December 4, 2000

Mr. R. G. Lizotte, Master Process Owner - Assessment
c/o Mr. D. A. Smith, Process Owner - Regulatory Affairs
Northeast Nuclear Energy Company (NNECO)
P.O. Box 128
Waterford, CT 06385

SUBJECT: MILLSTONE UNIT 2 - NRC INSPECTION REPORT 05000336/2000015

Dear Mr. Lizotte:

On October 20, 2000, the NRC completed a Safety System Design and Performance Capability Inspection at your Millstone Unit 2 reactor facility. The enclosed report presents the results of that inspection. The results of this inspection were discussed on October 20, 2000, with Mr. Stephen Scace and other members of your staff.

The inspection was an examination of 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. Within these areas, the inspection consisted of a selected examination of procedures and representative records, observations of activities, and interviews with personnel.

The NRC identified four issues that were evaluated under the risk significance determination process and were determined to be of very low safety significance (Green). These issues have been entered into your corrective action program and are discussed in the summary of findings and in the body of the attached inspection report. These four issues were determined to involve violations of NRC requirements, but because of their very low safety significance the violations are not cited. If you contest these Non-Cited 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, D.C. 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Millstone 2 facility.

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

Sincerely,

Daniel H. Dorman for:

Wayne D. Lanning, Director
Division of Reactor Safety

Docket Nos. 05000336
License Nos. DPR-65

Enclosure: Inspection Report 05000336/2000-015

cc w/encl:
B. D. Kenyon, President and Chief Executive Officer - NNECO
R. P. Necci, Vice President - Nuclear Technical Services
L. J. Olivier, Senior Vice President and Chief Nuclear Officer - Millstone
E. S. Grecheck, Vice President - Generation
F. C. Rothen, Vice President - Nuclear Work Services
J. T. Carlin, Vice President - Human Services - Nuclear
G. D. Hicks, Master Process Owner - Training
C. J. Schwarz, Master Process Owner - Operate the Asset
D. A. Smith, Process Owner - Regulatory Affairs
L. M. Cuoco, Senior Nuclear Counsel
J. R. Egan, Esquire
N. Burton, Esquire
V. Juliano, Waterford Library
J. Buckingham, Department of Public Utility Control
E. Wilds, Director, State of Connecticut SLO Designee
First Selectmen, Town of Waterford
D. Katz, Citizens Awareness Network (CAN)
T. Concannon, Co-Chair, NEAC
R. Bassilakis, CAN
J. M. Block, Attorney, CAN
G. Winslow, Citizens Regulatory Commission (CRC)
E. Woollacott, Co-Chair, NEAC

Distribution w/encl: (VIA E-MAIL)
H. Miller, ORAI/J. Wiggins, ORA (1)
E. Adensam, NRR (ridsnrrdipmlpdi)
J. Clifford, NRR
V. Nerses, PM, NRR
T. Madden, OCA
D. Thatcher, NRR
J. Shea, OEDO
J. Zimmerman, PM, NRR
S. Jones, SRI - Millstone Unit 2
A. Cerne, SRI - Millstone Unit 3
J. Linville, DRP
R. Summers, DRP
K. Jenison, RI
R. Junod, DRP
D. Screnci, PAO
M. Oprendek, DRP
Region I Docket Room (with concurrences)

DOCUMENT NAME: C:\mil20015.wpd
After declaring this document "An Official Agency Record" it **will/will not** be released to the Public.
To receive a copy of this document, indicate in the box: "**C**" = Copy without attachment/enclosure "**E**" = Copy with attachment/enclosure "**N**" = No copy

OFFICE	RI/DRS		RI/DRS		RI/DRP		RI/DRS			
NAME	R Fuhrmeister		LDoerflein(LJP for)		J Linville		W Lanning			
DATE	12/04/00		12/04/00		12/04/00		12/04/00			

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No:	50 - 336
License No:	DPR-65
Report No:	05000336/2000-015
Licensee:	Northeast Nuclear Energy Company
Facility:	Millstone Nuclear Generating Station Unit 2
Location:	P.O. Box 128 Waterford, CT 06385
Dates:	October 2 - 6, 2000 and October 16 - 20, 2000
Inspectors:	R. Fuhrmeister, Sr. Reactor Engineer, Division of Reactor Safety (DRS) K. Jenison, Senior Project Engineer, Division of Reactor Projects (DRP) G. Morris, Reactor Engineer, DRS R. Bhatia, Reactor Engineer, DRS A. Lohmeier, Reactor Engineer, DRS A. Smith, Reactor Engineer, DRS J. Panchison, Contract Engineer
Approved By:	Lawrence T. Doerflein, Chief Systems Branch Division of Reactor Safety

Daniel H. Dorman for:

TABLE OF CONTENTS

SUMMARY OF FINDINGS

IR 05000336/2000015, on 10/2/00 - 10/6/00 and 10/16/00 - 10/20/00, Northeast Nuclear Energy Company, Millstone Nuclear Generating Station Unit 2, Safety System Design and Performance Capability.

The report includes the results of a two-week team inspection, conducted by region-based inspectors, of the design and capability of the reactor building closed cooling water (RBCCW) and the 125 volt direct current (DC) electrical systems, and the conduct of evaluations of changes, tests and experiments under the 10 CFR 50.59 process.

