and Control System

E1.2.1 System Description

The safety-related ventilation dampers and fans, as well as the standby service water system pumps and major valves, are supplied by safety-grade power from all three division ac and dc power systems. During emergency conditions, the associated divisional ac buses are supplied from 4.16 kV 60 Hz diesel generators; dc power is provided from the corresponding safety-related divisional battery set.

The emergency ventilation systems are actuated by high drywell pressure (F signal, nominal 1.68 psig), low reactor vessel level (A signal, nominal -50 inches) or high reactor building ventilation exhaust plenum (Z signal, nominal 13 mr/hr). Motor-operated, outside air inlet bypass dampers for the main control room, cable room, and critical switchgear rooms close on F, A, and Z signals and control room ventilation intake monitor signals.

E1.2.2 Design Review

a. Inspection Scope

The team reviewed licensing basis information, drawings, calculations, design change packages, and related surveillance procedures associated with both the electrical and instrumentation and control aspects of the safety-related HVAC systems including main and remote shutdown control rooms, cable spreading, and critical switchgear rooms, reactor building emergency core cooling system rooms, diesel generator rooms, and standby service water buildings. The design of HVAC support systems such as standby service water were also reviewed. The review focused on two major areas: ensuring electrical safety-related equipment had adequate voltage to perform the intended safety functions, and equipment control logic was consistent with the design and licensing bases.

b. Observations and Findings

Voltage Adequacy During Degraded Grid Conditions

The team observed that Calculations E/I-02-89-02, “Evaluation of the Design of 120 Vac Starter Control Circuits for 480 Vac Motors,” Revision 0; and E/I-02-90-01, “Low Voltage Systems Loading and Voltage Calculations,” Revision 5, used appropriate conservative assumptions and techniques to evaluate voltage drops between the safety grade motor control centers and loads. The assumptions included using elevated temperatures to determine cable resistance, and minimum motor control center bus voltages associated with accident conditions concurrent with degraded grid voltages.

During degraded grid voltage conditions just above those that would result in divorcing the vital buses from the grid, and concurrent with a design basis accident, the available voltage at various components was less than the minimum values specified by the vendor for proper operation. Those loads with less than the minimum required voltages included several Division III loads, such as High Pressure Core Spray Service Water Pump HPCS-P-2, High Pressure Core Spray Service Water Pump Discharge Valve SW-V-29, Diesel Generator Room Exhaust Fan DEA-FN-31, Diesel Generator Room Fan DMA-FN-31; and a Division 2 load, the Control Room Chiller CCH-CR-1B control power transformer.

Inadequate voltage to the Division III pumps, fans, valves, and ventilation dampers could cause the equipment to not start in the case of pumps and fans or to not properly reposition in the case of valves and dampers. This would result in the loss of the high pressure core spray system when it was called upon to operate after an accident.

The loss of the control room chiller would not directly impact accident mitigation because, as noted in the next subsection, the licensee did not take credit for the control room chiller in the mitigation of design basis accidents. However, the failure of Chiller CCH-CR-1B and a single failure resulting in the loss of the Train A control room cooling train would require manual operator action outside the control room to restore adequate cooling to the control room.

Rather than change the plant design to increase the available voltage, install equipment designed to operate at the lower voltage levels, or change the technical specification limiting safety setting allowable value for degraded voltage, the licensee chose to perform one-time tests using Temporary Procedure 8.3.151, “Contactor Degraded Voltage Pickup Test Temporary Procedure,” Revision 0, dated May 27, 1989, for the

Division III components and Work Request AR5964, dated January 16, 1992, for the control room chiller.

The team reviewed the procedures and noted they tested the equipment at the design condition low voltages. The team determined that the tests were justifications for continued operation rather than final engineering solutions to the inadequate voltage problem. The team noted that the tests had not been performed again during subsequent years to ensure equipment maintenance, such as replacement of failed components or aging did not adversely impact the current applicability of the test results. The team consulted with the Office of Nuclear Reactor Regulation staff and determined that testing was an adequate solution only if the circuits were successfully retested on a periodic basis such as every refueling outage and after circuit maintenance activities.

The team identified a potential test preconditioning problem with Temporary Procedure 8.3.151. Calculation E/I-02-90-01 determined the worst-case board voltage for Motor Control Center 4A, associated with the high pressure core spray system, was 415 V. The Temporary Procedure 8.3.151 acceptance criteria for the high pressure core spray system related components was to operate properly at 414 V at the motor control center, which was more conservative than the voltage calculated for worst-case degraded grid voltage. However, before each component was tested at 414 V, it was first tested at 418 V. The team determined that testing at 418 V immediately before testing at 414 V was equipment preconditioning, in that the 418 V test made it more likely that the test at 414 V would be successful as a result of exercising moving parts.

The licensee initiated PER 200-0498 to address the team's concerns with inadequate voltage to some safety-related components and the failure to retest them on a regular basis. The operability assessment attached to the PER addressed minor circuit component heating and friction losses. The team agreed with the licensee's position that testing at 418 V would not invalidate the test results, but also considered that subsequent equipment tests should be performed only at 414 V.

The team agreed with the licensee's position that the affected components were operable, but degraded because the ability to operate at the design voltage had not been rigorously demonstrated. However, the team noted that the equipment could easily be made to function (in the event they were not functional) by divorcing the vital electrical buses from the degraded grid and powering them from the emergency diesel generators.

10 CFR Part 50, Appendix B, Criterion XI, states, in part, that “A test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service. . . .” The team determined that the licensee's test program to demonstrate the operability of components subject to degraded voltage conditions did not assure, for the long-term, that these components would preform satisfactorily in service, in that, retesting to account for changes due to replacement, aging, and maintenance were not included in the test program. This issue was identified as a violation of 10 CFR Part 50, Appendix B, Criterion XI. This Severity Level IV violation is being treated as a noncited violation (50-397/0006-02), consistent

with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee's corrective action program under PER 200-0498.

Control Room Heat Removal

Under normal conditions, control room heat is removed by radwaste building chilled water flowing through cooling coils in Control Room Air Handling Units WMA-CC-51A1 and -51B1. A second (emergency) coil for each unit is provided by a safety-related source of cooling water, either standby service water or chilled water. The second coil is normally aligned to standby service water for Train A and chilled water is aligned to Train B.

As noted on Drawing M-775, "Flow Diagram Emergency Chilled Water Piping System Control Room," Revision 19, and confirmed by the control room HVAC engineer, the licensee continued to use standby service for one train and chilled water on the other train of the control room emergency cooling coils. The standby service water and chilled water systems were redundant and diverse safety grade systems capable of removing control room heat, and, with manual re-alignment, both trains of the control room air handling unit emergency cooling coils can use either of these cooling sources.

