March 12, 2001

Mr. Oliver D. Kingsley
President, Nuclear Generation Group
Commonwealth Edison Company
ATTN: Regulatory Services
Executive Towers West III
1400 Opus Place, Suite 500
Downers Grove, IL 60515

SUBJECT: BRAIDWOOD - NRC INSPECTION REPORT 50-456/01-02(DRS); 50-457/01-02(DRS)

Dear Mr. Kingsley:

On February 9, 2001, the NRC completed the first baseline safety system design and performance capability inspection at your Braidwood Nuclear Generating Station. On February 9, 2001, the results were discussed with Mr. K. Schwartz and other members of your staff. The enclosed report presents the results of the inspection.

The inspection was a detailed examination of design activities and records as they related to ensuring that the emergency diesel generators and their required support systems were capable of performing required post-accident functions, and to verify compliance with the Commission's rules and regulations and the conditions of your license. Within these areas, the inspection consisted of observations of activities, discussions with cognizant personnel and a selective examination of procedures, design documents, and representative records.

Based on the results of the inspection, one issue of very low safety significance (Green) was identified. The issue 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 contest the Non-Cited Violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, Region III, Resident Inspector and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with 10 CFR 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/NRC/ADAMS/index.html** (the Public Electronic Reading Room).

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

/RA by Roy J. Caniano Acting for/

John A. Grobe, Director
Division of Reactor Safety

Docket Nos. 50-456; 50-457
License Nos. NPF-72; NPF-77

Enclosure: Inspection Report 50-456/01-02(DRS);
50-457/01-02(DRS)

cc w/encl: D. Helwig, Senior Vice President, Nuclear Services
C. Crane, Senior Vice President, Nuclear Operations
H. Stanley, Vice President, Nuclear Operations
R. Krich, Vice President, Regulatory Services
DCD - Licensing
K. Schwartz, Station Manager
T. Simpkin, Regulatory Assurance Supervisor
M. Aguilar, Assistant Attorney General
State Liaison Officer
Chairman, Illinois Commerce Commission

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-456; 50-457
License Nos:	NPF-72; NPF-77
Report No:	50-456/01-02(DRS); 50-457/01-02(DRS)
Licensee:	Commonwealth Edison Company
Facility:	Braidwood Nuclear Plant, Units 1 and 2
Location:	35100 South Route 53 Suite 84 Braceville, IL 60407-9617
Inspection Dates:	January 22 - February 9, 2001
Inspectors:	P. Lougheed, Team Leader A. Dunlop, Reactor Inspector Z. Falevits, Reactor Inspector G. O'Dwyer, Reactor Inspector D. Schrum, Reactor Inspector B. Gupta, Contractor
Approved by:	John M. Jacobson, Chief Mechanical Engineering Branch Division of Reactor Safety

NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas) reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety	Radiation Safety	Safeguards
● Initiating Events	● Occupational	● Physical Protection
● Mitigating Systems	● Public	
● Barrier Integrity		
● Emergency Preparedness		

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: http://www.nrc.gov/NRR/OVERSIGHT/index.html.

SUMMARY OF FINDINGS

IR 05000456-01-02(DRS); IR 05000457-01-02(DRS), on 1/22/01-2/09/01, Commonwealth Edison Company, Braidwood Nuclear Power Station, Units 1 and 2. Mitigating systems cornerstone.

The inspection was conducted by regional engineering specialists. The inspection identified one Green finding, which was a Non-Cited Violation. The significance of the finding is indicated by the color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609 "Significant Determination Process."

Mitigating Systems

- Green. The inspectors identified a Non-Cited Violation for failure to verify that the correct carbon dioxide tank weight was used in a seismic calculation. This impacted the ability of the auxiliary feedwater system to perform its safety function following an earthquake.

  The finding was of very low safety significance because of the overall low probability of an earthquake occurring and the presence of the motor-driven auxiliary feedwater pump. The licensee entered the issue into the corrective action program and performed a qualitative operability assessment to demonstrate that the tank would not fail during a seismic event.

Report Details

Baseline Inspection Procedure: IP 711111.21, “Safety System Design and Performance Capability,” dated April 3, 2000.

Summary of Plant Status: Both units were at or near 100 percent power throughout the inspection.