Cornerstone: Mitigating Systems

- GREEN. The team found that the licensee had failed to control the inputs and assumptions used in the calculations for determining battery sizing. The failure to correctly provide adequate design inputs and assumptions for the design margin correction factor in the above calculations was considered to have low risk significance (GREEN) because there was negligible impact to the operability of the system based on compensating margins and testing. The above example of the licensee's failure to verify or check the adequacy of design calculations was the first example of a Non-Cited violation of 10 CFR 50, Appendix B, Criterion III, "Design Control." (Section 1R21.3)

- GREEN. The team found that the licensee had used the incorrect discharge current in the turbine battery surveillance test performed in April 2000. The test results indicated a battery capacity of 140% when, in actuality, a capacity of less than 100% was demonstrated by the test. The failure to use the correct discharge current in the above surveillance test was considered to have low risk significance (GREEN) because there was negligible impact to the operability of the system based on compensating margins. This was an example of the licensee's failure to correctly translate a design change into plant procedures and a Non-cited violation of 10 CFR 50, Appendix B, Criterion III, "Design Control." (Section 1R21.4)

- GREEN. The team found that the licensee had failed to provide adequate review of the acceptance criteria for the battery surveillance discharge tests. The problems identified included incorrect minimum voltage for the service test acceptance criteria for both the safety-related station batteries and the Technical Specification (TS) required turbine batteries, both TS surveillance tests. The team evaluated this condition using the significance determination process and found the condition to be of very low safety significance (Green). This is based on a review of the 18 month surveillance tests that indicates that the lowest measured voltage at the end of the duty cycle is above 115 VDC and, therefore the batteries would perform the safety functions. This failure to properly translate design information into test acceptance criteria is a violation of 10 CFR 50, Appendix B, Criterion III, Design Control. This violation is considered a Non-Cited Violation (50-336/00015-01) consistent with Section VI.A of the Enforcement Policy. (Section 1R21.4)

- GREEN. The team found that the licensee had missed their prescribed calibration on the instruments for the battery charger voltmeters. The failure to maintain the calibration frequency was considered to have low risk significance because it would not prevent the system from preforming its required safety function due to the compensating margins. The failure to perform the required calibrations as identified in the design documents was a Non-Cited Violation of 10 CFR 50, Appendix B, Criterion XI, “Test Control.” (Section 1R21.4)

Report Details

1. REACTOR SAFETY

Cornerstone: Mitigating Systems

1R02 Evaluations of Changes, Tests, or Experiments

a. Inspection Scope

The team reviewed the safety evaluations for a sample of special tests, technical evaluations, design change notices, design change records, and safety evaluations using Procedure 71111, Attachment 2. The selections were based on risk significance of the equipment or activity. Related materials, including associated calculations, procedure revisions, operability evaluations, procedure changes, and operator compensatory activities were also reviewed. A sample of tests, design changes, and modifications which had been determined by the licensee to not need 10 CFR 50.59 evaluations was also reviewed to verify that the screen out process was appropriately implemented by the licensee. A sample of problem identification and resolution data related to 10 CFR 50.59 was reviewed to verify that technical concerns and regulatory requirements were adequately resolved in the licensee's corrective actions system. Additional supporting materials were reviewed to determine if the licensee was adequately identifying problems related to 10 CFR 50.59 in its internal audit and overview functions.

b. Findings

There were no findings identified.

1R21 Safety System Design and Performance Capability

Introduction

The reactor building closed cooling water (RBCCW) and the 125 volt direct current (125 VDC) power systems were reviewed using Procedure 71111, Attachment 21. The RBCCW and 125 VDC systems were selected because they are critical support systems for the mitigating systems used to respond to accidents and events at the facility.

.1 Reactor Building Closed Cooling Water System Designs

a. Inspection Scope

The team reviewed the licensee's electrical and instrumentation control design and licensing basis for the reactor building closed cooling water system. The reviews were performed to verify that: (1) the design basis was in accordance with the licensing commitments and regulatory requirements; (2) the design output documents, such as pump motor and valve design loads in procurement specifications and design control drawings, were correct; and (3) the installed system and components were tested to verify the design bases were met. For the documents reviewed, which included voltage drop and short circuit calculations and analyses, the team verified that the assumptions

were appropriate, that proper engineering methods and models were used, and that there was an adequate technical basis to support the conclusions. Where possible, the team performed independent calculations to evaluate the document adequacy.

The team reviewed the Updated Final Safety Analysis Report (UFSAR) to establish the design and licensing basis for the RBCCW components and control configuration, and the supporting interfacing systems design. The piping and instrumentation drawings (P&IDs), the electrical power distribution and protection schemes and logic and control drawings, and the installed configurations were also reviewed to assess the capability of the system to satisfy the design intent. The team performed walkdowns of selected system components such as pumps, valves, control stations (local and main control room), heat exchangers, station batteries, battery chargers, inverters, 4.16 kV buses, emergency diesel generators, motor control centers and ac and dc distribution panels.

The team also conducted other component design reviews, including components from supporting systems, such as:

- Valves used for isolation between the safety related and non-safety related systems
- Bypass valves around heat exchangers
- Instrumentation and control
- The design requirements for pump drivers and valve operators
- Electrical degraded and undervoltage relay device setpoint requirements and operation with both offsite power and in the emergency diesel loading and sequencing modes

The inspectors reviewed design documents and calculations to verify that the reactor building closed loop cooling water system was capable of providing design basis flow to system components during the five system operating conditions. Additionally, the inspectors reviewed actual flow balance testing data obtained during the last RBCCW flow balance to assure consistency and compliance with design basis calculation assumptions.

The team reviewed design documents and calculations to verify that the heat rejected to the reactor building closed loop cooling water heat exchanger was adequately transferred to the plant's safety related service water system under normal and abnormal operating conditions. The team further reviewed actual heat exchanger thermal performance test documentation and the licensee's analysis of this test data to verify cooling capability and to verify that acceptable fouling and appropriate tube plugging assumptions were considered.

The team reviewed Condition Report M2-00-1233 which was generated to address the lifting of thermal relief valves in the RBCCW system. The team reviewed an engineering evaluation which determined the cause of the valve failures as well as the licensee's Technical Evaluation M2-EV-000034 with regard to the relief valve lifting event. The team also reviewed Design Modifications DM2-04-0346-97 and DM2-00-0355-00 which implemented gagging of the relief valves. This issue is also discussed in section 1R21.2.