During initial plant licensing, the NRC staff raised a concern with the reliance on standby service water to remove control room heat if the nonsafety grade radwaste building chilled water system was lost during a design basis accident. The Final Safety Analysis Report notes the control room temperature could get as high as 104°F in this scenario. In response to the staff's concerns, the licensee committed to install a safety grade chilled water system; installation of the chilled water equipment was License Condition 21.

As previously noted, the normal system configuration called for one control room air handling unit cooler to be lined up to standby service water with the other lined up to chilled water. The reason for this diverse system lineup was that the two chilled water chillers are in the same fire zone; that is, a design basis fire could result in the loss of all control room cooling if both cooling coils were initially lined up to chilled water.

Licensee engineering supervisors stated that although standby service water and control room chilled water were safety related, only standby service water was required for safe shutdown. This situation was reviewed with the NRC staff on March 16, 2000. The staff stated that this condition was acceptable as long as standby service water could be shown to limit maximum control room temperature to 104°F along with an equivalent temperature of 85°F. The team determined that the standby service water system met these criteria.

Control Room Temperature Control

The control room HVAC is designed for automatic operation during normal and emergency conditions by throttling cooling water to the two sets of coils in both control room air handling units (WMA-AH-51A and -51B). During normal operation, Temperature Indicating Controllers WMA-TIC-12A and -12B provide signals to the temperature control valves (WMA-TCV-12A and -12B), which throttle radwaste chilled water flow to Cooling Coils WMA-CC-51A2 and -B2. During accident conditions, Temperature Indicating Controllers WMA-TIC-12A and -12B are designed to throttle control room chilled water or standby service water flow to Emergency Cooling Coils WMA-CC-51A1 and -B1.

The control room chiller and standby service water pumps are designed to start automatically during accident conditions. However, standard operating procedures defeat the automatic control room chiller start feature by not having the corresponding control room chilled water pump control switches in the AUTO position. The licensee's system engineer reported this lineup was preferred because it prevented starting the system when it is not required for cooling. The team noted that a more robust control room chiller start logic would have prevented unnecessary starts (such as by having a room temperature interlock) and relieved operators of unnecessary burdens during normal and emergency conditions.

Additionally, Procedure 2.10.3, "Control, Cable, and Critical Switchgear Rooms HVAC System Operating Procedures," Revision 31, Step 4.5, notes that the control room temperature is not automatically controlled when standby service water is providing the cooling to the Train A air handling unit because one of the permissive devices, SW-PS-11A, is normally closed. The pressure switch is normally isolated because standby service water flow to the associated Train A chiller is isolated when the chiller is not in a standby condition, and only the Train B chiller is left in standby. A more robust control system would not inhibit automatic control valve action in this manner (i.e., would leave the pressure switch in the circuit).

The balance-of-plant system engineering manager reported that an analysis existed to support not requiring operator action for at least 10 minutes to return the control room chiller system to automatic operation if the other control room cooling train was lost due to equipment failure. The individual also reported:

- Although the emergency operating procedures did not require personnel to place the control room chiller train in automatic or swap the cooling coil to standby service water during an accident, symptom-oriented Abnormal Operating Procedure 4.10.2.5, "Control Room High Temperature," Revision 3, Steps 3.1 and 4.5, directed this system reconfiguration;

- Personnel were trained to complete the task;

- Failures in the system are self-disclosing, as evidenced by control room temperature changes; and

- There were mission dose calculations that addressed the transfer from control room chilled water to standby service water cooling during design basis accidents.

The team determined that the normal system alignment with standby service water lined up to one train of control room coolers, control room chilled water lined up to the other train, and neither being in automatic was an undeclared operator work-around reflecting a less than optimal control system, but was acceptable because the large WNP-2 control room would not experience rapid temperature changes during the early stages of an accident.

High Pressure Core Spray Starting Logic Inconsistent with Final Safety Analysis Report Description

Section 9.2.7.5 of the Final Safety Analysis Report states, in part, “To avoid excessive system surge pressures, the SW [standby service water] pumps are started only if the associated pump discharge valve is closed.” Using Electrical Schematics ESD-58E-002, “Standby Service Water Pump SW-P-1A Electrical Wiring Diagram,” Revision 20, and ESD-58E-002A, “Standby Service Water Pump SW-P-1A Electrical Wiring Diagram,” Revision 4, the team verified that Standby Service Water Pumps SW-P-1A and -1B start logic included a check that the associated discharge valve was shut prior to starting the pumps.

However, high pressure core spray Standby Service Water Pump HPCS-P-2 did not have similar logic to ensure that its Discharge Valve SW-V-29 was shut prior to automatically starting.

The licensee addressed this discrepancy in PER 200-0489, and determined that the Final Safety Analysis Report was incorrect because, although the emergency diesel generators have the capability to run for approximately 2 minutes without service water cooling, the high pressure core spray diesel generator does not have this ability, and requires cooling water as soon as possible. The 60-second stroke time associated with opening Valve SW-V-29 would not permit adequate cooling to this diesel engine.

10 CFR 50.71(e) states, in part, that the Final Safety Analysis Report shall be periodically updated to assure that the Final Safety Analysis Report contains the latest material developed. In this case, the licensee's update program failed to assure that the description of the high pressure core spray standby service water pump was consistent with the design. This error was not discovered during the licensee's initial Final Safety Analysis Report validation effort, although additional reviews were pending. The failure to assure that the Final Safety Analysis Report contains correct and accurate information was identified as a violation of 10 CFR 50.71(e). This Severity Level IV violation is being treated as a noncited violation (50-397/0006-03), consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee’s corrective action program under PER 200-0489.

<u>Licensee Controlled Specification for Area Temperature Monitoring Inconsistent with Final Safety Analysis Report</u>

On April 19, 1999, the licensee identified in PER 299-0801 that Licensee Controlled Specification 1.7.1 (area temperature monitoring) was nonconservative with respect to Final Safety Analysis Report, Table 3.11-1. The licensee controlled specification permitted a 30°F allowance above the specified maximum temperature before declaring equipment inoperable; this allowance was not considered when evaluating equipment qualification and instrument setpoint uncertainties. There were also several inconsistencies identified between the licensee controlled specification, Final Safety Analysis Report Table 3.11-1, and plant surveillance procedures, as well as, a failure to translate several Final Safety Analysis Report requirements into the licensee controlled specification, such as minimum temperatures and upper limits for such areas as the cable corridor and steam tunnel.

The electrical and instrumentation and control design engineering supervisor informed the team that a night order was issued when the problem was discovered, eliminating the use of the 30°F allowance before equipment was declared inoperable.