1. REACTOR SAFETY

Cornerstones: Mitigating Systems and Barrier Integrity

1R21 Safety System Design and Performance Capability (71111.21)

The emergency diesel generators and their associated support systems were selected for review during this safety system design and performance capability inspection at the Braidwood Nuclear Generating Station. Support systems included: jacket water, lubrication oil, ventilation, combustion air, starting air, and diesel fuel. Additionally, the diesel-driven auxiliary feedwater pump was reviewed to verify that there were no common cause failures. The purpose of the inspection was to assess whether the design bases had been correctly implemented and to ensure that the system could be relied upon to meet functional requirements. The inspection was performed in accordance with the new Nuclear Regulatory Commission (NRC) regulatory oversight process, which uses a risk-informed approach for selecting the risk significant areas and attributes to be inspected.

.1 System Requirements

a. Inspection Scope

The inspectors reviewed the updated final safety analysis report, technical specifications, and available design basis information to determine the performance requirements of the emergency diesel generator system. 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 needed to be reviewed to ensure that the emergency diesel generators would supply the required electrical loading under the design basis events of loss of offsite power and loss of offsite power concurrent with a loss of coolant accident. As the process medium of the auxiliary feedwater system is different than that for the emergency diesel generators, this attribute was not reviewed for the diesel-driven auxiliary feedwater pump.

Energy Sources: This attribute needed to be reviewed to ensure that the emergency diesel generators would start when called upon. In order to ensure that the diesels to start, the following subsystems are necessary: direct-current control power, starting air, combustion air, and diesel fuel. The subsystems of direct-current control power, combustion air, and diesel fuel are also necessary for the operation of the diesel-driven auxiliary feedwater pump.

Controls: This attribute required review to ensure that the trips of the emergency diesel generator functioned as specified. This included review of trips bypassed during design basis events to ensure that the trips would not erroneously actuate and impact diesel operation.

Operations: This attribute was reviewed only from the aspect of a station blackout event, which required operator action to crosstie the other unit's diesels to the affected unit's grid.

Heat Removal: This attribute required review to ensure that the heat generated while the emergency diesel generators are running can be effectively removed. Three subsystems were included in this review: ventilation air, jacket water cooling, and lubrication oil cooling.

b. Findings

The inspectors identified a Green finding regarding the potential to lose the Unit 1 diesel driven auxiliary feedwater pump during an earthquake. During review of calculation, CQD-010997, "Seismic Qualification Analysis of the Carbon Dioxide Tank - 10 Ton Capacity," the inspectors found a fundamental error in the assumed weight of the tank. Basically, the calculation did not properly account for the weight of the carbon dioxide when the tank contained any carbon dioxide. The tank was required to be seismically qualified as it was located within a few feet of the combustion air intake for the diesel engine of the 1B auxiliary feedwater pump.

The need for the carbon dioxide tank to be seismically qualified was identified during a 1983 pre-operational NRC Integrated Design Inspection (Inspection Report 50-454/83-32) at Braidwood's sister plant, Byron. This inspection identified a design deficiency in that an earthquake would cause loss of the [then] non-safety and non-seismic carbon dioxide tank, as well as the non-safety and non-seismic main feedwater pump. Failure of the main feedwater pumps would require use of auxiliary feedwater to remove heat from the steam generators. Failure of the carbon dioxide tank would result in carbon dioxide entering the diesel engine combustion air intake for the 1B auxiliary feedwater pump. When combined with the single failure of the motor-driven auxiliary feedwater pump, the ability to remove reactor heat following an earthquake was jeopardized. The Byron design deficiency also applied to the Braidwood Station Unit 1 diesel driven auxiliary feedwater pump. To resolve the deficiency, the licensee performed calculation CQD-010997 and concluded that the carbon dioxide tank assembly, and associated piping would withstand a seismic event and not affect the functional requirements of the auxiliary feedwater pump diesel engine. This conclusion was submitted to the NRC on December 30, 1983.

In reviewing the calculation, the inspectors identified that the preparer did not use the correct configuration and weights for the tank and carbon dioxide. The vendor manual specified that the tank weighed 15,300 pounds empty and 35,300 pounds when filled with 10 tons of liquid carbon dioxide. In performing the calculation, the preparer assumed that the tank weighed 15,300 pounds when full, and attributed the remaining 20,000 pounds to the base structure. This resulted in changing the center of gravity 27 inches downward. The licensee reviewed the calculation and confirmed the deficiency.

The licensee attempted to use the correct weights in various seismic models but could not quantitatively demonstrate that the tank would remain intact following a seismic event. To determine operability, the licensee performed a qualitative analysis using engineering judgement to show that the tank would deform but not fail. The inspectors reviewed the operability determination and acceded that a complete failure of the tank during an earthquake was unlikely. However, the inspectors noted that the design basis of the auxiliary feedwater system was degraded.

