July 29, 2002

Mr. William Kanda
Vice President - Nuclear, Perry
FirstEnergy Nuclear Operating Company
P. O. Box 97, A200
Perry, OH 44081

SUBJECT: PERRY NUCLEAR POWER PLANT, UNIT 1
NRC INSPECTION REPORT 50-440/02-04(DRS)

Dear Mr. Kanda:

On June 27, 2002, the NRC completed an inspection at your Perry Nuclear Power Plant, Unit 1. The enclosed report documents the inspection findings, which were discussed on June 27, 2002, with you and members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. Specifically, this inspection focused on the design and performance capability of the emergency service water and the emergency closed cooling water systems to ensure the systems were capable of performing their required safety-related functions.

Based on the results of this inspection, the inspectors identified an issue of very low safety significance (Green) that was determined to involve a violation of NRC requirements. However, because of its very low safety significance and because it was entered into your corrective action program, the NRC is treating the issue as a Non-Cited Violation in accordance with Section VI.A.1 of the NRC' s Enforcement Policy. If you deny this Non-Cited Violation, you should provide a response with a basis for your denial, within 30 days of the date of this inspection report, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, Region III; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Perry Nuclear Power Plant.

In accordance with 10 CFR Part 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

David E. Hills, Chief
Mechanical Engineering Branch
Division of Reactor Safety

Docket No. 50-440
License No. NPF-58

Enclosure: Inspection Report 50-440/02-04(DRS)

cc w/encl: B. Saunders, President - FENOC
K. Ostrowski, Director, Nuclear
Maintenance Department
G. Dunn, Manager, Regulatory Affairs
B. Coad, Director, Nuclear
Services Department
T. Lentz, Director, Nuclear
Engineering Department
T. Rausch, General Manager,
Nuclear Power Plant Department
Public Utilities Commission of Ohio
Ohio State Liaison Officer
R. Owen, Ohio Department of Health

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-440
License No:	NPF-58
Report No:	50-440/02-04(DRS)
Licensee:	FirstEnergy Nuclear Operating Company (FENOC)
Facility:	Perry Nuclear Power Plant, Unit 1
Location:	P. O. Box 97, A200 Perry, OH 44081
Dates:	June 10 through 27, 2002
Inspectors:	P. Lougheed, Reactor Inspector G. Hausman, Reactor Inspector R. Lerch, Reactor Inspector D. Schrum, Reactor Inspector S. Sheldon, Reactor Inspector J. Neurauter, Trainee C. Baron, Contractor
Approved by:	David E. Hills, Chief Mechanical Engineering Branch Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000440-02-04(DRS); FirstEnergy Nuclear Operating Company; on 06/10-27/2002, Perry Nuclear Power Plant, Unit 1. Safety System Design and Performance Capability Inspection

The inspection was a three week baseline inspection of the design and performance capability of the emergency service water and emergency closed cooling water systems. It was conducted by regional engineering specialists and a consultant. The inspection identified

The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609 "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be "green" or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

Inspection Findings

Cornerstones: Mitigating Systems and Barrier Integrity

Green. The inspection team identified a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control" in that the emergency service water system forebay temperature limit was not properly incorporated into plant procedures. Specifically, the plant procedures did not include margin to account for temperature instrument uncertainty. As a result, the emergency service water forebay temperature could have exceeded its design limit during plant operation without being detected.

The finding was greater than minor because it impacted the ability of the emergency service water system to perform its design basis function and lake temperatures had previously approached the design basis limit. The finding was of low safety significance because the emergency service water system was operable (Section 1R21.1).

Report Details

1. REACTOR SAFETY

Cornerstones: Mitigating Systems and Barrier Integrity

1R21 Safety System Design and Performance Capability (71111.21)

Introduction

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

The objective of the safety system design and performance capability inspection was to assess the adequacy of calculations, analyses, other engineering documents, and operational and testing practices that were used to support the performance of the emergency closed cooling water and emergency service water systems during normal, abnormal, and accident conditions. The inspection was performed by a team of inspectors that consisted of a team leader, five Region III inspectors, and a mechanical consultant.

The systems selected for review during this inspection were based upon:

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

The criteria used to determine the system's performance included:

- applicable Technical Specifications;
- applicable Updated Final Safety Analysis Report sections; and
- the systems' design documents.

The following system and component attributes were reviewed in detail:

System Requirements

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

System Condition and Capability

Installed Configuration - elevation and flow path operation
Operation
Design - calculations and procedures
Testing - flow rate, pressure, temperature, voltage, and current

Components

The following components were selected for detailed review during the inspection: the emergency service water and emergency closed cooling water pumps and a limited number of valves chosen based on their work history. The following attributes were reviewed for these components:

Component Degradation
Equipment/ Environmental Qualification - temperature and radiation
Equipment Protection - flood, missile and freezing

.1 System Requirements

a. Inspection Scope

The inspectors reviewed the updated final safety analysis report, technical specifications, system descriptions, drawings and available design basis information to determine the performance requirements of the emergency service water and emergency closed cooling water systems. The reviewed system attributes included process medium, energy sources, control systems, operator actions and heat removal. The rationale for reviewing each of the attributes was:

Process Medium: This attribute required review to ensure that the emergency service water and emergency closed cooling water systems would supply the required amount of water to cool safety related components following a transient.

Energy Sources: This attribute needed to be reviewed to ensure that the emergency service water and emergency closed cooling water systems would start when called upon, and that appropriate valves would have sufficient power to change state when so required.

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

Operations: This attribute was reviewed because a number of emergency service water and emergency closed cooling water system functions were manually initiated. Therefore, operator actions played an important role in the ability of the emergency service water and emergency closed cooling water systems to achieve its safety related functions.

Heat Removal: This attribute required review to ensure that the numerous heat exchangers cooled by the emergency service water and emergency closed cooling water systems received adequate cooling.

b. Findings

Green. The inspectors identified a Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III "Design Control." The emergency service water system forebay temperature limit was not properly incorporated into plant procedures. As a result, the emergency service water system could have exceeded its design limit and not have been capable of removing its design basis heat load following an accident.

During the inspection, the team noted that plant procedures did not direct operations personnel to take actions to ensure operability of the emergency service water system until just prior to the emergency service water forebay temperature reaching 85°F. The 85°F limit represented the design basis limit of the emergency service water system. Through review of the design calculation, the team identified that there was no additional margin in the system to permit operation beyond this temperature limit.

The inspectors determined that the neither the design calculations nor the operating procedures took instrument uncertainty into account. In addition, formal instrument uncertainty analyses were not available for the instruments normally used to monitor emergency service water inlet temperature. As a result, the potential existed for the emergency service water forebay temperature to exceed its design limits during plant operation without being detected.

In response to these concerns, the licensee provided documentation related to unusually high temperatures recorded in 1999. In July 1999, the licensee prepared condition report 99-1886 when the recorded temperatures approached the emergency service water system inlet temperature limits of 85°F. The operability determination associated with this condition report concluded that the inlet temperatures should be monitored on an increased frequency in accordance with a memorandum to the Shift Supervisor titled "85°F Emergency Service Water Action Plan" (Revision 2). Besides recommending increased monitoring of emergency service water temperatures by plant operations, the memorandum stated that high accuracy measuring and test equipment was to be used for enhanced monitoring of the inlet temperatures. The memorandum required enhanced monitoring to commence whenever the emergency service water temperature exceeded 83°F based on normal plant instrumentation.

The team reviewed the operability determination 99-1886 (Revision 1) and the memorandum on increased monitoring and identified the following specific concerns:

1. Neither the 1999 operability determination nor the memorandum were active at the time of the inspection. Therefore, there was not any procedural direction to initiate enhanced monitoring of the emergency service water inlet temperature when the temperature design limits were approached. Based on the current plant procedures, no operator actions were required until the normal plant instrumentation indicated that the actual limits had been reached.

2. No bases were available for the "threshold temperature" of 83°F that was used to initiate enhanced monitoring. Formal instrument uncertainty analyses were not available for the instruments normally used to monitor emergency service water inlet temperature. Based on temperature instrument calibration data reviewed during the inspection, the inspectors determined that the instrument uncertainty could exceed the 2°F margin between the 83°F "threshold

temperature" and the 85°F design limit for emergency service water inlet temperature.