During the investigation into these issues, the licensee’s representative noted that the 30°F allowance issue was previously identified in PER 289-0760, but was not fully addressed at the time of issuance because the PER was closed by referencing a plant tracking list item (i.e., PTL 28309). However, PTL 28309 was voided, and the PER was not updated to show this.

Subsequent licensee analysis of PER 299-0801 resulted in the generation of PER 200-0194 on February 7, 2000, for failure to include correct temperature-related uncertainties for Low Pressure Core Spray Relay E-RLY-LPCS/62/1 and Residual Heat Removal Relay E-RLY-RHRA/62/1. The licensee determined that the affected systems were operable, but potentially degraded or non-conforming. The licensee's proposed corrective actions for this problem, revision of instrument uncertainties for the relays and possible revision of the setpoints, was determined by the team to be an appropriate approach for resolving these issues.

<u>Service Water Flow Instrument Uncertainty</u>

Based on the significant heat load in the diesel generator rooms, the team requested instrument uncertainty calculations for the standby service water flow indicators to the diesel generator room coolers. The licensee’s representative reported there was no instrument uncertainty calculations for these indicators because they were not associated with a specific setpoint. As such, the licensee was not able to provide a documented analysis to support the instrument uncertainty assumption used in Calculation ME-02-95-25, “Evaluation of Standby Service Water Capability,” Revision 0. Page 5 of Calculation ME-02-95-25 included the statement “[t]hat data has, of course, inherent uncertainties, and those are accounted for by reducing flow rates by 5 percent.”

The standby service water system flow elements are American Society of Mechanical Engineers orifices accurate to 1 percent, and the associated flow indicators, Dwyer Series 4000 Capsuhelic differential pressure gages have a stated accuracy of 2 percent. These flow indicators were used in Procedures O.P-SW-M101, -M102, and -M103, “Standby Service Water Loop A (B, C) Valve Position Verification,” Revisions 7, 4, and 3, respectively, to balance the standby service water flow to the various safety-related loads. The team noted a significant number of these flow indicators may not have been working properly during the inspection. The standby service water system engineer claimed that all of the relevant flow loops were properly calibrated when the standby service water loads were balanced, but was not able to explain why 9 of the 29 easily accessible standby service water flow loops with Dwyer series 4000 Capsuhelic differential pressure gauges were indicating significant flow or were pegged low when there was no flow in the system. This issue is further discussed in Section E1.2.4 of this report.

The licensee initiated PER 200-0503 to identify the basis for the 5 percent value and stated that the nine aberrant flow indicators would also be addressed under the same PER.

The team agreed that the 5 percent uncertainty assumption for the flow indicators was conservative and bounding. However, the licensee failed to have instrument uncertainty calculations or analyses for local standby service water flow indicators that were used to support technical specification system test acceptance criteria.

Minor Design Document Discrepancies

The team identified minor design document discrepancies that were discussed with the licensee’s staff.

c. Conclusions

A noncited violation of 10 CFR Part 50, Appendix B, Criterion XI, was identified concerning the failure to periodically verify that Division III electrical components would operate during limiting degraded grid conditions.

The normal system alignment with standby service water lined up to one train of control room coolers, control room chilled water lined up to the other train, and neither being in automatic was an undeclared operator work-around reflecting a less than optimal control process.

A noncited violation of 10 CFR 50.71(e) was identified concerning the failure to assure that the Final Safety Analysis Report description of the high pressure core spray standby service water pump was consistent with the design.

The licensee failed to have instrument uncertainty calculations or analyses for local standby service water flow indicators that were used to support technical specification system test acceptance criteria.

E1.2.3 Modifications/Temporary Modifications

a. Inspection Scope

The team reviewed Basic Design Change 88-0038-16, “E-CP-H13/P811 Recorder Upgrade,” for consistency with the plant initial design and licensing basis.

b. Observations and Findings

The licensee removed the nonsafety grade control room humidifiers because initial design problems prevented the system from working properly, and an analysis indicated that the control room relative humidity would not decrease significantly below 20 percent without the humidifiers. The team questioned the validity of this expectation as it pertained to design basis accident conditions when only standby service water was cooling the control room. Under these conditions, the team was concerned that relative humidity could drop below the minimum of 10 percent stipulated in GE Document 22A3008, when dry bulb temperature increased to its maximum design value of 104°F.

The team questioned the ability of control room electronic equipment to work properly in very low humidity conditions, which intensifies electrostatic discharge problems. The team noted that many of the control room recorders were replaced with digital recorders approximately 10 years ago. Approximately 34 of these recorders are safety related; some of these are required to operate under Regulatory Guide 1.97 (Instrumentation for Light-Water-Cooled Nuclear Power Plants To Assess Plant and Environs Conditions During and Following an Accident)**,** Category 1, post-accident conditions.

Basic Design Change 88-0038-16 was one of the most recent recorder replacement design changes, was approved on January 4, 1991, and was implemented during the Spring 1992 refueling outage. This design change replaced the standby gas treatment fan discharge flow recorders, the primary containment oxygen and hydrogen concentration recorders, and the hydrogen recombiner temperature and flow recorders.

Procurement Specification 17560, Release 5, Revision C, Section D, required the recorders to operate in the temperature range of 32 to 120°F and 10 to 90 percent relative humidity. The team noted the requirements were conservative with respect to control room temperature and relative humidity requirements in GE Document 22A3008, which provided limits of 40 to 120°F and 10 to 60 percent relative humidity.

When questioned about the ability of the recorders to operate under low humidity conditions, the licensee's representative stated that the manufacturer’s specified environment for the recorders was between 20 and 80 percent relative humidity for 21 of the safety-related replacement recorders, and 45 to 80 percent relative humidity for the other 13 safety-related replacement recorders. All of the recorders affected by Basic Design Change 88-0038-16 were safety related. In the 45 percent minimum relative humidity group, the certificate of conformance provided by the licensee, dated March 14, 1989, indicated the recorders were “tested in accordance with all applicable Yokogawa Standards and Specifications”; there was no mention of conformance to the licensee’s procurement specifications.

The licensee’s representative agreed that the recorders were purchased as commercial grade equipment and, therefore, should have undergone a commercial grade dedication process before being used as safety-related equipment. The team reviewed the design safety analysis section of the design change, as well as, the 10 CFR 50.59 safety evaluation, but did not note any references to electrostatic discharge hazards, commercial grade dedication, or equipment operation in low humidity conditions.

The licensee’s representatives agreed that they failed to ensure that the recorders were qualified in accordance with the procurement specification requirements and initiated PER 200-0492.