10 CFR Part 50, Appendix B, Criterion III states, in part, that design control measures shall provide for verifying the adequacy of the design. Contrary to the above, on December 2, 1986, the licensee failed to verify that the correct weight of the carbon dioxide tank was used in a seismic calculation. This issue is a violation of 10 CFR Part 50, Appendix B, Criterion III. In accordance with Section VI.A.1 of the NRC Enforcement Policy, this violation is being treated as a Non-Cited Violation (50-456/01-02-01; 50-457/01-02-01). It was entered into the licensee's corrective action program as condition report A2001-00402.

As the licensee was unable to demonstrate quantitatively that the 1B auxiliary feedwater pump diesel engine would not be affected following an earthquake, the inspectors deemed the issue to have a credible impact on the ability of the auxiliary feedwater system to perform its safety function. Furthermore, the issue could credibly affect the operability, availability, reliability, or function of the auxiliary feedwater system, which is a mitigating system under the significance determination process. The inspectors therefore entered Phase I of the significance determination process. Using the Phase I work sheet for seismic, fire, flooding, and severe weather, the inspectors determined that questions 1 and 2 should be answered yes. The reasoning for saying “yes” was because the tank had been specifically evaluated in 1983 to mitigate the effects of an earthquake on the auxiliary feedwater system and because loss of the tank could cause loss of all combustion air to the diesel driven auxiliary feedwater pump.

The inspectors noted that an earthquake was an external event and, as such, was not modeled in the Phase II significance determination process. After consultation with a regional senior reactor analyst, the inspectors used the Phase II worksheet for loss of offsite power, with the assumption of an event initiation frequency of 10^{-4} per year. The inspectors evaluated the loss of offsite power scenarios affected by loss of the diesel-driven auxiliary feedwater pump and determined that the event was of very low safety significance (Green).

.2 System Condition and Capability

a. Inspection Scope

The inspectors verified that the system condition and tested capability was consistent with the design bases. The inspected attributes were: installed configuration, design, and testing.

Installed Configuration: The inspectors confirmed that the installed configuration of the emergency diesel generators met the design basis by performing walk-downs of the emergency diesel generator system and subsystems. A limited walkdown of the diesel-

driven auxiliary pumps was also performed. The walk-downs 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 concerns; and the conformance of the currently installed configuration of the systems with the design and licensing bases.

Design: The inspectors reviewed the design of the emergency diesel generator to verify that the system 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 analyses in several areas to verify that design values were correct and appropriate.

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

b. Findings

During review of the diesel generator loading information, the inspectors identified that Updated Final Safety Analysis Report Table 8.3-5 did not contain updated and correct information regarding the diesel generator post accident loadings and instead referenced readers to a licensee controlled calculation that was not publically available. A similar issue was previously identified at the licensee's Quad Cities station (see Inspection Reports 50-254/265-98201; 98019 and 99017) and a violation was cited. This issue was discussed with the licensee; however, they believed their practices were in accordance with Nuclear Energy Institute standard NEI 98-03, “Guidelines for Updating Final Safety Analysis Reports,” Revision 1, which NRC endorsed in Regulatory Guide 1.181, “Content of the Updated Final Safety Analysis Report in Accordance with 10 CFR 50.71(e),” September 1999. The inspectors reviewed the regulatory guide and industry standard and identified that for an item to be considered incorporated by reference, it needed to be publically available and be held to the same standards as the updated final safety analysis report in terms of changes and controls. As the licensee controlled calculation did not meet this requirement, the inspectors did not agree with the licensee's position. However, in order to ensure that the inspector's position was in accordance with current NRC policy, the inspectors consulted with the Office of Enforcement. Pending OE's decision, this issue is unresolved (50-456-01-02-02; 50-457-01-02-02).

.3 Components

a. Inspection Scope

The inspectors examined the emergency diesel generators to ensure that component level attributes were satisfied. The attributes selected for review were: equipment and environmental qualification, equipment protection, and operating experience.

Equipment and Environmental Qualification: To confirm this attribute, the inspectors reviewed calculations and equipment qualification documents to ensure that components located in the emergency diesel generator rooms 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 diesel generator rooms would perform their function following seismic, tornado, and high energy line break events.

Operating Experience: The inspectors reviewed condition reports, problem identification forms, and other documents to confirm that the licensee adequately evaluated industry information regarding emergency diesel generator problems.

b. Findings

No findings of significance were identified.