An evaluation of this issue concluded that it was caused by a licensee performance deficiency resulting in a finding of very low safety significance (Green). The performance deficiency was that the licensee might not be aware of those times when the emergency service water system would not be able to achieve its safety related function due to lake conditions. The mitigating systems cornerstone was affected due to the potential of core decay heat removal and long term heat removal being degraded by this condition. This condition also has the potential of affecting the emergency diesel generators, which could degrade other mitigating systems. No other cornerstones were determined to be degraded as a result of this issue.

This finding was determined to be greater than minor based the potential to affect the emergency service water system's design basis function. Specifically, plant procedures allowed the emergency service water forebay temperature to approach the system design limit during plant operation without accounting for instrument uncertainty. The capability of the emergency service water system to perform its mitigating function of heat removal was based on an assumed maximum inlet temperature of 85°F. The design basis calculations demonstrated that there was not additional margin in the system to remove the design basis heat requirements post accident should the inlet temperatures exceed 85°F. The inspectors also determined that lake temperatures had approached 85°F in the past.

This finding was assessed as Green because it did not represent an actual loss of the emergency service water system's safety function. During the summer of 1999, the licensee monitored the inlet temperatures with appropriate instrumentation to ensure system operability. As the lake temperature approached the 85°F limit, the licensee ensured that the safety-related heat exchangers did not have design-basis fouling. The cleaner heat exchangers compensated for the increased temperatures. A review of plant data from the summers of 2000 and 2001 verified that the measured inlet temperatures did not exceed 81°F. The inspectors concluded that this information provided reasonable assurance that there had not been an actual loss of system function due to the performance deficiency.

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

Contrary to the above, as of July 2002, the design basis for the emergency service water inlet temperature limit was not correctly translated into plant operating procedures, in that neither the procedures nor the design calculations accounted for instrument uncertainty. As a result, the potential existed for operating the plant with an emergency service water inlet temperature in excess of the design limits. The licensee initiated condition reports 02-02069 and 02-02111 to address this issue. Because the inspection occurred at a time of year when there was potential for the lake temperature to reach the design value, the licensee initiated interim actions to ensure that increased temperature monitoring would occur.

Because of the issue's very low safety significance and because it is in the licensee's corrective action program, the issue is being treated as a Non-Cited Violation, consistent with Section VI.A.1 of the NRC Enforcement Policy (NCV 50-440/02-04-01).

.2 System Condition and Capability

a. Inspection Scope

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

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

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

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

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

Testing: The inspectors reviewed records of selected periodic testing and calibration procedures and results to verify that the design requirements of calculations, drawings, and procedures were incorporated in the system and were adequately demonstrated by test results. Test results were also reviewed to ensure automatic initiations occurred within required times and that testing was consistent with design basis information. Pre-operational test data was also reviewed to confirm initial design parameters that could not be tested under normal operations.

b. Findings

No findings of significance were identified.

.3 Components

a. Inspection Scope

The inspectors examined the emergency service water and emergency closed cooling water systems to ensure that component level attributes were satisfied. The attributes selected for review were: component degradation, equipment and environmental qualification, and equipment protection.

Component Degradation: This attribute was verified through review of component repair histories and through system walkdowns. The inspectors reviewed the attribute to verify the licensee was appropriately maintaining components in the emergency service water and emergency closed cooling water systems

Equipment and Environmental Qualification: To confirm this attribute, the inspectors reviewed calculations and equipment qualification documents to ensure that components in the emergency service water and emergency closed cooling water systems would perform their function under the temperatures that would be expected.

Equipment Protection: The inspectors reviewed calculations and other documents, performed walkdowns and interviewed personnel to ensure that components located in the emergency service water and emergency closed cooling water areas would perform their function following tornadoes and seismic events.

b. Findings

During review of a licensee calculation for loading on a clamp supporting a vertical pipe riser, the team identified that the licensee had not properly followed the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (the Code), Section III, Subsection NF, Article 3276.2(c), 1974 edition up to and including the Winter 1975 Addendum. Specifically, the Code requires that clamps that support vertical lines be designed to support the total load on either arm. For clamp 1P45H0273, the licensee assumed that each clamp arm would simultaneously carry half the total load.

In addition, the inspectors determined that the licensee had unofficially interpreted the Code in a different manner than the NRC's reading. The NRC considered the Code to require that the total load be applied not only to each arm of the clamp but also to all other structural components in the load path back to the supporting structure. The licensee interpreted the Code to only require the total load to be applied to the clamp itself, and that all other structural components only needed to be designed for half the total load. This technical disagreement was not resolved by the end of the inspection.

The inspectors noted that the particular support identified had sufficient margin such that if the total load were applied to only one arm, and the other structural components in the load path, the support would be within requirements. Based on this, the inspectors considered the failure to correctly apply the code to this support as a minor

issue. However, the licensee stated that they had consistently applied the above interpretation to other clamps on vertical risers. Therefore, the issue could have a broader application than just the one example. The licensee entered this into their corrective action program as condition report 02-02009 and planned to seek an official Code interpretation. This item is considered to be unresolved pending further NRC review and the licensee receiving the results of the official Code interpretation (URI 50-440/02-04-02.)

4. OTHER ACTIVITIES (OA)

4OA2 Identification and Resolution of Problems

a. Inspection Scope

The team reviewed a sample of emergency closed cooling water and emergency service water systems problems identified by the licensee in the corrective action program to verify an appropriate threshold for identifying issues and evaluate the effectiveness of corrective actions related to design issues. In addition, condition reports written on issues identified during the inspection were reviewed to verify adequate problem identification and incorporation of the problem into the corrective action system. The specific corrective action documents that were sampled and reviewed by the team are listed in the attachment to this report.

b. Findings

Regarding the issue discussed in Section 1R21.1.b, the licensee initially identified the issue in July 1999, and documented it in condition report 99-1886. At that time, an operability determination was prepared to support plant operation and additional actions were implemented. Although enhanced temperature monitoring with more accurate equipment was performed at that time, the recommendations were not implemented into appropriate operating procedures. As a result, the potential of operating the plant with an emergency service water inlet temperature in excess of the design limits continued to exist.

Because the finding was previously identified and documented by the licensee, it is also considered to be a problem identification and resolution failure. The current condition was reasonably within the licensee's ability to foresee and correct.

4OA6 Meetings, Including Exits

Exit Meeting

The inspectors presented the inspection results to Mr. W. Kanda, and other members of licensee management, on June 27, 2002. The licensee acknowledged the findings presented. The inspectors identified the proprietary information reviewed during the inspection and questioned the licensee as to whether proprietary information had been retained. The inspectors also discussed the potential for proprietary information to be included in the inspection report. The licensee confirmed that no proprietary information was retained at the completion of the inspection. The licensee concurred that the proposed inspection report content would not compromise any proprietary information.

KEY POINTS OF CONTACT

Licensee
B. Blair, System Engineering Manager
K. Cimorelli, Maintenance Manager
R. Coad, Services Director
T. Henderson, Acting Regulatory Affairs Manager
W. Kanda, Vice President-Nuclear
F. Kearney, Operations Manager
T. Lentz, Engineering Director
D. Phillips, Design Engineering Manager
T. Rausch, Plant Manager
E. Root, Configuration Management & Information Technology Manager

Response Team Members
C. Angstadt, Design Engineering Structural Supervisor
S. Mackowski, Design Engineering
A. Widmer, Design Engineering
P. Chatterjee, Design Engineering
R. Churlik, Design Engineering
R. Pikus, System Engineering
R. Tanney, Design Engineering Electrical Supervisor
T. Veitch, Shift Manager, Operations
K. Russell, Regulatory Affairs

NRC
B. Dickson, Senior Resident Inspector
J. Ellegood, Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-440/02-04-02	URI	Interpretation of ASME Code NF3276.2(c) for Vertical Risers

Opened and Closed

50-440/02-04-01	NCV	Failure to Incorporate Instrument Uncertainty Into Design Basis Calculations and Procedures

Discussed

2000-18	TIA	Design Basis Assumptions for Non-seismic Piping Failures at the Perry Plant

LIST OF ACRONYMS USED

ADAMS	Agency-wide Document Access and Management System
CFR	Code of Federal Regulations
DRS	Division of Reactor Safety
FENOC	First Energy Nuclear Operating Company
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records System
SDP	Significance Determination Process
TIA	Task Interface Agreement
URI	Unresolved Item