The team reviewed the initial operability assessment where the licensee documented that the recorders were properly grounded and shielded, and that good electrostatic discharge prevention design and manufacturing practices were used by the vendor. The recorders have been in place for approximately 10 years and the licensee’s staff stated that there have been no failures that can be attributed to electrostatic discharge or low relative humidity. As a result of this issue, the licensee’s staff contacted the vendor’s representatives, who noted 10 of the recorders in the minimum 45 percent relative humidity group were satisfactorily tested in 20 percent relative humidity at 104°F, and the other 3 were satisfactorily tested in 30 percent relative humidity at 122°F. Based on these facts, the team determined that there was a high degree of confidence the recorders would operate properly under limiting low humidity conditions.

10 CFR Part 50, Appendix B, Criterion VII, states, in part, that measures shall be established to assure that purchased equipment conform to the procurement documents. In this instance, the licensee failed to assure that the control room digital recorders conformed to the minimum humidity requirements noted in the procurement specification. This was considered a violation of 10 CFR Part 50, Appendix B, Criterion VII. This Severity Level IV violation is being treated as a noncited violation (50-397/0006-04), consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee’s corrective action program under PER 200-0492.

c. Conclusions

A noncited violation of 10 CFR Part 50, Appendix B, Criterion VII, was identified for the failure to ensure that procured control room digital recorders met minimum humidity requirements noted in the procurement specification.

E1.2.4 Walkdowns

a. Inspection Scope

The team completed several walkdowns in areas associated with safety-related HVAC electrical and instrumentation and control systems. These areas included all three diesel generator rooms, the reactor core isolation cooling room, the high pressure core spray pump room, the Residual Heat Removal Pump 2C room, the main control room, the remote shutdown room, the cable spreading room, the critical switchgear room, both standby service water pump houses, and the control room chiller rooms.

b. Observations and Findings

All three standby service water pumps were off during the walkdowns, but some of the local flow indicators for HVAC cooling coils indicated significant flow, and others were significantly less than zero, including some that were pegged low. Neither the HVAC nor the standby service water system engineer was aware of these questionable indications. The standby service water system engineer checked all 28 easily accessible flow indicators with no flow in the system and identified 9 as being questionable because they exhibited characteristics similar to those noted by the team.

Problem Evaluation Request 298-0147 documented a recurring problem with Flow Indicator SW-FI-8B (standby service water flow to Diesel Generator 3 Room Cooler DMA-CC-32). This device indicated there was flow in the system, but none existed. Problem Evaluation Request 298-0147 was closed based on trouble shooting conducted by a work order during the Fall 1999 refueling outage.

After the Fall 1999 refueling outage and sometime before the end of 1999, the previous standby service water system engineer, according to the licensee’s staff, identified that Flow Indicator SW-FI-8B was indicating flow again when there was no flow in the system, but failed to either re-open PER 298-0147 or initiate another one. As a result of this failure, the current system engineer, who had been the system engineer for approximately 3 months, was not aware that Flow Indicator SW-FI-8B was falsely indicating flow. The failure of the former system engineer to either revise PER 298-0147 or initiate a new PER was not consistent with the licensee’s corrective action program.

10 CFR Part 50, Appendix B, Criterion V, states, in part, that activities affecting quality shall be performed in accordance with appropriate procedures. Procedure SWP-CAP-01, “Problem Evaluation Requests,” Revision 1, Section 3.1.1, states, in part, that “any individual identifying a condition that warrants correction should initiate a PER” in accordance with the provisions of the procedure. The failure to initiate a PER to correct a faulty flow indicator (SW-FI-8B) was considered a violation of 10 CFR Part 50, Appendix B, Criterion V. This Severity Level IV violation is being treated as a noncited violation (50-397/0006-05), consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee’s corrective action program under PER 200-0483.

c. Conclusions

A noncited violation of 10 CFR Part 50, Appendix B, Criterion V, was identified for the failure to initiate a PER to properly document and correct a flow sensor that was falsely indicating flow in a stagnant run of piping.

E2 Engineering Support of Facilities and Equipment

E2.1 10 CFR 50.59 Safety Evaluations (37001)

a. Inspection Scope

The team performed a review of the licensee's safety evaluation program to determine if recent plant or document changes made under this program were in accordance with the requirements of 10 CFR 50.59. The team reviewed Procedure PPM 1.3.43, "Licensing Basis Impact Determinations," Revision 15; a sample of 16 CFR 50.59 screenings from 1997 through 2000; a sample of 14 10 CFR 50.59 safety evaluations from 1998 through 1999; and the training and qualification records of personnel who performed 10 CFR 50.59 screenings and evaluations.

b. Observations and Findings

General

The team found that 10 CFR 50.59 evaluations were performed in accordance with applicable procedures, and were comprehensive, of good quality, and technically adequate. The team reviewed the training records of engineers who had either performed or reviewed 10 CFR 50.59 screenings or safety evaluations and found that each person was appropriately qualified.

10 CFR 50.59 Screenings

Temporary Modification Request TMR 99-26, dated September 7, 1999, installed jumpers to eliminate nuisance alarms from the oscillating power range monitor system. This system was installed to assist in controlling reactor power in the regions of flow instability. The 10 CFR 50.59 screening, dated September 7, 1999, stated that the function of the oscillating power range monitor system "is not described in the licensing documents." Therefore, a safety evaluation was not performed to determine whether an unreviewed safety question was involved.

The licensee installed the oscillating power range monitor system in May 1999, and had previously issued a licensing document change notice on January 30, 1999, that incorporated the oscillating power range monitor system into the Final Safety Analysis Report. It was in a test mode at that time and the protective functions of the reactor protection system scram were bypassed. Section 7.1.2.4 of the Final Safety Analysis Report, which was in place on September 7, 1999, addressed the interface of the oscillating power range monitor and the bypass inoperability status indication systems.

Therefore, the September 7, 1999, change constituted a change to the facility as described in the Final Safety Analysis Report, and a safety evaluation was required. Licensee representatives speculated that the reason for the failure to perform an evaluation was confusion on the status of the system, in that, though installed, it was not fully functional.

10 CFR 50.59 (b)(1) states, in part, that the licensee shall maintain records of changes in the facility to the extent that these changes constitute changes to the facility as described in the Final Safety Analysis Report, and that these records must include a written safety evaluation. In this instance, on September 7, 1999, the licensee changed the facility as described in the Final Safety Analysis Report, but failed to perform and maintain a safety evaluation of the change. This was considered to be the first example of a violation of 10 CFR 50.59 (b)(1). This Severity Level IV violation is being treated as a noncited violation (50-397/0006-06), consistent with Section VII.B.1.a of the Enforcement Policy. This violation is in the licensee’s corrective action program as PER 200-0456. After the inspection, the team was informed by a licensee representative that a safety evaluation had been performed for this change and that no unreviewed safety question was identified.