.4 Problem Identification and Resolution

a. Inspection Scope

The inspectors reviewed a sample of emergency diesel generator system problems identified in the licensee's corrective action program. The inspectors also reviewed the licensee’s self-assessment performed prior to the inspection and the condition reports generated as a result of that assessment. Through this review, the inspectors evaluated the adequacy and effectiveness of the identification and correction of emergency diesel generator system problems. Inspection Procedure 71152, “Identification and Resolution of Problems,” was used as guidance for inspection in this area.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES (OA)

4OA6 Management Meetings

Exit Meeting Summary

The inspector presented the inspection results to Mr. K. Schwartz and other members of licensee management at the conclusion of the inspection on February 9, 2001. The licensee acknowledged the findings presented. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

M. Andrews, Operations Unit Planner
J. Bailey, Regulatory Assurance-NRC Coordinator
C. Bedford, Program Engineer, Response Team Member
J. Bergner, Design Engineer, Response Team Member
D. Gustafson, Electrical Group Lead, Response Team Member
R. Krich, Midwest Regional Operating Group Licensing Director
J. Kuchenbacker, Instrument Maintenance Manager
F. Lentine, Braidwood Design Engineering Manager
T. Luke, Braidwood Engineering Director
J. Meister, Exelon Engineering Vice President
K. Schwartz, Braidwood Station Manager
T. Simpkin, Braidwood Regulatory Assurance Manager
D. Skoza, Design Engineer, Response Team Member
B. Viehl, Performance Monitoring Group Lead, Response Team Leader
R. Wunder, Design Engineer, Response Team Member

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-456/01-02-02 50-457/01-02-02	URI	Information in UFSAR Table 8.3-5 Not Updated and Correct Regarding Post-accident EDG Loadings.

Opened and Closed in This Inspection

50-456/01-02-01 50-457/01-02-01	NCV	Violation of Criterion III Due to Failure to Verify Correct Assumptions in Seismic Calculation

Closed

None

Discussed

None

LIST OF ACRONYMS USED

ADAMS	Agency-wide Documents and Management System
CFR	Code of Federal Regulations
DRS	Division of Reactor Safety
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
PARS	Publically Available Records
URI	Unresolved Item

PARTIAL LIST OF DOCUMENTS REVIEWED

The following is a list of licensee documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort.

Action Requests

980070438	2B Diesel Generator Room Extremely Cold, November 11, 1998
990119741	Breaker 1DG01SA-A Found Tripped, November 20, 2000
990128596	Oil Leak on 1A Emergency Diesel Generator Air Start Solenoid, January 22, 2001

Calculations

1CO01	Calculation for Seismic Qualification of Carbon Dioxide Piping in the Emergency Diesel Generator and Diesel Driven Auxiliary Feedwater Pump Rooms, December 2, 1986
19-AN-5	Diesel Generator Protective Relay Settings, Revision 6
19-AN-29	Second Level Undervoltage Relay Setpoint, Revision 2
19-AQ-68	Degraded Voltage Analysis, Revision 6
19-T-1	Verify Suitability of the Emergency Diesel Generator Grounding Resistor, April 23, 1993
19-T-3	Station Blackout - Diesel Generator Loading, November 2, 1990
19-T-6	Diesel Generator Loading During Loss of Offsite Power Concurrent with Loss of Coolant Accident - Braidwood Units 1 and 2, Revision 4
3C8-0189-001	Diesel Generator Room Temperature Transient Following Loss of Heating, Ventilation and Air Conditioning, February 1, 1989
3C8-0691-002	Diesel Generator Room Temperature Transient Following Turbine Building High Energy Line Break, July 10, 1991
BRW-96-0362-I	Diesel Oil Storage Tank Level Setpoints, Revision 0
BRW-97-0916-M	Diesel Generator Exhaust Blockage, January 28, 1998
BRW-98-0694-E	Diesel Generator 1A (2A) Under-Frequency Trip Time Delay External Timer, Revision 0
BRW-98-0586-M	Determination of the Burst Pressure for the Diesel Generator Exhaust Stack Rupture Disk, July 28, 1998
BRW-98-0782-M	Diesel Generator Lube Oil Cooler Performance Evaluation, Revision 0
BRW-99-0306-M	Diesel Generator Jacket Water Cooler Tube Plugging Evaluation, Revision 1
BRW-00-0237-E	Voltage Drop Calculation for 4160 V Switchgear Breaker Control Circuits, Revision 0
CQD-010997	Seismic Qualification Analysis of the Carbon Dioxide Tank - 10 Ton Capacity (OC01T), November 23, 1983
DGD09301	Time Dependent Loading and Fuel Consumption for Emergency Diesel Generators Following Loss of Offsite Power Concurrent with a Loss of Coolant Accident, Revision 3
DCR 990799	Pending Change Calculation for Diesel Generator Jacket Water Cooler Tube Plugging Evaluation – Calculation BRW-99-0306-M, Revision 0