The team reviewed design documents, performed an RBCCW system walkdown, and reviewed system operating procedures to assure that system train separation was maintained. The team also reviewed Engineering Record Correspondence (ERC) 25203-ER-0413 which addressed procedure changes to address RBCCW loss of inventory, and also reviewed Chemical Addition Procedure CP-2802E.

b. Findings

There were no findings identified.

.2 Reactor Building Closed Cooling Water System Operation, Maintenance and Testing

a. Inspection Scope

The team reviewed selected operating and preventive maintenance procedures and test results to assess whether the RBCCW system was being operated and maintained in accordance with the system requirements. Work orders, system health reports, and various corrective actions taken to upgrade the RBCCW pump motors, valves and control components required to support this system were reviewed. The adequacy of surveillance and preventive maintenance testing to ensure that adequate cooling water flow would be supplied to the safety-related components during worst case accident conditions was also reviewed. The team also reviewed the test results and surveillance test procedures for the engineered safeguard safety system actuation logic which provided input to the RBCCW system.

The team reviewed the adequacy of the licensee's implementation of the Millstone Plant Unit 2 (MP2) inservice test (IST) program for pumps and valves in the safety-related reactor building closed cooling water (RBCCW) system. The inspectors reviewed the RBCCW pump quarterly inservice performance tests. This review included the applicable Technical Specifications and surveillance test procedures and focused on the capability of the RBCCW system to provide adequate cooling water supply to the RBCCW heat exchangers, containment air coolers, and other vital components. Special attention was given to the acceptance criteria invoked for the pump test to assure that the most limiting design basis conditions were enveloped.

The team reviewed the licensee compliance with the MP2 RBCCW system pump IST and the MP2 RBCCW system valve IST program. The requirements for these programs are identified in MP-24-IST-REF00, FSAR Section 9.4.1, and Technical Specification Section 4.7.3.1. Additionally, included were the requirements of ASME/ANSI "Operations and Maintenance (OM) 1987 Standards, Parts 6 and 10 respectively, Inservice Testing of Pumps in Light Water Reactor Power Plants" (OM - 6), and Addenda OMa -1988 as referenced in 10CFR50.55a and ASME Section XI, 1989 Edition.

The team examined IST results for the three RBCCW system Ingersoll-Rand Model 12SD Centrifugal Pumps P-11A, P-11 B, and P-11C to verify the ability of each pump to perform the safety function of providing up to 7,000 gpm flow at 150 feet head. The team examined IST results performed at system design flow rates or lower flow rates should the design flow rate under test conditions not be achieved. The team examined

measurements of the differential pressure, flow, and vibration recorded during each test. The types of test results examined included those at high (or low) flow, variable resistance, with flow set to initially established reference flows based on the initial operating acceptance tests of pumps P11-A, B, and C. The team further examined the results of the IST pump vibration surveillance tests to ascertain the safe continued operation of the pumps at acceptable levels of vibration over the inspection interval.

The team reviewed the IST procedures and test results for 51 valves (excluding relief valves) that regulate the flow to components served by the RBCCW system. The team reviewed 16 IST summary reports for RBCCW system valves that identified for each test, the actuator type, valve type, safety position, system location, valve class, category, size, test procedure used, performance dates, acceptance criteria, limiting time, and results. The detailed results of selected valve tests were examined by the team and compared to reference values. The team reviewed valve IST results to determine if the measured valve flow rates and differential pressures were within acceptable limits with no adverse performance trends noted. Other parameters related to the various design functions were reviewed by the team, including remote position indication, close/open stroke time, operational readiness, elapsed time for test from closed/open position, fail-locked test (drift) for operational readiness, and elapsed time for test from open/closed position, and the timeliness of implementation of the various valve tests. The team reviewed the data found acceptable by the licensee with no adverse trends noted.

The team reviewed the disposition of 40 RBCCW system Crosby thermal relief valves. The relief valves were “gagged” to ameliorate the valve leakage resulting from pressure spikes in the system. The team reviewed Design Change Notice (DCN) DM2-00-0355-00, “Installing Gagging Devices on the RBCCW Thermal Relief Valves.” The team reviewed the supporting documentation related to this modification, including safety evaluation S2-EV-000-0063 and the licensee basis for “gagging” the thermal relief valves while the RBCCW system was in operation. The team reviewed the proposed administrative controls that would remove the “gags” during isolated testing of components. The licensee continues to evaluate this issue and the team reviewed the proposal to operate with ”gagged“ valves through cycle 14, after which a decision will be made to provide a permanent solution to the leakage problem.

b. Findings

There were no findings identified.

.3 125Volt DC Emergency Electrical System Design

a. Inspection Scope

The team reviewed the design and licensing basis for the 125 VDC power system to verify that the performance requirements and capability of risk significant components associated with, or supporting, the system would not be degraded through plant modifications or the licensee's failure to perform assumed preventive maintenance and to verify that modifications that have been performed do not place the plant in an unsafe condition. The team reviewed the design basis documentation to verify that the system would function as required when called upon to do so. The review included the appropriateness of design assumptions, adequacy of analytical models and methods, engineering calculations, and acceptance criteria for in-service tests.

To support those activities, the team performed walkdowns of the following system components including: control station locations including local, Main Control Room, and Remote Shutdown Panel; electrical power supplies including the emergency diesel generators (EDGs), the 5 kV switchgear, 480 V load centers and motor control centers (MCCs); the 125 Volt dc batteries; battery chargers; DC switchgear and power panels; and the safety-related inverters.