LIST OF DOCUMENTS REVIEWED

Cable Pull Slips

1P42F14B	480V Motor Control Center EF1C09(1R24S025) Division 2 Compartment R to Control Complex Chiller B Emergency Supply MOV (P42F300B)	September 14, 1981
1P45F1C	480V Motor Control Center EF1E-2 (1R24S030) Division 3 Compartment H to High Pressure Core Spray Emergency Service Water Pump (1P45C002)	August 25, 1982
1P45F5A	480V Motor Control Center EF1B07(1R24S021) Division 1 Compartment XP to Residual Heat Removal A Heat Exchanger Emergency Service Water Inlet Valve (1P45F014A)	February 5, 1982
1P45F6B	480V Motor Control Center EF1D07(1R24S026) Division 2 Compartment XK to Residual Heat Removal B Heat Exchanger Emergency Service Water Inlet Valve (1P45F014B)	September 30, 1982
1P45F7A	480V Motor Control Center EF1B07(1R24S021) Division 1 Compartment XR to Residual Heat Removal A Heat Exchanger Emergency Service Water Outlet Valve (1P45F068A)	February 5, 1982
1P45F8B	480V Motor Control Center EF1D07(1R24S026) Division 2 Compartment XL to Residual Heat Removal B Heat Exchanger Emergency Service Water Outlet Valve (1P45F068B)	February 23, 1983
1P45H2A	4.16kV Switchgear Bus EH11 (1R22S007) Division 1 Compartment EH1106 to A Emergency Service Water Pump (1P45C001A)	March 9, 1983
1P45H3B	4.16kV Switchgear Bus EH12 (1R22S006) Division 2 Compartment EH1205 to B Emergency Service Water Pump (1P45C001B)	September 9, 1982

Calibration Data Sheets

0P45-R002	Indicator Calibration Data Sheet	May 26, 2000
1P41R0417	Instrument Calibration Data Sheet	May 22, 2000
1P45N0220A	Switch Calibration Data Sheet	December 26, 2001
1P45N0220B	Switch Calibration Data Sheet	November 15, 2000
1P45N0235	Switch Calibration Data Sheet	May 7, 2001
P45-T0367	Calibration - Trip Data Sheet	March 4, 1992
P45-T0369	Calibration - Trip Data Sheet	February 20, 1992
P45-T5398	Calibration - Trip Data Sheet	February 11, 1994

Calculations

1:05.11	Sargent and Lundy Calculation - Probability of a Tornado Striking Vulnerable Targets in Perry Nuclear Power Plant	Revision 1
23:02.10	Scaffolding Procedure Calculation	Revision 0
C-0042	Alternating Current Gate/Globe Motor Operated Valve Degraded Voltage Capability Calculation Utilizing Limitorque Method	Revision 5
C-0047	Butterfly Motor Operated Valves Degraded Voltage Torque Capability Calculation Using Limitorque Method	Revision 3
C-0060	Anchor Darling (Contromatics) Butterfly Valve Required Torque Analysis	Revision 1
C-0073	Butterfly Motor Operated Valves Degraded Voltage Torque Capability Calculation Using Commonwealth Edison Method	Revision 2
CL-MOV-0P42-2	0P42-F290, F295A/B, F300A/B, F320, F325A/B, and F330A/B Maximum Delta-Pressure	Revision 1
CL-MOV-1P45-3	1P45 - F130A/B and F140 Maximum Delta-Pressure	Revision 3
DI DV9325	Motor Control Center Bus Voltages for Motor Operated Valves Degraded Voltage Analysis	Revision 6
DI-155	Emergency Closed Cooling Water (P-42) System Heat Exchanger Size, Operating Temperature and Outlet Temperature and P42 System Operating Temperatures	Revision 3
E12-089	Required Emergency Service Water Flow for the Residual Heat Removal Heat Exchangers	Revision 1
E12-C13	Loop Accuracy Calculation for Emergency Service Water Flow to Residual Heat Removal Heat Exchanger	Revision 0
E22-037	Required Emergency Service Water Flow for the High Pressure Core Spray Diesel Generator Jacket Water Heat Exchangers	Revision 1
FSPC-0018	Division 1 Motor Operated Valves Power Fuse Size Calculation	Revision 3
G41-034	Cooling of Fuel Pool Using Emergency Service Water	Revision 2
M39-014	Closed Spray Pump Room Cooler Air Flow Rate and Performance Evaluations at Design Basis Conditions	Revision 0

Calculations

P42-007	Analysis to Determine If the Venting Requirements for the Emergency Closed Cooling Water Surge Tanks Based on a Postulated Through-wall Leakage Crack on the 12-inch Moderate Energy Pipe	Revision 0
P42-008	Emergency Closed Cooling Water Overpressure Protection Analysis	Revision 1
P42-012	Determine If the Thermal Relief Valves for the Heat Exchangers Cooled by the Emergency Closed Cooling Water Are Adequately Sized	Revision 0
P42-028	Emergency Closed Cooling Water Thermal/ Hydraulic Flow Calculation; Proto-flow Hydraulic Model of the Emergency Closed Cooling Water System	Revision 2
P42-036	Emergency Closed Cooling Water Pump Performance Acceptance Criteria Calculation	Revision 1
P42-039	Required Emergency Service Water Flow for the Emergency Closed Cooling Water Heat Exchangers	Revision 1
P42-C01	Emergency Closed Cooling Flow Switches 0P42N0306A/B/C	Revision 3
P42-C02	Emergency Closed Cooling Water Control Complex Chiller Emergency Supply and Return Motor Operated Valves Time Delay	Revision 0
P45-023	Overpressure Protection Analysis	Revision 2
P45-044	Leakage Rates/Emergency Service Water Standpipe Allowable Draindown Level	Revision 1
P45-053	Emergency Service Water Loop A - Potential Pump Degradation Through Refueling Outage 6	Revision 0
P45-056	Emergency Service Water Pump Performance Acceptance Criteria Calculation	Revision 0
P45-057	Emergency Service Water System Thermal Hydraulic Model	Revision 1
P45-061	Determine Minimum Surveillance Instruction Emergency Service Water Loop Flow Rate That Would Enable Emergency Service Water Cooled Heat Exchangers to Remove Design Heat Loads	Revision 0
P45-C03	Loop Accuracy Calculation for Emergency Service Water Flow from Emergency Closed Cooling Water Heat Exchanger A	Revision 0
P45-H0273	Calculation for Hanger Mark No. 1P45-H0273	Revision 3
P45-T06	Emergency Service Water Pump Discharge Strainer Delta-Pressure	Revision 1

Calculations

P49-001	Water Velocity Approaching Screen and Through Screen	Revision 1
PRDC-0014	Div I, 125Vdc System Load Evaluation, Voltage Drop, Battery/Battery Charger Sizing Calculation	Revision 1
PRDC-0015	Div II, 125Vdc System Load Evaluation, Voltage Drop, Battery/Charger Sizing Calculation	Revision 0
PRDC-0016	Div III, 125Vdc System Load Evaluation, Voltage Drop, Battery/Battery Charger Sizing Calculation	Revision 1
PRLV-0002	480V Safety Related Motor Relay Calculation for Motors Connected to Switchgear Breakers	Revision 4
PRLV-0004	Motor Control Center EF1A07/Breaker EF1A07	Revision 3
PRLV-0011	480V Busses EF-1-A, EF-1-B, EF-1-C, and EF-1-D	Revision 1
PRMV-0002	Current Transformer Saturation Evaluation	Revision 1
PRMV-0003	Emergency Service Water Pumps A and B Circuit Protection and Coordination, Breakers EH 1106 and EH 1205; Motor and Feeder Circuit Protection	Revision 3
PRMV-0008	Unit 1 EH Bus Supply Breakers, Preferred and Alternate	Revision 3
PRMV-0018	Protective Relay Setpoints for Circuit Breaker EH 2101	Revision 3
PRMV-0020	Degraded Voltage and Loss of Off-Site Power, Under-Voltage Relaying for Division 1, 2, and 3	Revision 2
PRMV-0062	4.16kV Degraded Voltage Instrumentation Loop Tolerance Calculation	Revision 1
PSTG-0001	Perry Nuclear Power Plant Auxiliary System Voltage Study	Revision 4
PSTG-0014	Electrical Load Determination of Division 1, 2, and 3 Diesel Generators	Revision 4
PSTG-0030	Voltage Drop in Control Circuits of Safety Related Motor Control Center Starters, NEMA Sizes 1,2, 3, and 4	Revision 0
R46-018	Required Emergency Service Water Flow for the Division 1 & 2 Diesel Generator Jacket Water Heat Exchangers	Revision 1
SQ-0043	Weak Link Analysis of Contromatic's Butterfly Valves	Revision 2
SSC-001	Safe Shutdown Capability Report	Revision 1
SSC-005	Protection for Redundant Emergency Service Water Trains & Availability of Emergency Service Water with Fire Damage to Screen Wash Circuits in Fire Zone Emergency Service Water-1a	Revision 1