EQC-BB-008	Evaluation of the Thermal Endurance of 1E Components Located in the Miscellaneous Electrical Equipment Rooms, April 14, 1992
JP-95-263	Verify Adequacy of Available Suction Head for Engine Driven Jacket Water Cooling Pump and Jacket Water Circulating Pump for Emergency Diesel Generators, Revision 1
L-VD-704	Incremental System Analysis Calculation for Diesel Generator Fans 1VD01CA/CB, Revision 0
MAD 83-0538	Pressure Drop in Diesel Generator and Oil Storage Room Ventilation System, Revision 0
MAD 90-0079	Effect of Fire on Diesel Oil Lines, July 8, 1998
NED-I-EIC-0141	Diesel Oil Storage Tank Indication Accuracy at Normal Operating Conditions, Revision 0
RSA-B-93-02	Byron and Braidwood Long Term Containment Analysis for Diesel Generator Fuel Evaluation, March 18, 1993
SBO-1	Diesel Generator Motor Starting Capability, Revision 1
VA-102	Auxiliary Building Energy Load Calculations for Elevations 330', 346', 364', 383', 401',and 426' in Abnormal Condition, June 17, 1987
VD-100	Diesel Generator Room Energy Loads, Revision 0
VD-200	Diesel Generator Room Pressure Drop, Revision 0
VD-201	Fan Total Pressure for Diesel Generator Rooms Exhaust Fans, Revision 0
VD-218	Diesel Generator Room Ventilation Fan Pressure Drop Input Data for High Energy Line Break Analysis, Revision 0
VD-400	Heat Dissipation of Diesel Generator with Respect to the Emergency Diesel Generator Room Ambient Temperature, Revision 2
VX-205	Pressure Drop for Intake Shaft - Diesel Generator Supply Room, December 8, 1978

Condition Reports Generated Due to the Inspection

A2001-00205	2B Auxiliary Feedwater Diesel Time Delay Relay Setting Discrepancy, January 22, 2001
A2001-00258	Auxiliary Feedwater 32V Battery Charger Drawing Errors, January 25, 2001
A2001-00262	No Preventive Maintenance Initiated for 65 IDLE Time Delay Relay in 2PL08J Panel, January 25, 2001
A2001-00299	Updated Final Safety Analysis Report Section 8.3.1.2, Not Revised for Change in Degraded Voltage Analysis Assumption, January 30, 2001
A2001-00322	Relay Testing Requirements for Diesel Generator Modifications Not Established, January 26, 2001
A2001-00371	Emergency Diesel Fuel Calculation Discrepancies, February 5, 2001
A2001-00383	Various Errors Discovered on Design Drawings During the Safety System Design Inspection, February 6, 2001
A2001-00391	Drawing M-152, Sheet 14, Has Incorrect Temperature Setpoint Reference, February 7, 2001
A2001-00398	Calculation Evaluates/Contains Equipment Removed From Plant Design, February 8, 2001
A2001-00399	Various Deviations From Design Drawings Identified in Safety System Design Inspection, February 6, 2001

A2001-00402	Deficiency Identified in Carbon Dioxide Tank Seismic Calculation, February 7, 2001
A2001-00414	Potential Inservice Testing Improvements, February 8, 2001
A2001-00426	Electronic Work Control System Controlled Documents Drawing Discrepancies, February 8, 2001
A2001-00430	Administrative Errors in Emergency Diesel Generator Relay Setting Calculation, February 8, 2001
A2001-00436	Minor Drawing Discrepancies, February 8, 2001
A2001-00437	Modification Package Document Discrepancies, February 8, 2001
A2001-00479	Technical Specification Bases 3.8.3.1 Needs Wording Clarification for "Seven Days at Full Load," February 13, 2001