The team also conducted design reviews of the risk-significant components of the system. This review included instrumentation and control, including local and Main Control Room control, remote shutdown control, monitoring significant variables, initiating signals, interlocks, shutdown, and isolation signals and Post Accident Monitoring instrumentation; electrical voltage relay setpoint, including motor overcurrent protection, and MOV thermal overload selection; cable sizing and routing including pump cable ampacity, cable separation; sizing of the station batteries and turbine battery; sizing of the battery chargers and inverters; DC system voltage and current studies; DC system surveillance procedures; DC system component maintenance procedures; DC system operating procedures; DC system alarm response procedures; and the as-built condition of the system.

b. Findings

The team found that the Millstone 2 battery sizing calculations, 97-ENG-01774, 01775 & 01776-E2, failed to acknowledge the potential "less than optimum battery maintenance" as a factor in the Design Margin correction for the battery sizing calculations as described in IEEE Standard 485, Sizing Large Stationary Batteries. The Millstone 2 batteries have a nominal electrolyte specific gravity of 1.215. The Millstone 2 weekly and quarterly surveillance procedures accept a minimum electrolyte specific gravity of 1.200. Using the common rule-of- thumb of .003 points of specific gravity equates to 1.0% capacity, the difference between nominal and minimum acceptable could equate to 5% loss of capacity. This discrepancy should have been addressed in the Design Margin factor in the sizing calculation.

The failure to use correct design inputs and assumptions in the battery sizing calculations was considered to have low risk significance (GREEN) because there was negligible impact to the operability of the system based on compensating margins and

testing. This failure to verify or check the adequacy of design calculations is a violation of 10 CFR 50, Appendix B, Criterion III, Design Control. However, this violation is considered a Non-cited Violation (50-336/00015-01) consistent with Section VI.A.1 of the General Statement of Policy and Procedures for NRC Enforcement Actions, (NUREG-1600), issued May 1, 2000 (Enforcement Policy). The issues associated with this non-cited violation are being tracked in the corrective action program under Condition Report CR-M2-00-2776.

.4 125 VDC System Operation and Maintenance, and Testing

a. Inspection Scope

The team reviewed selected equipment technical manuals, operating procedures, surveillance procedures, and preventive maintenance procedures to assess whether the selected systems and components were being operated, tested and maintained in accordance with the system design.

b. Findings

The team found that the licensee had used an incorrect discharge current in the turbine battery surveillance test performed in April 2000. The test results indicated a battery capacity of 140% when, in actuality, a capacity of less than 100% was demonstrated by the test.

The team found that the turbine battery performance test, a technical specification required surveillance test using procedure SP 2736F, “Turbine Battery Test,” used the wrong discharge current and had calculated the battery capacity to be 140% of design. The licensee’s review of the test data at the time of the test failed to identify that the 8 hour test, which ran for 11.2 hours, used the discharge current specified for the previous, smaller, turbine battery. When the battery was replaced under DCR M2-97046/ EWR 2-95-00087, the related test procedures were not updated with the new battery discharge rate.

The failure to correctly translate design information into the performance test procedure acceptance criteria was considered to have low risk significance (GREEN) because there was negligible impact to the operability of the system. This failure to adequately translate the design into test procedures is a violation of 10 CFR 50, Appendix B, Criterion III, Design Control. This violation is considered a Non-cited Violation (50-336/00015-01) consistent with Section VI.A.1 of the General Statement of Policy and Procedures for NRC Enforcement Actions,(NUREG-1600), issued May 1, 2000 (Enforcement Policy). The issues associated with this violation are being tracked in the corrective action program under Condition Report CR-M2-00-2782.

The team found that the battery service test acceptance criteria used a nominal system minimum voltage of 105 volts rather than the battery minimum voltage used in the DC system voltage drop calculations. The condition pertained to both the Technical Specification required turbine battery and the safety-related batteries. The team evaluated this condition using the significance determination process and found the

condition to be of very low safety significance (Green). This is based on a review of the 18 month surveillance tests that indicates that the lowest measured voltage at the end of the duty cycle is above 115 VDC and therefore the batteries would perform their safety functions. This failure to properly translate design information into test acceptance criteria is a violation of 10 CFR 50, Appendix B, Criterion III, Design Control. This violation is considered a Non-Cited Violation (50-336/00015-01) consistent with Section VI.A of the Enforcement Policy. This issue is being tracked in the corrective action program under CR-M2-00-2718.

The team found that the latest calibration for the 201A and 201D DC switchboard under-voltage relays, performed in 1994, failed to record the as-found and as-left dropout voltage settings. The team found the last calibrations for the battery charger voltmeters had been performed in 1994 and 1995 and had not been rescheduled for re-calibration until 2002. The Millstone 2 preventive maintenance program identifies that these calibrations should have been performed on a four-year cycle. Commitment AR 98020252-01, in response to an NRC SER on the ATWAS design, indicated the under-voltage relays would be tested once each refueling cycle. The licensee issued CR-M2-00-2857 to address these missed calibrations.

The failure to maintain the calibration frequency was considered to have low risk significance (Green) because it would not prevent the system from performing its required safety function due to the compensating margins. The failure to perform the required calibrations as identified in the design and licensing documents is a violation of 10 CFR 50, Appendix B, Criterion XI, Test Control. This violation is considered a Non-Cited Violation (50-336/00015-02) in accordance with Section VI.A of the Enforcement Policy.

4. OTHER ACTIVITIES

4OA1 Identification and Resolution of Problems

a. Inspection Scope

The team reviewed activities associated with the identification and resolution of problems associated with the reactor building closed cooling water (RBCCW) and the direct current (DC) systems. The team reviewed a sample of condition reports associated with the selected systems to evaluate the adequacy of the corrective actions that were identified and also assessed the timeliness of the completion of the corrective actions. For the selected corrective actions the team also reviewed associated operability evaluations and/or verified the completion of corrective actions.

b. Findings

There were no findings identified.

4OA5 Management Meetings

.1 Exit Meetings

The team presented the results of the inspection to Mr. Stephen Scace and other members of your staff at the conclusion of the inspection on October 20, 2000. The findings presented were not contested at that time.