Calculations

SSC-006	Availability of Automatic and Manual MSIV Trip with Fire Damage to B21 Circuits in Fire Zone IB-3	Revision 0
SSC-009	Availability of Residual Heat Removal B for Reactor Inventory Control and Shutdown Cooling with Damage to LPCI C and Emergency Closed Cooling WaterS Room Cooler Circuits Due to Fire in Fire Zone 1AB-2	Revision 1
SSC-012	Separation & Protection for Trays with Redundant Div 1 Emergency Service Water and Div 2 Residual Heat Removal Trains with Fire in Fire Zone IB-3	Revision 1
SSC-015	Availability of Emergency Service Water Flow Indication with Fire Damage to P45 Circuits in Areas CC-1a and CC-1b	Revision 0

Condition Reports Reviewed During the Inspection

99-1886	Plant Service Water and Emergency Service Water Inlet Temperatures May Exceed Their Design Maximum Values	July 28, 1999
00-0532	Review of Results of PIFRA 96-3390-005 Indicate Licensing/ Design Basis Documents May Be Impacted and Additional Corrective Actions Needed	February 22, 2000
00-0586	The Unverified Operating Data Used as Input for the Category 1 Immediate Investigation on the Pinhole Leak in the Hot Surge Tank	February 28, 2000
00-1364	Ineffective Repair/ Rebuild of Emergency Service Water B Pump	May 1, 2000
00-1398	Emergency Service Water Pump A Discharge Vacuum Breaker Failed its Exercise Closed Test	May 9, 2000
00-2070	Unable to Achieve Minimum Required Emergency Service Water B Flow to Residual Heat Removal B	July 9, 2000
00-2243	Maintenance Performed on Non-safety Valve 0P48F0070B May Have Introduced Air into the Affected Emergency Service Water Loop	July 25, 2000
00-3490	Emergency Service Water B Discharge Strainer High Indicated Differential Pressure	November 10, 2000
00-3859	Conflict on Full Performance Credit for SVI-P42T2001	December 13, 2000
01-3685	Emergency Closed Cooling Water By-Pass and Control Complex Chiller Supply and Return Valves	October 17, 2001
01-0817	PTI-P0010 Loop A System Leakage	February 24, 2001
01-1175	1P45F0040A Will Not Stroke Closed	March 16, 2001
01-1443	Calculation Procedure (NEI-0341) Interface Issues from Audit 01-02	March 15, 2001

Condition Reports Reviewed During the Inspection

01-1453	Potential Error in Design Heat Load for Emergency Closed Cooling Water Heat Exchanger	March 15, 2001
01-2416	Seating Torque Increase of Contromatics Butterfly Valve	June 12, 2001
01-2442	Degraded Emergency Service Water B Flow Through Division 2 Diesel Generator Heat Exchanger	June 13, 2001
01-2515	Seating Torque Increase of Contromatics Butterfly Valve	June 21, 2001
01-2974	Degraded Piping Elbow in P45 System	August 2, 2001
01-3393	Emergency Service Water B Discharge Vacuum Breaker Failed to Close Following Pump Start	September 21, 2001
01-3421	High Pressure Core Spray Emergency Service Water Discharge Vacuum Breaker Failed to Close Following Pump Start	September 24, 2001
01-3563	P42 Latent Issues Review - Lack of Overpressure Protection for Residual Heat Removal Piping	October 9, 2001
01-3580	P42 Operability with Throttled Surge Tank Recirculation Valve	November 5, 2001
01-3675	Latent Issues for Emergency Closed Cooling Water - Calculations Deficiencies Associated with Loop	October 16, 2001
01-3685	Latent Issues P42 - 30 Second Time Delay of Emergency Closed Cooling Water Initiation Valves Is Not Tested	October 17, 2001
01-3719	Latent Issues for Emergency Closed Cooling Water - Certified Pump Characteristic Curve Was Not Used as Design Input	October 23, 2001
01-3739	P42 Piping and Instrumentation Drawings 352-621 Discrepancies Identified During Latent Issues Review	October 25, 2001
01-3776	P42 Latent Issues, Emergency Closed Cooling Water Hi/low Temperature Alarm Response Instruction Doesn't Address Temperature Control Valve	October 29, 2001
01-3846	P42 Latent Issues - Emergency Closed Cooling Water Surge Tank Chemistry	November 5, 2001
01-3972	Latent Issues Review - Repetitive Task Discrepancy Between Motor Control Center	November 14, 2001
01-4022	Inadequate Justification for Valves Excluded from the Generic Letter 89-10 Motor Operated Valves Program	November 20, 2001
01-4065	Latent Issues, Emergency Closed Cooling Water Loop Leakage Test Boundary	November 27, 2001

Condition Reports Reviewed During the Inspection

01-4067	Latent Issues Review - Flow Balance Inconsistencies	November 27, 2001
01-4069	Latent Issues Review - Periodic Emergency Closed Cooling Water System Flow Balancing	November 27, 2001
01-4071	Latent Issues Review - Documentation and Review of Test Results	November 27, 2001
01-4168	Latent Issues Review - Flow Balancing and Pump Performance Acceptance Criteria	December 5, 2001
01-4171	Latent Issues Review - P42 - Emergency Closed Cooling Water to Nccw Leakage	December 5, 2001
01-4198	Latent Issues Review - Overpressure Protection for Residual Heat Removal Seal Water Coolers	December 6, 2001
01-4255	Latent Issues Review - Stress Calculation Deficiency	December 13, 2001
01-4257	Latent Issues Review Recommendations	December 13, 2001
02-00029	Emergency Closed Cooling Water A Temperature Controller Did not Control Properly When Reactor Core Isolation Cooling Was Shutdown	January 3, 2002
02-00103	Design Basis Assumptions for Non-Seismic Piping Failures at Perry Plant	January 10, 2002
02-00326	PA02-03 Audit Finding, Operability Determination Not Appropriately Utilized on Emergency Service Water	January 31, 2002
02-00531	Emergency Service Water C Operability	February 19, 2002
02-00564	Biocide Addition Performed in Manual Rather than Automatic as Described in Updated Safety Analysis Report	February 25, 2002
02-00568	Emergency Service Water A Pump Vacuum Breaker 1P45F0502A Not Seating with Pump Running	April 11, 2002
02-00586	Latent Issues, Emergency Service Water Flow out to the Swale	February 26, 2002
02-00599	Latent Issues, Emergency Service Water Piping Analysis	February 27, 2002
02-00604	Latent Issues, Emergency Service Water Forebay Temperature Heatup	February 28, 2002
02-00605	Errors Found in Mechanical Calculation P42-001, Revision1	February 28, 2002
02-00704	Latent Issues, Emergency Service Water Design Pressure May Not Meet ASME Code Requirements	March 11, 2002
02-00723	Latent Issues, Emergency Service Water Valves Do Not Have Hot Short Modification	March 12, 2002

Condition Reports Reviewed During the Inspection

02-00737	Perform Relaxation Parameters Used in Latest Calculation Revision	March 13, 2002
02-00748	Latent Issues, Emergency Service Water Alarm Response Instruction Needs Immediate Operator Action	March 13, 2002
02-00799	Latent Issues, Methodology Used to Degrade Emergency Service Water Pump Curves Non-conservative	March 18, 2002
02-00829	Heat Loads for Emergency Closed Cooling Water Pump Rooms Can Not Be Verified	March 19, 2002
02-00869	Latent Issues, Emergency Service Water System Division 3 Does Not Comply with Updated Safety Analysis Report	March 25, 2002
02-00871	Latent Issues, Emergency Service Water Non-safety Setpoint Issues	March 25, 2002
02-00979	Latent Issues, Emergency Service Water Isolation Valves Removed from Generic Letter 89-10 Program	April 01, 2002
02-00980	P45 Latent Issues Service Water and Emergency Service Water Intake and Discharge Tunnel Inspections	April 01, 2002
02-00986	Latent Issues, Emergency Service Water Design Does Not Comply with Updated Safety Analysis Report Section 7.5.1	April 02, 2002
02-00998	Latent Issues, P45 Emergency Service Water Piping and Instrumentation Drawings Errors	April 03, 2002
02-01016	Latent Issues, Emergency Lighting in Emergency Service Water Pump House	April 04, 2002
02-01753	High Pressure Core Spray Room Cooler Emergency Service Water Flow Out-of-Specification	June 5, 2002
02-01950	Technical Rigor Concerns with Design Engineering Services Response to Condition Report 02-00586	June 19, 2002
02-01980	Timeliness Concerns with Two Operability Determination Related Engineering Activities	June 21, 2002
02-01985	Intake/Discharge Tunnel Inspection Frequency Concerns	June 21, 2002