Condition Reports Reviewed During the Inspection

A1998-00251	Operability Surveillance, January 21, 1998
A1998-00657	2A Diesel Generator Vent Fan High Differential Pressure Alarms and Trips, February 19, 1998
A1998-00857	Method Used for Calculating Diesel Fuel Oil Consumption Differs from the Updated Final Safety Analysis Report Methodology, March 4, 1998
A1998-04125	Diesel Generator Vent Fan Stuck on Outside Air Mode, November 11, 1998
A1998-04368	1A Diesel Generator Room Vent Fan Outside Air Damper Failed Open, December 14, 1998
A1999-01891	1B Diesel Generator Standpipe Level Increase Due to Valve Leakby – Rework, June 16, 1999
A1999-01978	1B Diesel Generator Jacket Water Leak, June 25, 1999
A1999-03030	Temperature Controller 2TIC-VD001 Failed Upscale, October 10, 1999
A1999-03031	Damper 1VD01YA Failed Full Open, October 10, 1999
A1999-03544	Panel 2VD01JB Problems, November 16, 1999
A1999-03711	Fan 2VD02CD Trips on Start, November 29, 1999
A1999-03947	2B Diesel Generator Room Overcooled Due to Damper Hydramotor Failure, December 16, 1999
A2000-00184	1A Diesel Generator Failed Post Modification Testing Due to Leaking Fitting, January 12, 2000
A2000-00492	1A Diesel Generator Jacket Water Leak – No Automatic Makeup, January 29, 2000
A2000-00553	Vent Fan 1VD02CA Would Not Start, February 4, 2000
A2000-01595	Temperature Switch ITS-DG112A Found Broken upon Diesel Generator Return to Service, March 28, 2000
A2000-01811	Breaker 2DG01SB-B Tripped on Thermal Overload, April 6, 2000
A2000-02689	Concerns with Level of Monitoring for Ventilation Supply to Motor Driven Auxiliary Feedwater Pumps under Maintenance Rule, June 26, 2000
A1999-03666	Abnormal Copper, Silicon and Boron Levels in 1/2 DG01KA/B Crankcases, November 23, 1999
A2000-04403	1A Diesel Generator #1 Air Compressor Failure to Start, November 20, 2000
A2000-01602	1A Emergency Diesel Generator Manual Trip Due to Loss of Jacket Water Level, March 29, 2000
A2001-00056	Responses to NRC Information Notices, January 9, 2001

A2001-00060	Incorrect Reference in Procedure BwHS4002-091, January 9, 2001
A2001-00064	Calculation Documentation Weaknesses, January 9, 2001
A2001-00076	Predefine Addition, January 10, 2001
A2001-00077	Emergency Diesel Generator Reliability, January 10, 2001
A2001-00079	Maintenance Rule Data Base Discrepancies, January 10, 2001
A2001-00080	Emergency Diesel Generator Hot Restart Procedure Test Typographical Error, January 10, 2001
A2001-00081	Poor Administrative Controls for Technical Specification SR3.7.5.7 Implementation, January 10, 2001
A2001-00292	Breaker Thermal Overloads Found Tripped, January 29, 2001
B2000-01781	Maintenance Rule Monitoring Concerns with Vent Supply to Motor Driven Auxiliary Feedwater Pumps (Byron), June 20, 2000

Correspondence

IR 50-454/83-32	NRC Integrated Design Inspection, September 30, 1983
Letter	Byron Generating Station, Units 1 and 2, Response to Integrated Design Inspection Report 50-454/83-32, C. Reed to R. DeYoung, December 30, 1983
Memo	DG 1A Rupture Disc Event Exhaust Impact on DG Air Intake Filters, October 28, 1994
Memo	Turbine Building High Energy Line Break Impact on the Diesel Driven Auxiliary Feedwater Pump, March 11, 1993
Memo	Byron Integrated Design Inspection Audit Draft Responses, November 10, 1983

Drawings

62241	Auxiliary Feedwater Pump Drive Engine Cooling System, Units 1and 2, Revision C
20E-0-4001	Station One Line Diagram, Revision U
20E-1-4001D	Station Key Diagram, Revision N
20E-1-4001E	Station Key Diagram, Revision M
20E-1-4002C	Single Line Diagram 4.16KV Switchgear BUS 141 and 143 Diesel Generator 1A and 480V Switchgear, Revision R
20E-1-4006A	Key Diagram 4160V Essential Safety Feature Switchgear BUS 141 (1AP05E), Revision G
20E-1-4007A	Key Diagram 480V Essential Safety Feature Substation Bus 131X (1AP10E), Revision M
20E-1-4008A	Key Diagram 480V Auxiliary Building Essential Safety Feature Motor Control Center 131X1 (1AP21E) Part 1, Revision AB
20E-1-4008B	Key Diagram 480V Auxiliary Building Essential Safety Feature Motor Control Center 131X1 and 131X1A (1AP21E and E4) Part 2, Revision AA
20E-1-4008E	Key Diagram 480V Auxiliary Building Essential Safety Feature Motor Control Center 131X2 (1AP25E) and 131X2A (1AP25E-A), Revision AD
20E-1-4008G	Key Diagram 480V Auxiliary Building Essential Safety Feature Motor Control Center 131X2B (1AP25-B), Revision J
20E-1-4008Q	Key Diagram 480V Auxiliary Building Essential Safety Feature Motor Control Center 131X3 (1AP22E), Revision V