The inspector asked whether any of the materials examined during the inspection were considered to be proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

E. Grechek, Vice President, Generation
R. Necci, Vice President, Technical Services
B. Wilkens, Director, Design Engineering, (former Master Process Owner, Procurement)
S. Scace, Director, Nuclear Oversight and Regulatory Affairs, (former Master Process Owner, Manage the Asset, Engineering)
C. Maxson, Director, MP2 Design Engineering
R. Lizzotte, Master Process Owner, Assessment
D. Smith, Process Owner, Regulatory Affairs
D. Hagan, Process Owner, Operations
M. Ahern, Process Owner, Oversight
C. Schwarz, Station Director
P. Grossman, Deputy, Manage the Asset, Engineering
S. Heard, Manager, Performance Assessment
F. Mattioli, Audit Team Leader, Engineering
T. Cleary, NRC Coordinator, Regulatory Affairs
D. Fredericks, NRC Coordinator, Regulatory Affairs
M. Marino, Design Engineering
N. Jaycox, Senior Design Engineer
T. Soboleski, Senior Design Engineer
R. Kasuga, System Engineer
D. Godinez, Operations Engineer
T. Hendy, Liaison
B. Lockett, Liaison
A. Pjura, Liaison
B. Sharrow, Liaison
L. Schwartz, Liaison
W. Bellows, Systems Engineer, IST
T. Ickes, Systems Engineer, IST
J. Diluca, Electrical Design Engineering
B. Malik, System Engineer

NRC

L. Doerflein, Chief, Systems Branch
S. Jones, Senior Resident Inspector

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

336/00015-01	NCV	Failure to properly translate design information into procedure for the battery service test acceptance criteria.
336/00015-02	NCV	Failure to provide adequate controls on testing for the battery charger voltmeters and under-voltage relays

LIST OF ACRONYMS USED

ASME	American Society of Mechanical Engineers
CFR	Code of Federal Regulations
CR	Condition Report
CTMT	Containment
DBS	Design Basis Summary
DCN	Design Change Notice
EDGR	Emergency Diesel Generator
FSAR	Final Safety Analysis Report
HPSI	Hjgh Pressure Safety Injection
IST	Inservice Testing
LPSI	Low Pressure Safety Injection
MP2	Millstone Plant Unit 2
OM	Operations and Maintenance
RBCCW	Reactor Building Closed Cooling Water
RCP	Reactor Coolant Pump
RV	Reactor Vessel
SI	Safety Injection
TS	Technical Specification
VDC	Volts, Direct Current

ATTACHMENT 1 - LIST OF DOCUMENTS REVIEWED

Condition Reports

M2-99-4015	M2-99-1172	M2-99-2292	M2-99-2293
M2-99-4025	M2-00-0429	M2-00-0534	M2-99-0553
M2-99-0242	M2-99-0480	M2-99-0528	M2-99-1591
M2-99-3131	M2-98-3307	M2-98-3838	M2-00-1233
M2-00-1609	M2-00-2167	M2-00-1621	M2-00-1573
M2-00-1388	M2-00-1385	M2-99-3120	M2-99-1471
M2-99-0908	M2-99-0796	M2-00-1608	M2-00-1189

Safety Evaluations

S2-EV-97-0035	S2-EV-98-0003	S2-EV-98-0008	S2-EV-98-0009
S2-EV-98-0010	S2-EV-98-0013	S2-EV-98-0018	S2-EV-98-0047
S2-EV-98-0065	S2-EV-98-0194	S2-EV-98-0307	S2-EV-98-0340
S2-EV-99-0004	S2-EV-99-0011	S2-EV-99-0019	S2-EV-99-0034
S2-EV-99-0039	S2-EV-99-0052	S2-EV-99-0058	S2-EV-99-0079
S2-EV-99-0083	S2-EV-99-0124	S2-EV-00-0011	S2-EV-00-0016
S2-EV-00-0024	S2-EV-99-0034	S2-EV-99-0036	S2-EV-99-0049

Procedures

RAC 12, Revision 2, Safety Evaluation Screens
DCM 01, Revision 8, Policy and Overview Process
WC 10, Revision 3, Temporary Modifications
DCM 04, Revision 7, Design Inputs and Design Verification
DCM 05, Revision 7, Calculations
MP 05, Revision 4, Manuals, Procedures and Guidelines
DCM 02, Revision 7, Engineering Work Assignments
DCM 03, Revision 8, Design Changes
DCM 07, Revision 7, Design Drawing Control
DCM 01, Revision 7, 10 CFR 50.54(f) Information
DCM 12, Revision 7, Safety Functional Requirements
PT21461B, Revision 6, MP2 Timing Device Calibration Program
SP 2736E, Revision 9, Battery Service Test
SP 2736F, Revision 007-02, Battery Performance Discharge Test
SP 2736G, Revision 9, Battery Charger Capacity Test
SP 2736H, Revision 1, Battery Weekly and Quarterly Surveillance
SP 2611A, Rev. 8, “A” RBCCW Pump Test Procedure
IC 2429A, Revision 9, Safety-Related Instrument Calibration-Operating
SP 2403BA, Revision 1, Millstone 2 Instrumentation & Control Procedure for Facility 1 ESAS UV, RSST and Sequencer Calibration and Functional Test
SP 2403GA, Revision 0, Millstone 2 Instrumentation & Control Procedure for Facility 1 RSST UV Time Delay Calibration

ATTACHMENT 1 - LIST OF DOCUMENTS REVIEWED

MP-2721J, Maintenance Procedure-Periodic Inspection of Unit 2 Tanks
AOP 2564, Abnormal Operating Procedure - Loss of RBCCW
MP-24-IST-FAP01.2, Inservice Test Program Implementation, Rev 0, 11/1/99
SP 2611B-2, RBCCW Pump "C" IST