Basic Design Change 98-0081-0A replaced the Woodward 0.33 amp power supply (DG-E/S-DG1/A7) with a Lambda 2.1 amp power supply. During troubleshooting of the Division 2 diesel generator, it was identified that the Woodward power supply was undersized and needed to be replaced. The power supply fed the speed switch electronics and the speed switch auxiliary relays in the diesel generator control panel. In the screening, the activity was determined to not change the facility as described in the Final Safety Analysis Report. Therefore, a safety evaluation was not performed to determine if an unreviewed safety question was involved.

Figure 8.3-14 of the Final Safety Analysis Report, “DG1 Governor Speed Control,” which identifies Power Supply DG-E/S-DG1/A7, was changed to reflect this modification. In the previous Final Safety Analysis Report, Figure 8.3-14, the old design, Woodward, was shown with four terminals, whereas the revised Figure 8.3-14 showed the new design, Lambda, with six terminals. The licensee's representative stated that an evaluation was not performed because it was felt that the change was editorial in nature, i.e., revising identification numbers to components already on the drawing (without changing the safety class or material of the component). The team did not agree with this position, since the amperage and the Final Safety Analysis Report drawing had changed. Subsequent to the inspection, a licensee representative notified the team that PER 200-0537 had been written against this finding.

10 CFR 50.59 (b)(1) states, in part, that the licensee shall maintain records of changes in the facility to the extent that these changes constitute changes to the facility as described in the Final Safety Analysis Report, and that these records must include a written safety evaluation. In this instance, on August 16, 1998, the licensee changed the facility as described in the Final Safety Analysis Report, but failed to perform and maintain a safety evaluation of the change. This was considered to be the second example of a violation of 10 CFR 50.59 (b)(1). This Severity Level IV violation is being treated as a noncited violation (50-397/0006-06), consistent with Section VII.B.1.a of the Enforcement Policy.

This violation is in the licensee's corrective action program as PER 200-0537. After the inspection, the team was informed by a licensee representative that a safety evaluation had been performed for this change and that no unreviewed safety question was identified.

c. Conclusions

Selected 10 CFR 50.59 safety evaluations were comprehensive and of good quality. Two examples of a noncited violation were identified by the team of screenings that incorrectly concluded that a full safety evaluation was not required.

E2.2 Temporary Modifications

a. Inspection Scope

The team reviewed Procedure PPM 1.3.9, "Temporary Modifications," Revision 25, and 13 temporary modifications listed in the attachment to assess the licensee's temporary modification program and its implementation. 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 properly considered. In addition, the team physically examined the current temporary modification installations in the plant.

b. Observations and Findings

General

The team requested a list of all temporary modifications initiated since January 1998 and any installed temporary modifications that were currently open, regardless of installation date. The team found that 66 temporary modifications had been initiated since January 1998, but only 10 remained open. The team reviewed the 10 open temporary modification packages and inspected the existing installations. The team also reviewed three temporary modifications that were recently closed. In addition, the team verified that current temporary modification package information and temporary modification logs were maintained in the control room.

Risk Information

Procedure 1.3.9, Section 2.16, states, "Prior to TM installation, evaluation of the effects of the modification on plant safety and availability using the WNP-2 Probabilistic Safety Analyses should be considered. Often, probabilistic safety analyses can provide quantitative indication of the safety and availability effects of the TM on the plant (in its expected configuration). Probabilistic safety analysis should be an integral part of maintaining an optimal risk profile. Contact Engineering for assistance as necessary."

Interviews by the team with system engineers and probabilistic risk analysis engineers could not establish a time when anyone obtained risk information for a temporary modification. The procedure check list, “Temporary Modification Request Technical Review,” did not have an entry regarding risk information. None of the current temporary modifications reviewed by the team had any information about risk documented in the modification packages.

The licensee documented this observation in its corrective action program as PER 200-0429. The procedural requirement uses the word “should” rather than “shall.” However, the licensee, as part of the PER, intended to review current temporary modifications to assure that there was no risk impact. In addition, the licensee planned to revise the procedure to provide better direction and documentation of this expectation.

Splash Guards

During the walkdown of the standby service water system, it was noted by the team that Standby Service Water Pumps 1 and 2, as well as, the high pressure core spray standby service water pump had splash guards installed around the pump shaft to deflect water spray. There was no log entry and no temporary modification package for the installation of these splash guards.

After this condition was identified by the team, the licensee reviewed the condition and concluded that a temporary modification was not required because the shields did not change the design function of the pumps and were below the level of detail of the design. The team agreed with this position; however, there was a concern about how this configuration could change with time. The bailing wire used could become rusted and require replacement with perhaps strapping or angle iron. Heavier metals could then bring forth a seismic question, i.e., the support material coming lose during an earthquake and interfering with the shaft rotation. The team observed this to be an example of system engineering lacking a questioning attitude in that this question had not been explored by the licensee.

c. Conclusions

The team concluded that the licensee’s temporary modification process was satisfactory. One minor exception was an isolated case of a failure to implement a procedural recommendation to use risk information.

E2.3 Plant Evaluation Requests/Operability Determinations

a. Inspection Scope

As part of a focused review, the team reviewed 39 PERs, five technical evaluation requests, and 29 assessments of operability. The team met with licensee personnel to discuss many of the corrective action documents selected for review.

b. Observations and Findings

The team found that the technical evaluation requests and the followup assessments of operability were adequate. Some issues were identified associated with PERs, as discussed below:

Problem Evaluation Request 298-0031

The team reviewed PER 298-0031, dated January 12, 1998, which documented unexpected leakage from a rupture disc in the safety-related chilled water system. The PER stated that a valve lineup problem caused service water to over-pressurize chilled water, thus rupturing the disc. The team determined that standby service water and chilled water can both be used to supply cooling water to the control room chillers and that there had been numerous failures in the past where the rupture disc in the chilled water system had failed due to being pressurized by service water. The design pressure of the service water system was 309 psig and the design pressure of the chilled water system was 100 psig.

In discussions with the team, licensee operations personnel stated that they believed that the event discussed in PER 298-0031 did not result from a valve lineup problem since the rupture disc did not rupture, but exhibited only pinhole leaks. This was in conflict with the assertion in the PER that pin hole leaks were caused by valve lineup problems. The PER further stated that the preliminary examination of the failure did not indicate any evidence of over-pressurization. In addition, the PER stated that no corrective actions were recommended since the failure rate history had been acceptable since 1985, when operating procedure changes to the chilled water system were implemented. Eight rupture disc failures had occurred since 1985. Seven of these failures occurred between 1985 and 1994 and all of these were considered by the licensee to have been caused by valve lineup problems. The licensee's representatives stated that the 1998 failure was caused by fatigue during system fill and vent operations. The team noted that the PER did not discuss this failure mode. The team observed that the PER was inaccurate and misleading, since it did not state the actual cause for the failed rupture disc. However, the team considered that the the overall corrective action, given the low safety significance, was adequate.