Condition Reports Written as a Result of the Inspection

02-01832	Safety System Design Inspection - Conservative Values in Alarm Response Instruction	June 10, 2002
02-01857	Combustibles in Unit 2 Turbine Building Track Bay	June 11, 2002
02-01864	P45 - System Description Manual	June 12, 2002

Condition Reports Written as a Result of the Inspection

02-01866	Emergency Service Water Temperature Calculated in P45-30, Revision 3, Is Nonconservative	June 12, 2002
02-01868	Emergency Service Water Pump Impeller Change Package Information Questioned Relative to Seismic Adequacy	June 12, 2002
02-01869	Safety Class Code Designators on Drawing D-302-621	June 12, 2002
02-01874	Inappropriate Statement Made in the Design Verification Record for Calculation P42-028	June 12, 2002
02-01876	Calculation P45-55 Emergency Service Water Keepfill Does Not Agree with the Values in SOI-P45/P49 B Loop	June 12, 2002
02-01877	Updated Safety Analysis Report Discrepancy Relative to Emergency Service Water Discharge Strainer Back Flush Flow	June 12, 2002
02-01878	Impact of Emergency Service Water Strainer Back-Wash Flow on Emergency Service Water Heat Loads Not Documented	June 12, 2002
02-01883	Screen Wash System Calculation Is Missing One Page	June 12, 2002
02-01885	Engineering Review of Simple Modification Request Form 96-4069 for Agastat Time Delay Relay Replacement	June 13, 2002
02-01909	Emergency Service Water Inlet and Outlet Valves for the Residual Heat Removal Heat Exchanger	June 17, 2002
02-01913	Errors Identified in Calculations P45-CO2 And E12-C13	June 17, 2002
02-01915	Condition Report 00-2070 Incorrectly Used the Operability Determination for Condition Report 00-0532 to Determine Operability	June 17, 2002
02-01936	Seismic Fall Down: Interaction of Diving Equipment Staged in the Emergency Service Water Pump House	June 19, 2002
02-01939	Incorrect Yield Stress Used for Flange Calculation 1P45G115A	June 19, 2002
02-01970	Calculation Performed for Condition Report 01-4067 Past Operability Evaluation Is Nonconservative	June 19, 2002
02-02008	Scaffold Bracing Criteria in Safety-Related Buildings	June 24, 2002
02-02009	Design Criteria for Piping Clamps to Support Vertical Piping	June 24, 2002

Condition Reports Written as a Result of the Inspection

02-02030	Incorrect Motor Control Center Compartment Number in Cable Pull Card for Circuit 1P45F5A	June 25, 2002
02-02034	Updated Safety Analysis Report Table 9.2-14 Lists Maximum Flow to the Residual Heat Removal-Seal Coolers Rather than the More Appropriate Minimum Flow	June 25, 2002
02-02040	Bent Sensing Line to P42-R0135A	June 25, 2002
02-02056	Request for Assistance - Addition of P45R0002 to Outside Rounds	June 26, 2002
02-02063	Foreign Material Exclusion Concerns During Diving Activities	June 12, 2002
02-02069	Actions Required by the Operability Determination for Condition Report 99-1886 Not Implemented	June 26, 2002
02-02069	Implementation of Condition Report 99-1886	June 26, 2002
02-02075	Request for Assistance on Scaffold Requests	June 26, 2002
02-02080	Butterfly Motor Operated Valve Required Torque Calculation	June 26, 2002
02-02085	Calculation Format Not up to Date	June 26, 2002
02-02090	Change 8 to GCI-0016 Processed as "Non-intent" Versus "Intent"	June 26, 2002
02-02108	SOI-P45/49 Precaution and Limitation #8 Gives Confusing Direction to Operator	June 27, 2002
02-02110	Concern over Emergency Service Water Operability with Sluice Gate Open and High Outlet Temperatures	June 27, 2002
02-02111	Ensuring That Future Corrective Actions and Operability Determinations Are Properly Implemented	June 27, 2002
02-02126	Request for Assistance - Lessons Learned from Safety System Design Inspection Versus Latent Issues Reviews	June 27, 2002

Drawings

022-0041-00000	Environmental Conditions for Intermediate Building	Revision F
22-0125-00000	Gould Pumps - Large Emergency Service Water Pumps	Revision 2
206-0001-00000	Electrical One Line Diagram Index	Revision A
206-0010-00000	Main One Line Diagram 13.8kV & 4.16kV	Revision Z
206-0017-00000	Electrical One Line Diagram Class 1E 4.16kV Bus EH11 & EH 12	Revision EE
206-0020-00000	Electrical One Line Diagram Main One Line Diagram 480V	Revision DD

Drawings

206-0021-00000	Electrical One Line Diagram Class 1E 480V Bus EF1A	Revision AAAA
206-0023-00000	Electrical One Line Diagram Class 1E 480V Bus EF1B	Revision MMM
206-0025-00000	Electrical One Line Diagram Class 1E 480V Bus EF1C	Revision UUU
206-0027-00000	Electrical One Line Diagram Class 1E 480V Bus EF1D	Revision SSS
206-0029-00000	Electrical One Line Diagram Class 1E 480V Bus EF1E	Revision JJ
206-0037-00000	Electrical One Line Diagram Non-Class 1E 480V Bus F1D	Revision SS
206-0043-00000	Electrical One Line Diagram Non-Class 1E 480V Bus F1G	Revision GG
206-0051-00000	Electrical One Line Diagram Class 1E DC System, Division 1 & 2	Revision ZZ
206-0053-00000	Electrical One Line Diagram Class 1E 120Vac Panels EB-1-A1, EK-1-A1	Revision HH
206-0054-00000	Electrical One Line Diagram Class 1E 120Vac Panels EB-1, EK-1-B1 & EK-1-C1	Revision KK
206-0055-00000	Electrical One Line Diagram Non-Class 1E 120Vac Panels V-1-A, B-1-A & K-1-N	Revision GGG
206-0056-00000	Electrical One Line Diagram Non-Class 1E 120Vac Panels K-1-A, K-1-B & K-1-C	Revision XX
208-0001-00000	Graphics Standards	Revision H
208-0002-00000	Relay Standard Terminal Markings - Cutler Hammer M-300 Volt AC and Type M DC Multi-Pole Relays	Revision A
208-0003-00000	480 Volt Switchgear Internals	Revision D
208-0004-00000	4.16kV Switchgear Internals	Revision F
208-0005-00000	Term Markings 1TE J10AC & J13DC and Agastat GP & 7000 Series Relays Description	Revision K
208-0006-00000	4.16kV Switchgear Internals	Revision F
208-0006-00001	15kV Switchgear Internals	Revision A
208-0007-00000	Overload Relay Heater Coil Selection Table	Revision D
208-0008-00001	Motor Operated Valves Standards and Notations	August 21, 1988
208-0009-00002	LED Lamps	Revision C
208-0172-00205	Service Water Common Discharge Flow Instrumentation	Revision K
208-0173-00000	Index Power Source from Unit 1	Revision G