Calculations

00-ENG-02975-C2, Revision 0, Containment Pressure
89-ENG-078-881ES, Revision 3, Target Thrust/Torque
00-ENG-6ST97C024, Revision 1, Auxiliary Feedwater (AFW) Flow
M2-PRI01-222-EM, Revision 1, Auxiliary Feedwater (AFW) Flow
PA-79-126-01027E2, Revision 1, Emergency Diesel Generator (EDG) Loading
00-ENG-02975-C2, Revision 1, Containment Vapor Barrier
98-ENG-027045-E2, Revision 0, Containment Loop Pressure
97-ENG-01775-E2, Revision 1, Vital Battery Charger Load
PA79-126-1027-E2, Revision 2, MP2 EDG Loading Calculation
PA89-078-272E2, Revision 0, MP2 MOV Voltage Drop Calculation
PA91-004-286E2, Rev. 1, Millstone Unit 2-6.9kV, 4.16 kV, 480V Short Circuit & Equipment Duty Analysis
PA98-ENG-02767E2, Revision 0, Calculation of Analytical Limit and Minimum Bus Voltage at 4160 V Emergency Buses during Large Break LOCA
98-ENG-02678-E2, Revision 0, Cable Size Assessment for Class 1E Cables and select Non-Class 1E Cables (4160 VAC, 480VAC, 120V Vital AC and 125 VDC)
PA91-004-0317E2, Revision 3, Emergency Bus Undervoltage ESAS Input Error
92-030-131111E2, Revision 01, Emergency Bus Undervoltage Setpoint Analysis
97-ENG-01912E2, Revision 0, 4.16kV Switchgear Relay Settings
GLRBCCW-02139C2, RBCCW Piping Code Qualification for GL-96-06 Water Hammer Loads & Temperature Changes

Technical Evaluations

TE-M2-EV-99-0078, Revision 0, Operability of Service Water Supply to "A" EDG
SP-ST-ME-9947, Revision 0, Non Code Repair in Safety Class 3 Piping
MTE-1128, Revision 1, Volumetric Model 14342-3 Leak Rate Monitor Calibration
M2-EV-99-0060, Revision 0, Adequacy of Operation for Safety Related Motors, Heaters and Battery Charger at Less than 90% of Rated Voltage
97-ENG-01962-M2, RCS Cooldown Time With Reduced RBCCW Flow During Normal Shutdown
97-ENG-01862-M2, RBCCW System Heat Loads and Flow Rates
MP2-PRA-89-014, MP2 Summary of Plant Specific Thermal Hydraulic Analysis and Bases for Success Criteria, Revision 4
006-ST97-C-019, RBCCW Peak Temperature Analysis for Millstone Unit 2, Revision 1
97-064, MP2 RBCCW Component Outlet Temperature for Headers "A" and "B"
00-067, Analysis of X-18A and B HX Thermal Performance Test Results, Revision 0
1F20-3 (Bechtel), RBCCW Surge Tank Sizing
97-169, MP2 RBCCW Design Basis Flow Distribution, Revision 3,

ATTACHMENT 1 - LIST OF DOCUMENTS REVIEWED

97-170, MP2 RBCCW System Documentation of Proto-Flo Thermal Hydraulic Model, Revision 0, CN 1
M2-EV-97-0021, Evaluation of RBCCW Design Pressure
M2-EV-98-0075, RBCCW Pump Shifting and Evaluation of Check Valve Slam
M2-EV-00-0034, RBCCW Thermal Relief Valve Lifting from RBCCW Pump Starts

Drawings

25203-26022 1 of 6, Piping and Instrumentation Diagram RBCCW System
25203-26022 2 of 6, RBCCW System Spent Fuel and Shutdown Heat Exchangers
25203-26022 3 of 6, RBCCW System Containment Pump and SI Pump Coolers
25203-26022 4 of 6, RBCCW System RCP Thermal Barriers and LO Coolers
25203-26022 5 of 6, RBCCW System Containment Air Recirculation and Coolant Unit
25203-26022 6 of 6, RBCCW System RV Support Concrete Cooling Coils
MP 2703B5 Rev. 8, RBCCW Pump Sectional Assembly and Parts List pp 29-30
MP 2703B5 Rev. 8, RBCCW Pump/Motor Coupling Offset Detail pp 31,32
25203-28122, Sheet 11, Revision 6, Logic Diagram RBCCW Pumps
25203-28150 Sh. 1, Revision 6, Engineered Safety Logic
25203-28150, Sh. 2C, Revision 2, Engineered Safety Logic Actuated Equipment Tabulation
25203-28150, Sh. 3, Revision 4, Engineered Safety Logic Sequencer & Channel 5 Output
25203-28122, Sh. 14, Revision 3, Logic Diagram RBCCW Safeguard Room Outlet Valves
25203-28122, Sh. 15, Revision 2, Logic Diagram RBCCW Shutdown HX Outlet Valves
25203-28122, Sh. 19, Revision 4, Logic Diagram RBCCW Air Recirc. Cooler Contain Valves
25203-30001, Revision 18, Millstone Unit 2 Main Single Line Diagram
25203-30005, Revision 14, Single Line Meter & Relay Diagram 4.16KV Emergency. Buses 24C, 24D
25203-30006, Sheet 1,Revision 7, Single Line Meter & Relay Diagram 4160V Emergency Diesel Generator H7A9
25203-30009, Revision 7, Single Line Meter & Relay Diagram 4.16KV Emergency Bus 24E
25203-30011, Sheet 37D, Revision 5, Emergency MCC B52(22-2E) Facility Z1 Load Summary AUX BLDG
25203-30011, Sheet 42E, Revision3, Emergency MCC B62 Facility Z2 Load Summary AUX. BLDG.
25203-30022, Sheet 1, Revision 11, 125 VDC & 120 VAC Distribution Panel Schedule (DV10)
25203-30022, Sheet 3, Revision 13, 125 VDC & 120 VAC Distribution Panel Schedule (DV20)
25203-30108, Sheet 14, Revision 2, 4160V System Relay Settings
25203-32015, Sheet 1, Revision 17, Electrical Control Schematic for RBCCW Pump MP11A
25203-32015, Sheet 2, Revision 17, Electrical Control Schematic for RBCCW Pump MP11B
25203-32015, Sheet 3, Revision 16, Electrical Control Schematic for RBCCW Pump MP11C
25203-32015, Sheet 8, Revision 9, Electrical Control Schematic for RBCCW Safeguard Room HX Outlet SOV. HV6731 (2-RB-68.1A)
25203-32015, Sheet 10, Revision 11, Electrical Control Schematic for RBCCW Shutdown Heat Exchanger Outlet SOV. HV6050 (2-RB-13.1A)
25203-32015, Sheet 12, Revision 12, Electrical Control Schematic for RBCCW Spent Fuel Pool HX. Outlet SOV HV66315 (2-RB-8.1A)
25203-32015, Sheet 20, Revision 8, Electrical Control Schematic for RBCCW Inlet HDR. “A” Isolation MOV. HV6096 (RB-30.1A)