Problem Evaluation Request 299-0620

The team reviewed PER 299-0620, dated March 29, 1999, which documented that Control Room Chiller CCH-CR-1A failed its monthly surveillance test. The licensee's representative stated that on December 14, 1998, a work request had been generated stating that the chiller lube oil pressure was approximately 59 psig and that the filter should be cleaned. The normal chiller lube oil pressure is approximately 90 psig with a clean filter. The team noted that licensee personnel had recognized in December 1998 that the chiller lube oil pressure was degraded. However, no correction actions were taken to clean the filter.

In March 1999, the chiller failed to start during a surveillance test because of a low lube oil pressure trip caused by the clogged filter. Licensee personnel stated that the filter was almost completely blocked. The chiller lube oil trip setpoint was 28 to 30 psig. The team reviewed the surveillance tests for the chiller between December 1998 and the failed surveillance test in March 1999 to determine if lube oil pressure was recorded. The team noted that Surveillance Procedure *OSP-CCH/IST-M701, "Control Room Emergency Chiller System A Operability," Revision 1, only required that the lube oil pressure was to be verified to confirm that lube oil pressure was 30 psig or greater. Thus, the surveillance procedure failed to provide a margin to the trip setpoint to assure that the chiller remained operable until the next surveillance test. The licensee's personnel initiated PER 200-0481, dated March 14, 2000, which addressed this issue. The licensee's personnel revised the surveillance procedure to require that the oil pressure be recorded during testing, and if the pressure drops below 60 psig, the chiller shall be declared inoperable and a work request initiated to change the oil filter.

The team determined that the surveillance procedure was inadequate since the procedure failed to provide an adequate margin between the trip setpoint and the lube oil pressure verified in the procedure.

10 CFR Part 50, Appendix B, Criterion V, requires, in part, that activities affecting quality shall be prescribed by documented procedures and the procedures shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. The team determined that the surveillance test procedure for the control room chiller did not contain appropriate acceptance criteria with respect to lube oil pressure, such as, to ensure that the chiller would remain functional during the next surveillance interval. This failure constituted the second example of a violation of 10 CFR Part 50, Appendix B, Criterion V. 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 PER 200-0481 (50-397/0006-05).

c. Conclusions

A noncited violation of 10 CFR Part 50, Appendix B, Criterion V, was identified for an inadequate surveillance test procedure associated with the control room chiller.

In addition, the team noted that two PERs were inaccurate or narrowly focused.

V. Management Meetings

XI Exit Meeting Summary

The team presented the preliminary inspection results in an exit meeting to members of licensee management on March 16, 2000. A supplemental exit meeting was conducted by telephone on April 26, 2000. The licensee's management acknowledged the findings presented.

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

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Arbuckle, Licensing Technical Assistant
D. Atkinson, Manager, Engineering
J. Bekhazi, Technical Services
B. Boyum, Assistant Engineering Manager
P. Inserra, Licensing Manager
C. King, Manager, Design Engineering
W. LaFramboise, Engineering Supervisor
A. Langdon, Assistant Manager, Technical Services
S. Oxenford, Operations Manager
G. Smith, Vice President, Generation/ Plant General Manager
R. Torres, Technical Services Manager

NRC

D. Powers, Acting Chief, Engineering and Maintenance Branch
J. Rodriquez, Resident Inspector

INSPECTION PROCEDURES USED

37001	10 CFR 50.59 Safety Evaluation Program
93809	Safety System Engineering Inspection (SSEI)

ITEMS OPENED AND CLOSED

Opened and Closed

50-397/0006-01	NCV	Errors in Calculations and Configuration Control (Sections E1.1.2 and E1.1.4)
50-397/0006-02	NCV	Inadequate Test Program to Demonstrate Operability Under Degraded Voltage (Section E1.2.2)
50-397/0006-03	NCV	Final Safety Analysis Report Error in Description of High Pressure Core Spray Pump Control Circuit (Section E1.2.2)
50-397/0006-04	NCV	Procured Control Room Recorders Failed to Meet Procurement Specification (Section E1.2.3)
50-397/0006-05	NCV	Inadequate Procedure and Failure to Follow Procedure (Sections E1.2.4 and E2.3)
50-397/0006-06	NCV	Two Examples of Failure to Perform 10 CFR 50.59 Safety Evaluation (Section E2.1)

DOCUMENTS REVIEWED

Procedures

1.4.5, “Processing of Licensing Document Changes,” Revision 16

1.5.13, “Predefined Parameter Data System,” Revision 7

10.2.13, “Approved Lubricants,” Revision 20

OSP-RHR/IST-Q702, “RHR Loop A Operability Test,” Revision 7

SWP-CAP-01, “Problem Evaluation Requests,” Revision 1

SWP-MAI-01, “Work Management - Planning, Scheduling and Work Activities,” Revision 5

SWP-PRO-02, “Preparation, Review, Approval, and Distribution of Procedures,” Revision 7

MSP-WMA-B103, “Control Room Div-A Filtration System Carbon Adsorber Test,” Revision 2

*4.12.4.1, “Fire,” Revision 23

*10.25.105, “Motor Control Center and Switch Gear Maintenance,” Revision 11

*1.3.1, “WNP-2 Operating Policies, Programs and Practices,” Revision 43

*OSP-CCH/IST-M701, “Control Room Emergency Chiller System A Operability,” Revision 3

1.4.3, “Instrument Setpoints,” Revision 19

O.P.-ELEC-M702, “Diesel Generator 2 - Monthly Operability Test,” Revision 9

O.P.-ELEC-S701, “Diesel Generator 1 Semi-Annual Operability Test,” Revision 10

4.10.2.5, “Control Room High Temperature,” Revision 3

2.10.3, “Control, Cable, and Critical Switchgear Rooms HVAC System Operating Procedures,” Revision 31

O.P.-SW-M101, “Standby Service Water Loop A Valve Position Verification,” Revision 7

O.P.-SW-M102, “Standby Service Water Loop B Valve Position Verification,” Revision 4

O.P.-SW-M103, “HPCS Service Water Valve Position Verification,” Revision 3

TP 8.3.151, “Contactor Degraded Voltage Pickup Test Temporary Procedure,” Revision 0

*1.3.9, “Temporary Modifications,” Revision 25

*1.3.43, “Licensing Basis Impact Determinations,” Revision 15

OSP-SW-M101, “Standby Service Water Loop A Valve Position Verification,” Revision 7

TSP-SW-A101, “Service Water Loop A Cooling Coil Heat Load Capacity Test,” Revision 0