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208-0173-00001	Pump A C001A	Revision R
208-0173-00002	Pump B C001B	Revision M
208-0173-00003	Chiller Bypass Motor Operated Valve F150A	Revision L
208-0173-00004	Chiller Bypass Motor Operated Valve F150B	Revision L
208-0173-00005	Fuel Pool Heat Exchanger Bypass Motor Operated Valve F255A	Revision H
208-0173-00006	Fuel Pool Heat Exchanger Bypass Motor Operated Valve F255B	Revision J
208-0173-00007	Fuel Pool Heat Exchanger Emergency Supply Motor Operated Valve F260A	Revision E
208-0173-00008	Fuel Pool Heat Exchanger Emergency Supply Motor Operated Valve F260B	Revision F
208-0173-00009	Fuel Pool Heat Exchanger Emergency Return Motor Operated Valve F265A	Revision G
208-0173-00010	Fuel Pool Heat Exchanger Emergency Return Motor Operated Valve F265B	Revision F
208-0173-00011	Control Complex Chiller A Cross Tie Isolation Motor Operated Valve F295A	Revision H
208-0173-00012	Control Complex Chiller B Cross Tie Isolation Motor Operated Valve F295B	Revision G
208-0173-00013	Control Complex Chillers Emergency Supply Motor Operated Valve F300A	Revision L
208-0173-00014	Control Complex Chillers Emergency Supply Motor Operated Valve F300B	Revision L
208-0173-00015	Control Complex Chiller A Cross Tie Isolation Motor Operated Valve F325A	Revision G
208-0173-00016	Control Complex Chiller B Cross Tie Isolation Motor Operated Valve F325B	Revision H
208-0173-00017	Control Complex Chillers Emergency Return Motor Operated Valve F330A	Revision L
208-0173-00018	Control Complex Chillers Emergency Return Motor Operated Valve F330B	Revision L
208-0173-00019	Fuel Pool Heat Exchanger Cross Tie Isolation Motor Operated Valve F380A	Revision G
208-0173-00020	Fuel Pool Heat Exchanger Cross Tie Isolation Motor Operated Valve F380B	Revision E
208-0173-00021	Fuel Pool Heat Exchanger Cross Tie Isolation Motor Operated Valve F390A	Revision G
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208-0173-00023	Surge Tank Make-up SOV F140A & B	Revision D

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208-0173-00024	Control Complex Chillers Normal Supply Motor Operated Valve F290	Revision H
208-0173-00025	Control Complex Chillers Normal Return Motor Operated Valve F320	Revision F
208-0173-00026	Fuel Pool Heat Exchanger Normal Supply Motor Operated Valve F440	Revision D
208-0173-00027	Fuel Pool Heat Exchanger Normal Return Motor Operated Valve F445	Revision D
208-0173-00030	Emergency Closed Cooling Water To Chiller C Isolation Valve 0P42-F551 Train A	Revision A
208-0173-00031	Emergency Closed Cooling Water To Chiller C Isolation Valve 0P42-F550 Train B	Revision A
208-0173-00032	Emergency Closed Cooling Water Temperature Control Electro-Hydraulic Actuator 1P42-F665A	February 29, 1996
208-0173-00033	Emergency Closed Cooling Water Temperature Control Electro-Hydraulic Actuator 1P42-F665B	Revision A
208-0173-00200	Emergency Closed Cooling Pump A Pressure & Flow Process Instrumentation	Revision J
208-0173-00201	Emergency Closed Cooling Pump B Pressure & Flow Process Instrumentation	Revision J
208-0173-00202	Emergency Closed Cooling Temperature Process Instrumentation	Revision N
208-0173-00205	Emergency Closed Cooling System Heat Exchanger A Flow Process Instrumentation	Revision E
208-0173-00206	Emergency Closed Cooling Water Temperature Monitoring	Revision F
208-0173-00207	Emergency Closed Cooling Heat Exchanger A Temperature Process Instrumentation	March 22, 1996
208-0173-00208	Emergency Closed Cooling Heat Exchanger B Temperature Process Instrumentation	March 22, 1996
208-0176-00000	Emergency Service Water Index	Revision E
208-0176-00001	A Emergency Service Water Pump C001A	Revision X
208-0176-00002	B Emergency Service Water Pump C001B	Revision Y
208-0176-00003	High Pressure Core Spray Emergency Service Water Pump C002	Revision P
208-0176-00004	A Emergency Service Water Pump Discharge Valve F130A	Revision Z
208-0176-00005	B Emergency Service Water Pump Discharge Valve F130B	Revision X
208-0176-00006	High Pressure Core Spray Emergency Service Water Pump Discharge Valve F140	Revision W

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208-0176-00007	Inlet Isolation Valve to Residual Heat Removal Heat Exchanger A (1P45-F014A)	Revision N
208-0176-00008	Inlet Isolation Valve to Residual Heat Removal Heat Exchanger B (1P45-F014B)	Revision J
208-0176-00009	Outlet Isolation Valve from Residual Heat Removal Heat Exchanger A (1P45-F068A)	Revision P
208-0176-00010	Outlet Isolation Valve from Residual Heat Removal Heat Exchanger B (1P45-F068B)	Revision H
208-0176-00011	Residual Heat Removal Heat Exchanger Tube Side Drain Pump (1P45-C003A)	Revision H
208-0176-00012	Residual Heat Removal Heat Exchanger Tube Side Drain Pump (1P45-C003B)	Revision J
208-0176-00013	Sluice Gate (P45-D004A)	Revision L
208-0176-00014	Sluice Gate (P45-D004B)	Revision L
208-0176-00015	Pump A Discharge Strainer (1P45-D002A)	Revision N
208-0176-00016	Pump B Discharge Strainer (1P45-D002B)	Revision N
208-0176-00017	High Pressure Core Spray Discharge Strainer (1P45-D003)	Revision P
208-0176-00018	Pump A Discharge Strainer Drain Motor Operated Valve (1P45-F040A)	Revision J
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208-0176-00022	Loop C Pressure & Temperature Process Instrument	Revision H
208-0176-00200	Loop A Pressure & Temperature Process Instrument	Revision G
208-0176-00201	Loop B Pressure & Temperature Process Instrument	Revision G
208-0176-00203	Loop A Flow Process Instrument	Revision K
208-0176-00204	Loop B Flow Process Instrument	Revision J
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208-0176-00206	Residual Heat Removal & Emergency Closed Cooling Water Heat Exchanger A Flow Process Instrumentation	Revision E
208-0176-00207	Discharge Flow Instrumentation	Revision K
208-0176-00208	RTD's to Temperature Monitor 1P45-R0718	November 2, 1990
235-0173-00011A	Motor Operated Valve Data Sheet 0P42F295B - Emergency Closed Cooling	Revision E

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302-0002-0	Piping and Instrumentation Diagram Symbology Intergraph Cell Library	Revision C
302-0212-0	Piping System Diagram - Service Water System	Revision TT
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302-0712-0	Piping System Diagram - Two-Bed Demineralizer Distribution System - Middle Zone Distribution	Revision Y
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304-0791-0	Piping System P45 - Plan - Yard Area	Revision P
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39515	R.P. Adams Company, Inc. - 8" VWS-7NS 150# Strainer	Revision 3
803-0173-00001	Emergency Closed Cooling Water Pump A to Heat Exchanger A Pressure	Revision E
803-0173-00002	Emergency Closed Cooling Water Heat Exchanger A Outlet Flow	Revision E
803-0173-00003	Emergency Closed Cooling Water Pump B to Heat Exchanger B Pressure	Revision D
803-0173-00004	Emergency Closed Cooling Water Heat Exchanger B Outlet Flow	Revision E
803-0173-00005	Heat Exchanger 1P42-B001A Temperature	Revision D
803-0173-00006	Heat Exchanger 1P42-B001B Temperature	Revision D
803-0173-00009	Heat Exchanger A Outlet Flow	Revision E
803-0173-00012	Control Complex Water Chiller	Revision B
803-0173-00013	Control Complex Water Chiller	Revision A
803-0173-00014	Residual Heat Removal Room A Cooler Outlet	Revision B