ATTACHMENT 1 - LIST OF DOCUMENTS REVIEWED

25203-32015, Sheet 21, Revision 9, Electrical Control Schematic for RBCCW Inlet HDR. "B" Isolation MOV. HV6095 (RB-30.1B)
25203-32015, Sheet 31, Revision 13, Electrical Control Schematic for Containment Air Recirc. Cooler Cont. Valve SOV. HV6080 (2-RB-28.3A)
25203-32015, Sheet 35, Revision 10, Electrical Control Schematic for Sample & Degasifier Effluent Coolers Stop Valve SOV. HV6739 (2-RB-210)
25203-32021, Sheet 01, Revision 6, Electrical Control Schematic for Battery Room Roof Exhaust Fan MF112A
25203-39047, Sheet 9, Revision 9, Schematic Electrical Millstone Point Safety Feature Actuation System
25203-39047, Sheet 10, Revision 9, Schematic Electrical Millstone Point Safety Feature Actuation System
25203-39047, Sheet 11, Revision 10, Schematic Electrical Millstone Point Safety Feature Actuation System
25203-39047, Sheet 12, Revision 6, Schematic Electrical Millstone Point Safety Feature Actuation System
25203-39047, Sheet 13, Revision 9, Schematic Electrical Millstone Point Safety Feature Actuation System
25203-39047, Sheet 14, Revision 9, Schematic Electrical Millstone Point Safety Feature Actuation System
25203-39047, Sheet 15, Revision 9, Schematic Electrical Millstone Point Safety Feature Actuation System
25203-28122, Logic Diagram - RBCCW Pumps
Allis Chalmers Valve Drawing 25203-29054
25203-29031, RBCCW Surge Tank T-3
25203-26022, RBCCW P&ID, Sheet 1 thru 6

Design Change Notices

DM2-00-0192-97, "Reactor Building Closed Cooling Water (RBCCW) Relief Valve Replacemen", dated March 25, 1997
DM2-00-0097-98, Installation of Raychem Splices, dated February 4, 1998
DM2-00-0355-00, RBCCW Relief Valve Gag Installation, dated May 29, 2000
DM2-00-0358-98, RBCCW Vent Valve Lock Wire, dated March 2, 1998
DM2-00-1327-97, RBCCW Minimum Recirculation Line Orifice Replacement, dated March 6, 1998
DM2-00-1560-99, RBCCW Penetration Isolation Valve Groove Pins and Set Screws, dated December 3, 1999
DM2-00-1042-97, RBCCW Valve Motor Operator Gear Changes, dated September 17, 1997
DM2-00-0152-98, Main Steam Line Break Analysis 2-SI-656, dated March 27, 1999
DM2-00-0102-98, Motor Operated Valve Ring Packing and Gear Changes, dated February 2, 1998
25203-28122, Logic Diagram - RBCCW Pumps
DM2-04-0346-97, Design Change Notice, Gag Relief Valve 2-RB-330

ATTACHMENT 1 - LIST OF DOCUMENTS REVIEWED

Design Change Records

M2-06074, Revision 1, RBCCW Valve Motor Operator Gear Replacement
M2-97011, Revision 0, Emergency Diesel Generator (EDG) Prelube, Slow Start, Ready to Load, Alarm Modification
M2-97015, Revision 0, RBCCW System - Addition of Check Valves
M2-97017, Revision 0, Installation of Cavitating Venturis on the Auxiliary Feed Water (AFW) System
M2-98032, Revision 0, Spent Fuel Pool Cooling
M2-98061, Revision 0, Containment Pressure transmitter

Miscellaneous Records

MP-03-LBM-GDL-01, Revision 0, 10 CFR 50.59 Annual Report, submittedAugust 2, 2000
VTM 25203-127-001, Revision 1, Installation, Operation and Maintenance of Standby Batteries
VTM 25203-174-001, Revision 2, Installation, Operation and Maintenance of 15 KVA Single Phase Inverters and Static Switches
VTM 25203-174-004, Revision 1, Installation, Operation and Maintenance of Dual 3 Phase Regulated Battery Chargers
Operability Determination MP2-034-00
DBS-2330A, Revision 0, Reactor Building Closed Cooling Water System Design Bases Summary
Computer Data Base Covering Description of All 51 RBCCW Valves- July 11, 2000
Computer Data Base Covering Type Test Frequency for all 51 RBCCW Valves
Spec. No. RL-4778-1, Vendor Test Report of Reserve Station Service Transformer Dated 12/22/1970
SP-M2-EE-0016, Revision 1, Electrical Separation Specification
UFSAR, Chapters 6 and 9
Technical Specification Section 3/4.7.3
25203-ER-00-0039, Engineering Record Correspondence, dated May 2, 2000, Transmittal of Revised RBCCW Data Resulting from the Earlier Initiation of Spent Fuel Pool Cooling Following a LOCA.
Raytheon Evaluation Letter, dated October 21, 1996, RBCCW Relief Valve Evaluation
Engineering Work Request M2-00061, RBCCW System Pressure Design Modifications