20E-1-4008S	Key Diagram 480V Auxiliary Building Essential Safety Feature Motor Control Center 131X4 (1AP26E), Revision S
20E-1-4008U	Key Diagram 480V Auxiliary Building Essential Safety Feature Motor Control Center 131X5 (1AP30E), Revision T
20E-1-4029DG01	Control Logic Diagram - Diesel Generator 1A Feed to 4.16KV Essential Safety Feature Switchgear Buses 141, Revision C
20E-1-4029DG02	Control Logic Diagram - Diesel Generator 1B Feed to 4.16KV Essential Safety Feature Switchgear Buses 142, Revision C
20E-1-4030-AF19	Schematic Diagram - 32VDC Battery Charger 1AF01EA-1 and 1AF01EB-1, Revision B
20E-1-4030DG01	Schematic Diagram - Diesel Generator 1A Feed to 4.16V Essential Safety Feature Switchgear Bus 141 ACB #1413, Revision Y
20E-1-4030DG10	Diesel Generator 1A Starting Air Compressors 1DG01SA-A and 1DG01SA-B, Revision F
20E-1-4030DG34	Schematic Diagram - Diesel Generator 1A Starting Sequence Control (Description of Operations) 1DG01KA, Part 4, Revision D
20E-1-4030EF01	Schematic Diagram - Essential Safety Feature Sequencing and Actuation Cabinet Train A, 1PA13J, Revision U
20E-1-4030EF11	Schematic Diagram - Reactor Protection System Output Relays Development Train A, Revision AA
20E-1-4030SX17	Schematic Diagram - Diesel Generator 1A and 1B Essential Service Water Valves 1SX169A and 1SX169B, Revision N
20E-1-4044L	Internal Wiring Diagram - Main Control Board Generating and Auxiliary Power 1PM01J-Part II, Revision M
20E-1-4044V	Internal-External Wiring Diagram - Main Control Board Generating and Auxiliary Power 1PM01J-PT.8, Revision V
20E-1-4092AE	Internal Wiring Diagram - Diesel Generator 1A and 1B Control Panels 1PL07J and 1PL08J, Part 21, Revision U
20E-1-492AF	Internal Wiring Diagram - Diesel Generator 1A and 1B Control Panels 1PL07J and 1PL08J, Part 22, Revision U
20E-1-4092T	Internal Wiring Diagram - Diesel Generator 1A and 1B Control Panels 1PL07J and 1PL08J, Part 10, Revision P
20E-1-4098D	External Wiring Diagram - Diesel Generator 1B Control Panel 1PL08J, Part 4, Revision R
20E-1-4122A	Internal Wiring Diagram - Essential Safety Feature Sequencing and Actuation Cabinet Train A, 1PA13J - Part 1, Revision K
20E-1-4122B	Internal Wiring Diagram - Essential Safety Feature Sequencing and Actuation Cabinet Train A, 1PA13J - Part 2, Revision H
20E-1-4122C	Internal/External Wiring Diagram - Essential Safety Feature Sequencing and Actuation Cabinet Train A, 1PA13J, Part 3, Revision L
20E-1-4122D	Internal/External Wiring Diagram - Essential Safety Feature Sequencing and Actuation Cabinet Train A, 1PA13J, Part 4, Revision B
20E-1-4681J	Internal/External Wiring Diagram - 480V Auxiliary Building Essential Safety Feature Motor Control Center 132X1, Section J (1AP23E) 120/208V Distribution Panel, Revision Y
20E-1-4955A	Internal/External Wiring Diagram - Junction Boxes on Service Water System, Revision J
20E-1-4955B	Internal-External Wiring Diagram - Diesel Generator Essential Service Water Valves Junction Boxes, Revision C