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803-0173-00015	Residual Heat Removal Room B Cooler Outlet	Revision B
803-0173-00016	Residual Heat Removal Room C Cooler Outlet	Revision B
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803-0173-00020	Surge Tank A	Revision A
803-0173-00021	Surge Tank B	Revision A
803-0173-00022	Control Complex Water Chiller	Revision -
803-0173-00024	Reactor Core Isolation Cooling Room Cooler Outlet	Revision B
803-0173-00025	Residual Heat Removal Pump A Seals Outlet	Revision B
803-0173-00026	Residual Heat Removal Pump B Seals Outlet	Revision B
803-0173-00027	Residual Heat Removal Pump C Seals Outlet	Revision B
803-0173-00032	Heat Exchanger A Temperature	Revision -
803-0173-00033	Heat Exchanger B Temperature	Revision -
803-0173-00500	Power Supply Emergency Closed Cooling	Revision -
803-0176-00001	Loop A Pump Discharge Pressure	Revision B
803-0176-00002	Pump A Discharge Pressure	Revision E
803-0176-00003	Loop B Pump Discharge Pressure	Revision B
803-0176-00004	Pump B Discharge Pressure	Revision E
803-0176-00005	Pump C Discharge Pressure	Revision E
803-0176-00006	Closed Cooling Heat Exchanger A Flow	Revision D
803-0176-00008	Closed Cooling Heat Exchanger B Flow	Revision E
803-0176-00009	Loop B Flow	Revision D
803-0176-00010	High Pressure Core Spray Diesel Generator Heat Exchanger Flow	Revision D
803-0176-00011	Loop A Closed Cooling Heat Exchanger Flow	Revision D
803-0176-00012	Residual Heat Removal Heat Exchanger	Revision D
803-0176-00013	Pump Discharge Pressure	Revision A
803-0176-00014	Pump Discharge Pressure	Revision A
803-0176-00015	Pump Discharge Pressure	Revision A
803-0176-00016	Pump Discharge Pressure	Revision A
803-0176-00017	Pump Discharge Pressure	Revision A
803-0176-00018	Pump Discharge Pressure	Revision A
803-0176-00019	Residual Heat Removal Heat Exchanger	Revision A
803-0176-00020	Residual Heat Removal Heat Exchanger	Revision A
803-0176-00021	Discharge Strainer	Revision B
803-0176-00022	Standby Diesel Generator A Outlet	Revision C
803-0176-00023	Pump Discharge Strainer	Revision A

Drawings		
803-0176-00024	Pump Discharge Strainer	Revision A
803-0176-00026	Discharge Flow	Revision B
B-8x14SD86 X216B	Ingersoll-Rand - General Arrangement - Pump Size 8x14SD	Revision 3
D4997	Gould Pumps - Sectional, Model VIT 8x12JMC-5 Stage	Revision 1A
S-235-176	Motor Operated Valve Data Sheet 1P45-F130A - A Emergency Service Water Pump Discharge	Revision B
Latent Issues Reports		
414-DES-2001	Emergency Closed Cooling Water System	December 2001
527-CMIT-2002	Emergency Service Water System	April 2002
529-DES-2002	Collective Significance Review - P42 and P45 System Latent Issues	June 27, 2002
Memoranda		
To: Shift Supervisor From: T.A. Lentz	85°F Emergency Service Water Action Plan - Revision 2	August 6, 1999
ML013480323	Task Interface Agreement 2000-18, Design Basis Assumptions for Non-seismic Piping Failures at the Perry Plant	January 4, 2002
Miscellaneous		
Change Request 90-033	Changes to Updated Safety Analysis Report Section 9.2.1.3 and Table 9.13-13	April 12, 1990
Commitment Z02722	Diversion of the Residual Heat Removal Pump Seal Cooling Water Flow	December 7, 1989
Commitment Z05214	Flooding of Emergency Core Cooling System Rooms Caused by Fire Protection System Water Hammer	May 20, 1999
Fax Message	Required Torque to Manually Backwash Strainers	June 18, 2002
Graph	Service Water Inlet Temperature Data (Channel 4) compiled by licensee.	May 14, 2000 - September 11, 2000
Graph	Service Water Inlet Temperature Data (Channel 4) compiled by licensee.	May 29, 2001 - September 6, 2001
Handwritten	Emergency Service Water Strainer Flow Data for Loop A, B, and C, compiled by licensee.	November 22, 1999 December 7, 2000 October 26, 2001
Logs	Operator Round Logs for Service Water Inlet and Outlet Temperatures	June 2002
Screening 02-00111	Replacement of the P48 System and Deletion of Associated Setpoints	march 07, 2002
Spreadsheet	Results of SVI-P42-T2001 Pump Tests from 1992 through 2002, compiled by licensee.	Various Dates

Miscellaneous		
SP-560-4549-00	Bill of Materials for Class 1E Cables	March 8, 1978
	Emergency Service Water Maintenance Rule Monitor Report	June 25, 2002
	Emergency Service Water Flow Trending Evaluation 2002	June 24, 2002
Modifications		
88-0068	Install Interlocks in Open Valves 1P45F0014 A/B and 1P45F0068A/B	September 6, 1990
88-0300	Install Permanent Temperature Instruments to the Emergency Service Water Inlet Lines	November 9, 1990
89-0018A	Pipe Support Modification Due to Increased Loads Resulting from Modification to Emergency Service Water Loop C in the Auxiliary Building	November 10, 1990
89-0117	Install 30 Second Time Delay on the Control Complex Chiller Circuitry During a Loss of Offsite Power or Loss of Coolant Accident Initiation	July 14, 1989
90-0012	Provide Means to Trip the P47C Chiller When a Loss of Offsite Power or Loss of Coolant Accident Signal Is Received	April 24, 1992
90-0033	Carbon Steel Emergency Service Water Keep Fill System Being Replaced with a Larger Diameter Stainless Steel System	November 9, 1990
90-0086	Rotation of Eight Spectacle Flanges on the Emergency Closed Cooling Water System to Line up the Emergency Service Water System	November 15, 1990
90-0225	Replace the Second Stage Pump Impeller with a Larger Size Impeller	December 11, 1990
90-225A	Replace Current 17" Impeller with a 18.25" Impeller, Pump 1P45C1A	February 5, 1998
92-0060	Convert Valves 0P42F0315A, B, & C from Motor Operated Valves to Manually Operated Valves	July 12, 1994
94-0027	Install a Temperature Controlled Valve in the Emergency Service Water Outlet Line from the Emergency Closed Cooling Water Heat Exchangers	September 24, 1997
95-6100	Pipe Supports 1P45H0218 and H0603-H0608 Shall Be Modified to Change Their U-bolt from Tight Fit to Loose Fit	November 7, 1996
96-4069	Replace Time Delay Relay in the Control Circuit for the Emergency Closed Cooling Water Supply to the P47 System A Chiller	Revision 0

Modifications

97-5070	Install Spacer Blanks in Place of Valves 0P42F551 (Motor Operated Valves) and 0P42F580 (Manual) in Order to Eliminate the Potential for Inter-Loop Leakage	July 14, 1997
00-8008	Relocate Temperature Elements 1P42N050B/ 0261B Farther Downstream from Heat Exchangers to Prevent Spurious Alarms	May 23, 2001
00-8081	Replace 0P42F0295B Stainless Steel Stem-to-Disc Pins with Pins of Higher Strength Material (SA564 Type 630 H1100)	May 23, 2001

Preoperational Tests

1P42-P-001	Emergency Closed Cooling System Preoperational Test	April 30, 1985
1P42-P-001	Emergency Closed Cooling System Preoperational Test Addendum 1	October 22, 1985
1P42-P-001	Emergency Closed Cooling System Preoperational Test Addendum 2	September 20, 1985
1P42-P-001	Emergency Closed Cooling System Preoperational Test Addendum 3	October 25, 1985
1P45-P-001	Emergency Service Water System Preoperational Test	October 7, 1985
TP1P45-P-001	Emergency Service Water System Preoperational Test	May 18, 1986

Problem Identification Forms Reviewed During the Inspection

93-245	Potential of an Inter-system Loss of Water Between the Emergency Closed Cooling Water System and the Nuclear Closed Cooling System During a Design Basis Event	October 8, 1993
96-2159	Emergency Service Water A Flow to the Division 1 Diesel Generator is at the Minimum Permitted by the Updated Safety Analysis Report	November 4, 1997
96-3390	The Flow Balances Established to the Heat Exchangers Serviced by Emergency Service Water Do not Account for the Worse Case Conditions	March 31, 1997

Procedures

ARI-H13-P601-16	Division 3 Diesel Generator & High Pressure Core Spray	November 21, 1994
ARI-H13-P601-17	Residual Heat Removal B & C	September 11, 1992
ARI-H13-P601-20	Residual Heat Removal A	November 28, 1994
ARI-H13-P604-1	Emergency Service Water Loop A Process Radiation Monitor Radiation High	Revision 2