General RBCCW IST Documents

MP-24-IST-PRG, Rev. 0	Inservice Test Program
MP-24-IST-REF00, Rev. 0	IST Program Requirements Reference manual
DBS-2330A, Rev. 0	RCCBW Design Bases Summary
ASME Article IWF-5000	Inservice Test Requirements
10CFR50.55a(f)	NRC Inservice Test Requirements
Computer Data Base	2C14 Unit 2 Cycle 13 Online Schedule
9.4 MNPS-2	FSAR Reactor Building Closed Cooling Water System
Computer Data Base	MS2 Predictive Maintenance Component Profile Report
ASME OM-10, 1987	Inservice Testing of Valves in Light Water Reactor Power Plants
ASME/ANSI OMa-6 1988	Inservice Testing of Pumps in Light Water Reactor Power Plants

ATTACHMENT 1 - LIST OF DOCUMENTS REVIEWED

RBCCW System Centrifugal Pump IST Data

System 2330A Pump P-11A Pump and Valve Basis Document
System 2330A Pump P-11B Pump and Valve Basis Document
System 2330A Pump P-11C Pump and Valve Basis Document
RBCCW Pump P-11A Pump Summary Report April 1, 1989 to October 16, 2000
RBCCW Pump P-11B Pump Summary Report April 1, 1989 to October 16, 2000
RBCCW Pump P-11C Pump Summary Report April 1, 1989 to October 16, 2000
Pump P-11A "A" RBCCW Pump IST Test Data, dated July 17,2000
Pump P-11A, "A" RBCCW Pump IST Test Data, dated January 31, 2000
Pump P-11A, "A" RBCCW Pump IST Test Data, dated April 19, 2000
Pump P-11B, "B" RBCCW Pump IST Test Data Facility 1, dated August 24, 2000
Pump P-11B, "B" RBCCW Pump IST Test Data Facility 1, dated July 17, 2000
Pump P-11C, "C" RBCCW Pump IST Test Data, dated August 28, 2000
Pump P-11C, "C" RBCCW Pump IST, dated June 5, 2000
Pumps P-11A, B, C Pump Reference Test Values
EN 21137, Pump Vibration Monitoring Equipment Operating Procedure
MP2-2ndQtr00.xls, Predictive Maintenance Profile Report

RBCCW System Valve ISTs Summary Reports Reviewed (Relief Valves Not Included)

2-RB-2A	RBCCW Pump P11A Discharge Check Valve
2-RB-4.1A	RCCW Heat Exchanger Header A Outlet Valve
2-RB-8.1A	7FPC Heat Exchanger Header A Outlet Valve
2-RB-13.1A	A Shutdown Cooling Heat Exchanger Outlet Stop Valve SP
2-RB-28.1A	Containment Air Recirculation A RBCCW Inlet Valve
2-RB-28.2A	Containment Air Recirculation A RBCCW Normal Outlet Valve
2-RB-28.3A	Containment Air Recirculation A RBCCW Emergency Outlet Valve
2-RB-30.1A	A RBCCW Header Containment Supply Valve
2-RB-37.2A	A RBCCW Header Containment Return Valve
2-RB-39	C RBCCW Pump Radiation Monitor Flow Stop Valve
2-RB-56A	RBCCW Pump A Sample Stop Valve
2-RB-68.1A	EDGR Cooling 36A RBCCW Outlet Valve
2-RB-107A	RBCCW Pump A Minimum Flow Stop Valve
2-RB-210	Degassifier Effluent Return Isolation Valve
2-RB-211A	RBCCW Pump A Heater A Suction Valve
2-RB-251A	RBCCW Pump B Discharge Cross Tie to Heat Exchanger A

Special Tests

SP 2605C, Revision 14, Containment Leak Test
SPROC EN98-2-13, Revision 0, RBCCW Peak Pressure Test
SPROC EN00-2-05, Revision 0, Loss of Normal Power
SP 2619C, Revision 39, Containment Pressure
SPROC EN99-1-02, Revision 0, Head Insulation Package

ATTACHMENT 1 - LIST OF DOCUMENTS REVIEWED

Work Orders

AWO M2-93-08737
AWO M2-94-08094
M2-98-08204, Calibration of Containment Air Recirc. Outlet Flow Loop F-6089 for HX35C
M2-98-08256, Calibration of Containment Air Recirc. Outlet Flow Loop F-6085 for HX35B
M2-00-00491, Calibration of RBCCW HX Outlet Flow "Header A" Instruments of Loop 6035
M2-98-08203, Calibration of Containment Air Recirc. Outlet Flow Loop F-6081 for HX35A
M2-99-13824, Calibration of "A" Engineered Safeguard Room Air Rec. Fan Suction Cooling Coil of Loop F-6732
M2-98-03406, Calibrate "A" Shutdown Cooling Heat Exchanger Instrumentation of Loop F-6043
M2-95-03606, Facility 1 RSST UV Time Delay Calibration Data Sheet
M2-99-02231, Facility 2 RSST UV Time Delay Calibration Data Sheet
M2-99-02231, Facility 2 RSST UV Time Delay Calibration Data Sheet
M2-91-08258, RBCCW Pump Breaker P11C Overcurrent and ground relays and timer calibration
M2-91-08413, RBCCW Pump Breaker P11A Overcurrent and ground relays and timer calibration
M2-91-08371, RBCCW Pump Breaker P11B Overcurrent and ground relays and timer calibration
M2-92-14057, RBCCW Pump Breaker P11C Overcurrent and ground relays and timer calibration
M2-98-08024 dated January 19, 2000, Performed 3 Year PM on 4.16 kV RBCCW Pump C Breaker
M2-98-08905 dated January 26, 2000, Performed 3 Year PM on 480 V CAR Fan F 14D breaker
M2-98-100063 dated February 9, 2000, Performed 3 Year PM on 125 VDC Switchgear Breaker (D0104)