Calculations

7.10.05, “Heat Release in Main Control Room,” Revision 0

9.10.01, “HVAC – Outside Design Conditions,” Revision 0

9.24.02, “DG Building Room Temperature During Extreme Conditions,” Revision 1, plus CMRs 98-0232 and 99-0309

9.32.00, “HVAC – Control Room, Cable Spread Room and Critical Switchgear Room,” Revision 5, plus CMRs 91-0245, 94-0154, 94-0155, and 95-0321

9.32.02, “HVAC - Control Room Emergency Chiller System,” Revision 1

9.32.21, “Radwaste Building - Control Room Supply - WMA-AH-51A,” Revision 1

9.32.25, “Control Building – Critical Switchgear - WMA-AH-53A,” Revision 1

9.32.27, “Control Bldg. Emergency Filtration Unit WMA-FU-54B,” Revision 1

9.46.03, “HVAC Control Room Emergency Chiller System,” Revision 2, plus CMRs 92-0536 and 93-0147

9.49.54, “Control Room - Infiltration (Leakage) Rate to Space,” Revision 0

ME-02-92-40, “HVAC Systems,” Revision 0

ME-02-92-41, “Ultimate Heat Sink Analysis,” Revision 4

ME-02-92-43, “Room Temperature Calculation for DG Building, Reactor Building, Radwaste Building and Service Water Pumphouse Under Design Basis Accident Conditions,” Revision 5, plus CMRs 99-0101 and 99-0116

ME-02-92-56, “Room Temperature Calculation for DG Bldg. Corridors (D104 & D113), RW Bldg. Corridor (C121), Cable Chase (C230), and Rail Bay Under Accident Conditions,” Revision 1, plus CMRs 94-1204, 94-0703, 99-0037, and 99-0048

ME-02-93-76, “Cooling Loads for the Control Room Under Normal and Accident Conditions with all Non-Emergency Lighting Turned Off in the Adjacent Areas,” Revision 0

NE-02-94-19, “Secondary Containment Drawdown Analysis,” Revision 0, plus CMRs 95-0206, 95-0199, and 96-0211

ME-02-95-25, “Evaluation of Standby Service Water Capability,” Revision 0, plus CMRs 99-0049 and 99-0080

E/I-02-92-1073, “Drywell Pressure Instrument Loop MS-PS-48A, B, C, D Setting Range and Allowable Value, Revision 2

E/I-02-90-01, “Low Voltage Systems Loading and Voltage Calculations,” Revision 5

E/I-02-89-02, “Evaluation of the Design of 120 VAC Starter Control Circuits for 480 VAC Motors, Revision 0

Drawings

M-544, “Flow Diagram – HVAC – Standby Gas Treatment – Reactor Building,” Revision 64

M-545-1, “Flow Diagram – Heating, Ventilation and Air Conditioning – Reactor Building,” Revision 68

M-545-2, “Flow Diagram – Heating, Ventilation and Air Conditioning – Reactor Building,” Revision 6

M-545-3, “Flow Diagram – Heating, Ventilation and Air Conditioning – Reactor Building,” Revision 17

M-548, “Flow Diagram – HVAC for Control & Switchgear Room – Radwaste Building,” Revision 86

M-549, “Flow Diagram – Heating Ventilating & Air Conditioning – Radwaste Building,” Revision 53

M-551, “Flow Diagram – HVAC Circ. & MU Water, S.W. Pump Houses & Diesel Generator Bldg.,” Revision 51

M-775, “Flow Diagram – Emergency Chilled Water Piping System – Control Room,” Revision 19

E-774, “Radwaste & Control Building Lighting Panel Schedule,” Revision 37

CVI No. 02-67-00 Sh. 337, “Marlo Cooling Coil Performance Graphs,” no revision given

81E003, “Reactor Building Emergency Cooling System Fan RRA-FN-1 Schematic,” Revision 8

81E004, “Reactor Building Emergency Cooling System Fan RRA-FN-2 Schematic,” Revision 6

81E005, “Reactor Building Emergency Cooling System Fan RRA-FN-3 Schematic,” Revision 8

ESD-58E-002, “Standby Service Water Pump SW-P-1A Electrical Wiring Diagram,” Revision 20

ESD-58E-002A, “Standby Service Water Pump SW-P-1A Electrical Wiring Diagram,” Revision 4

ESD-58E-039, “Standby Service Water Pump HPCS-P-2 Electrical Wiring Diagram,” Revision 10

EWD-84E-001, “WMA-AD-51A1 Electrical Wiring Diagram,” Revision 14

EWD-84E-008, “Fan WMA-FN-51A Electrical Wiring Diagram,” Revision 7

EWD-84E-015, “Fan WMA-FN-54A Electrical Wiring Diagram,” Revision 16

EWD-84E-017, “WMA-AD-54A2 Electrical Wiring Diagram," Revision 19

EWD-84E-025, “Dampers WMA-AD-54A1 and WMA-AD-54B1 Electrical Wiring Diagram," Revision 11

EWD-84E-044, “CCH-P-1A Electrical Wiring Diagram," Revision 8

M544, “Standby Gas Treatment Flow Diagram," Revision 64

M545-1, “Reactor Building HVAC Flow Diagram,” Revision 68

M545-2, “Reactor Building HVAC Flow Diagram,” Revision 6

M545-3, “Reactor Building HVAC Flow Diagram,” Revision 17

M548, “Control & Switchgear Room HVAC Flow Diagram,” Revision 86

M551, “SW Pump Houses & D.G. HVAC Flow Diagram,” Revision 51

M620 Sh 545-4, “Reactor Building Heating and Ventilating Logic,” Revision 7

M775, “Emergency Chilled Water Flow Diagram,” Revision 19

Problem Evaluation Requests

290-0082	297-0091	297-0475	297-0854	298-0239
290-0399	297-0102	297-0490	297-0870	298-0628
295-0435	297-0219	297-0627	297-0933	298-1075
295-1127	297-0400	297-0696	298-0031	298-1107
		297-0800	298-0147	298-1184

298-1187	299-0111	299-1699	200-0411	200-0489
298-1416	299-0519	299-1778	200-0429	200-0490
298-1894	299-0620	299-1833	200-0452	200-0492
298-1978	299-0699	299-2744	200-0456	200-0498
298-2028	299-0797	200-0194	200-0481	200-0503
299-0029	299-0801	200-0409	200-0483	200-0537
299-0102	299-1177	200-0410		