Procedures		
GCI-0016	Scaffolding Erection, Modification or Dismantling Guidelines	Revision 1
ICI-B5-0	Generic Temperature Instrumentation Calibration	March 1, 1993
ICI-B8-0	Generic Recorder Calibration	January 16, 1987
IOI-15	Seasonal Variations	November 10, 1995
MCI-0426	Component/ Part Equivalency Review	July 20, 1998
NEI-0341	Calculations	December 27, 2001
NEI-0375	Equivalent Replacements	August 24, 2000
NEI-0701	Equipment Qualification Process	August 10, 1998
NOP-WM-4001	Foreign Material Exclusion	Revision 0
ONI-E12-2	Loss of Decay Heat Removal	August 27, 2001
ONI-R10	Loss of Alternating Current Power	May 21, 2001
SOI-E22B	Division 3 Diesel Generator System	May 11, 1995
SOI-P40/41	Service Water and Service Water Screen Wash	October 26, 1993
SOI-P42	Emergency Closed Cooling System	March 16, 1996
SOI-P45/49	Emergency Service Water and Screen Wash System	September 19, 1995
SOI-R43	Division 1 & 2 Diesel Generator System	December 28, 1992
SVI-P42-T2001	Emergency Closed Cooling System Pump and Valve Operability Test	Revision 7
TCN-9	Intent Instruction Temporary Change to SOI-P45/49	April 25, 1990
VLI-P42	Emergency Closed Cooling System	September 29, 1995
VLI-P45	Emergency Service Water System	August 22, 1989
Setpoint Changes		
0-96-1034	Change Agastat Time Delay Relay Model/Type	January 30, 1998
0-96-1040	Change Pressure Switch Chiller A Data for Clarification	October 28, 1996
0-02-9 thru 0-02-0014	Change Time Delay Relay Setpoints for Associated Motor Operated Valves 0P42-F150A/B, 0P42-F300A/B, and 0P42-F330A/B Timers	April 9, 2002
1-92-1016	Revise Torque Switch Settings for 1P45F0014A	April 28, 1992
1-92-1017	Revise Torque Switch Settings for 1P45F0014B	September 22, 1997
Special Tests		
AFP 0P42F0295B-006	Motor Operated Valve Test Report	Revision 0
AFP 1P45F0130A-004	Motor Operated Valve Test Report	Revision 0

SVI-P42-T2002	Partial Performance of SVI-P42-T2002 for 0P42F0390A and 0P42F0380A	August 1, 2000
SVI-P42-T2002	Partial Performance of SVI-P42-T2002 for P42F0380A and P42F0390A	February 20, 2002
SVI-P42-T2002	Partial Performance of SVI-P42-T2002 for 0P42F0255B	October 26, 2001
SVI-P42-T2002	Partial Performance of SVI-P42-T2002 for 0P42F0380B and 0P42F0390B	August 21, 2001
SVI-P42-T2002	Partial Performance of SVI-P42-T2002 for 0P42F0440	November 7, 2000
SVI-P42-T2003B	Partial Performance of SVI-P42-T2003B for P42F265B.	August 21, 2001
TXI-0230	P42 Flow Balancing	January 18, 1996
<u>Specifications</u>		
1514	Design, Fabrication and Delivery of Safety Related 3-Way Control Valves	March 15, 1995
E7012/7022	Model E7012/7022 Series Timing Relays, Class 1E	April 30, 1980
<u>Surveillances (completed)</u>		
SVI-E12-T0373	Emergency Service Water Residual Heat Removal A Heat Exchanger Flow Channel Functional/ Calibration	October 10, 2000 January 2, 2001 June 13, 2001 September 10, 2001 December 7, 2001 February 28, 2002
SVI-P42-T2001	Emergency Closed Cooling System Pump and Valve	June 1, 2000
SVI-P45-T0375	Emergency Service Water Flow to Diesel Heat Exchanger Channel Calibration/Functional For 1P45-N206	January 17, 2001 April 9, 2001 July 2, 2001 October 2, 2001 December 20, 2001
SVI-P45-T2001	Emergency Service Water Pump A and Valve Operability Test	October 2, 2001
SVI-P45-T2002	Emergency Service Water Pump B and Valve Operability Test	June 8, 2000 November 22, 2000 December 1, 2000 April 17, 2001 May 18, 2001 July 9, 2001 July 26, 2001 September 22, 2001 January 24, 2002

Surveillances (completed)

SVI-P45-T2003	High Pressure Core Spray Emergency Service Water Pump and Valve Operability Test	May 13, 2000 July 29, 2000 October 27, 2000 January 26, 2001 April 12, 2001 July 11, 2001 January 3, 2002
TXI-0230	P42 Flow Balancing	March 14, 1996

System Descriptions

P42	Emergency Closed Cooling System	Revision 9
P45	Emergency Service Water	Revision 9

System Health Reports

2002-1	Emergency Service Water System Health Report	May 2002
2002-1	Emergency Closed Cooling System Health Report	May 2002

Technical Assignment File

Tab 12	Emergency Closed Cooling Water Pump Curve 25	May 7, 1979
Tab 12	Emergency Closed Cooling Water Pump Curve 26	May 7, 1979
Tab 13	Emergency Service Water Pump A Curve 27	September 26, 1997
Tab 13	Emergency Service Water Pump B Curve 28	September 26, 1997
Tab 13	Emergency Service Water Pump C Curve 29	November 28, 1978

Vendor Manuals

219	NH90 Series Hydramotors Model B & Model B1 Maintenance Manual	February 1991
416	Service Air Compressor Manual	Revision 16
417	Instrument Air Compressor Manual	Revision 15
671	Esterline Angus Multipoint Recorder/Data Logger	

Work Requests

95-000348-0	Perform Meggar Check of Emergency Closed Cooling Water Pump	September 24, 1996
97-000784-0	Replace Motor Control Center Fuses per Field Service Change Request 96-0004	July 22, 1997
99-000017-0	Emergency Service Water Flow from Emergency Closed Cooling Water Heat Exchanger B Channel Functional/Calibration	May 6, 2001
99-005662-0	Clean, Lubricate, Meggar Emergency Closed Cooling Water Pump	August 16, 2001

Work Requests

99-009293-0	Division 1 Emergency Core Cooling System Flow (Remote Shutdown Monitoring) Channel Calibration	July 19, 2000
99-009294-0	Emergency Service Water Flow to Emergency Closed Cooling Water Heat Exchanger Channel Calibration	July 19, 2000
99-010261-0	Emergency Closed Cooling Water System Flow (Remote Shutdown Monitoring) Division 2 Channel Calibration	October 16, 2001
99-010262-0	Emergency Service Water Flow to Residual Heat Removal A Heat Exchanger (Remote Shutdown Monitoring) Channel Calibration	December 5, 2001
99-012459-0	Clean, Lubricate, Meggar Emergency Closed Cooling Water Pump	December 13, 2001
99-012523-0	480v Motor Control Center Bucket Preventive Maintenance	November 7, 2000
99-012524-0	480v Motor Control Center Bucket Preventive Maintenance	November 7, 2000
99-014524-0	Residual Heat Removal A Heat Exchanger's Emergency Service Water Outlet Butterfly Valve Has Greater than 300 Drops per Minute Packing Leak	September 22, 1999
99-014834-0	Replace Agastat Relay in Control Room	December 14, 1999
01-000076-0	Clean, Lubricate, Meggar Emergency Closed Cooling Water Pump	September 10, 2001
01-001345-0	480v Motor Control Center Bucket Preventive Maintenance	May 7, 2001
01-003472-0	Emergency Service Water Flow from Emergency Closed Cooling Water Heat Exchanger	December 5, 2001
01-003474-0	Emergency Service Water Flow Division 1 Diesel Heat Exchanger Channel Functional/Calibration	December 5, 2001
01-003817-0	Emergency Service Water Flow Division 2 Diesel Heat Exchanger Channel Functional/Calibration	January 10, 2002
01-003900-0	Emergency Service Water Flow to Residual Heat Removal B Heat Exchanger (Remote Shutdown Monitoring) Channel B Functional/Calibration	January 10, 2002
01-003998-0	Emergency Service Water Flow Monitor Functional/Calibration for 1P45-N271	February 19, 2002
01-010867-0	Residual Heat Removal A Heat Exchanger's Emergency Service Water Outlet Butterfly Valve Leaking from the Packing on Each Side of the Valve	May 29, 2001
01-012169-0	Motor Operated Valve Preventive Maintenance	September 12, 2001

Work Requests

01-012351-0	Motor Operated Valve Preventive Maintenance	September 12, 2001
01-013257-0	Clean, Lubricate, Meggar Emergency Closed Cooling Water Pump	October 15, 2001
01-017085-0	Emergency Closed Cooling Water B Flow Balance	December 1, 2001
02-006024-0	Residual Heat Removal A Heat Exchanger's Emergency Service Water Outlet Butterfly Valve Leaking from Bottom of Stem	May 22, 2002