Technical Evaluation Requests

97-0018
97-0138
98-0068
99-0042
99-0049

Calculation Modification Records

96-0211
00-0255
00-0267
00-0289
00-0292

Follow-Up Assessments of Operability

297-0653	297-0997	298-0243	298-0997	299-2257
297-0673	297-1036	298-0290	298-1115	299-2281
297-0697	298-0149	298-0600	298-1587	299-2753
297-0895	298-0173	298-0663	299-0278	200-0191
297-0900	298-0222	298-0672	299-1431	200-0194
297-0996	298-0232	298-0887	299-1824	

Safety Evaluations

SE-98-0009, “Removal of Valves RRC-V-915 and 916,” Revision 0

SE-98-0043, “Remove residual heat removal Valves RHR-V-606 and 631 vent valves,” Revision 1

SE-98-0044, “De-energize reactor closed cooling electric heating coil to cause temperature control Valve RCC-TCV-72A to fail in the open position,” Revision 1

SE-98-0050, “Gaps on jet pump inlet mixer to riser bracket set screws,” Revision 0

SE-98-0059, “Status of low pressure ECCS minimum flow control valves when in standby mode,” Revision 0

SE-98-0060, “Replace equipment drains radioactive system flow transmitter,” Revision 0

SE-98-0065, “Revise path for removal and reinstallation of RHR Pump 2C,” Revision 0

SE-98-0091, “Installing redundant vacuum breakers and a check valve in fire protection system,” Revision 0

SE-99-0004, “The core monitoring system (POWERPLEX) input deck was modified to include a .03 penalty to compensate for potential non-conservative monitored operating limit maximum critical power ratio values for SVEA-96 reload,” Revision 0

SE-99-0013, “The installation of vacuum breakers to certain standpipes under allowed safe operation of the fire protection water system,” Revision 0

SE-99-0017, “Modify main steam safety relief valves with an improved full cantilever flexi-disc,” Revision 0

SE-99-0022, “Relocate reactor water clean up pump seal purge line from downstream of control rod drive check Valves CRD-V-524/525 (secondary containment bypass leakage valves) to upstream of check,” Revision 0

SE-99-0046, “This design change improves the fault protection and coordination,” Revision 0

SE-99-0057, “The proposed activities described in this design package permanently deactivate standby service water keepfill subsystem,” Revision 0

Temporary Modification Requests

TMR-98-011, “A sand filter skid will be located neat the corner of spray Pond B”

TMR-98-021, “Revised procedures to allow operation of radioactive floor drain Valves FDR-V-607, 608, and 609 in the closed position”

TMR-98-023, “Relocate the TR-M1 normal 480 V feeder Cable BP2DB-001 within Power Panel E-PP-2DB”

TMR-98-027, “Plug safety shower floor drain in flocculator building”

TMR-99-02, “On the main steam reheater’s bypass Valves HV-V-42 and 46 for both trap Stations 29 and 30, a jumper will be installed on the electrical circuit to cause the bypass valves to be closed all the time”

TMR-99-04, “Remove fuses and lock breakers open for floor Drain FD-V-10, 15, 18 and 24. Deactivate and tag out of service instruments and annunciators for radiation Monitors FD-RIS-1, 2, 3, and 4"

TMR-99-08, “Attach accelerometers to MSIV actuators and main steam line pipe supports”

TMR-99-14, “Install a sample valve for stator cooling water cleaning and flush”

TMR-99-15, “Remove pressure reducing valve upsteam of COND-PC-30A and replace COND-PC-30A’s bourdon tube”

TMR-99-26, “Lift leads to oscillating power range monitor trouble alarm relays and lift leads to inoperative bypass inoperative status indication inputs”

TMR-99-38, “Installation of temporary accelerometers on reactor recirculation coolant system elbow tap flow instrument lines”

TMR-99-39, “Determinate SPTM-TE-1A temperature input to summer SPTM-SUM-1 and install a jumper from SPTM-TE-8A to the same summer in the transient data acquisition system”

TMR-00-02, “Astromed recorder will be installed to monitor battery Charger E-C1-2 logic voltages”

Screenings for Licensing Basis Changes

PMR 96-0185-0	PMR 98-0081-0	TMR 99-026
PMR 97-0123-0	TMR 98-023	TMR 99-038
PMR 97-0128-0	TMR 99-002	TMR 99-039
PMR 97-0149-0	TMR 99-008	TMR 00-002
PMR 97-0164-0	TMR 99-014	
PMR 98-0080-0	TMR 99-015	

Design Specifications

Design Specification for Division 300, Section 335, “Standby Service Water Pumphouse HVAC,” Revision 0

Design Specification for Division 300, Section 331, “Diesel Generator Building HVAC,” Revision 0

Reportability Evaluation

Reportability Evaluation for PER 297-0219, “WMA-FN-52B Suction damper WMA-AD-52/1 does not function as designed (reversed operation)”

Training System Descriptions

“Standby Service Water,” Revision 7

“Control Room, Cable Room and Critical Switchgear Rooms – HVAC (CR-HVAC),” Revision 8

“Diesel Generator,” Revision 7

“Reactor Building – Heating, Ventilation and Air Conditioning,” Revision 8

“Standby Gas Treatment System,” Revision 10

“Standby Service Water,” Revision 7

Design Changes

BDC 88-0038-16, “E-CP-H13/P811 Analog Recorder Upgrade,” March 6, 1992

BDC 98-0081-0A, “Replace Woodward Power Supply with Lambda Power Supply,” August 16, 1998

96-0133-0, “Flow Orifice to Reduce/Eliminate the Cavitation Downstream from Flow Elements SW-FE-1A/B,” April 23, 1997

95-0135-0, “Standby Service Water Pump SW-M-P/1B Vibration Reduction,” May 23, 1995

Miscellaneous Documents

NUREG 0892, “WPPSS Nuclear Project No. 2 Safety Evaluation Report,” August 1982, with Supplements 1, 2, 3, 4, 5

AR5964, “Control Chiller CCH-CR-1B Operational Test With Less Than 90 percent Voltage,” January 16, 1992

NUREG/CR-3788, “Review of Regulatory Requirements Governing Control Room Habitability Systems,” August 1984

23A1915, “Main Control Room Panels Design Specification,” Revision 1

22A3008, “Equipment Environmental Interface Data 5 Yokogawa Corporation of America Certificate of Conformance on WPPSS Order No. 099655001,” March 14, 1989

Qualification Records of 10 CFR 50.59 Preparers and Reviewers

Control Room Logs of Temporary Modifications

Work Request AR5964

Procurement Specification 17560, Release 5

Contractor/Vendor Information

02-67-00, 73, 2; “Instruction Manual - H. K. Porter Fan/Coil Cooling Units”

02-67-00, 423, 1; “Instruction Manual - Cambridge Models HAR & HMR Horizontal Auto-Roll Filter”

02-28-00, 102; “Operating and Maintenance Manual - Type BL Centrifugal Fans”