20E-2-4030-AF19	Schematic Diagram - 32VDC Battery Charger 1AF01EA-1 and 1AF01EB-1, Revision D
20E-2-4092K	Internal Wiring Diagram - Diesel Generator 2A and 2B Control Panels 2PL07J and 2PL08J, Part 2, Revision U
20E-2-4092Q	Internal Wiring Diagram - Diesel Generator 2A and 2B Control Panels 2PL07J and 2PL08J, Part 7, Revision L
20E-2-4092R	Internal Wiring Diagram - Diesel Generator 2A and 2B Control Panels 2PL07J and 2PL08J, Part 8, Revision H
20E-2-4092S	Internal Wiring Diagram - Diesel Generator 2A and 2B Control Panels 2PL07J and 2PL08J, Part 9, Revision F
20E-2-4092T	Internal Wiring Diagram - Diesel Generator 2A and 2B Control Panels 2PL07J and 2PL08J, Part 10, Revision P
20E-2-4092U	Internal Wiring Diagram - Diesel Generator 2A and 2B Control Panels 2PL07J and 2PL08J, Part II, Revision Y
20E-2-4098A	External Wiring Diagram - Diesel Generator 2B Control Panel 2PL08J, Part 1, Revision M
M-8	General Arrangement Grade Floor at Elevation 401' 0", Units 1 and 2, May 12, 1976
M50, Sheet 1A	Diagram of Diesel Fuel Oil Unit 1, Revision AW
M50, Sheet 1B	Diagram of Diesel Fuel Oil Unit 1, Revision AW
M50, Sheet 1C	Diagram of Diesel Fuel Oil Unit 1, Revision BA
M50, Sheet 1D	Diagram of Diesel Fuel Oil Unit 1, Revision AY
M-50, Sheet 2	Diagram of Diesel Fuel Oil Units 1 and 2, Revision Y
M-50, Sheet 5	Diagram of Diesel Fuel Oil Units 1 and 2, Revision F
M54, Sheet 1	Diagram of Service Air Diesel Generator Starting Air, Revision E
M54 Sheet 4A	Diagram of Service Air Diesel Generator Starting Air Unit 1, Revision E
M54 Sheet 4B	Diagram of Service Air Diesel Generator Starting Air Unit 2, Revision D
M-58	Diagram of Carbon Dioxide and Hydrogen System, June 2, 1976
M-95	Diagram of Auxiliary Building Heating, Ventilation, and Air Conditioning System, May 19, 1977
M152, Sheet 14	Diesel Generator Jacket Water Schematic, Revision T
M152, Sheet 18	Diesel Generator Starting Air, Revision H
M152 Sheet 19	Diesel Generator Cooling Water, Revision F
M152, Sheet 20	Diesel Generator Starting System and Alarms, Revision D
M2050, Sheet 1	Diesel Fuel Oil System, Revision G
M2050, Sheet 2	Diesel Fuel Oil System, Revision M
M2050, Sheet 6	Diesel Fuel Oil System, Revision C
M2050, Sheet 7	Diesel Fuel Oil System, Revision D
M2054, Sheet 6	Service Air System, Revision C
M-4042-1SX05	Control Logic Diagram - Essential Service Water Valves, Revision E
NL10760	Auxiliary Feedwater Pump Diesel Fuel Oil Day Tanks, Revision 7
NL10896	Auxiliary Feedwater Pump Diesel Fuel Oil Day Tanks, Revision 1
S30467	American Society of Mechanical Engineers Code and Underwriters Laboratory Name Plate for a Auxiliary Feedwater Pump Diesel Fuel Oil Day Tank, Revision 3
S30468	American Society of Mechanical Engineers Code and Underwriters Laboratory Name Plate for a Auxiliary Feedwater Pump Diesel Fuel Oil Day Tank, Revision 3

Information Notices

89-30	High Temperature Environments at Nuclear Power Plants, November 1, 1990
89-07	Failures of Small-Diameter Tubing in Control Air, Fuel Oil, and Lube Oil Systems Which Render Emergency Diesel Generators Inoperable, January 25, 1989
96-06	Design and Testing Deficiencies of Tornado Dampers at Nuclear Power Plants, January 25, 1996
96-67	Vulnerability of Emergency Diesel Generators to Fuel Oil/Lubricating Oil Compatibility, December 19, 1996

Maintenance Rule

Expert Panel Scoping Determination for Diesel Ventilation System
Performance Criteria for Diesel Ventilation System

Modifications

88-2-006	Will Allow Use of Compressor for Emergency Diesel Generator Start, November 23, 1988
D20-1-98-229	Modify B Auxiliary Feedwater Water Pump Control Switch Wiring, April 20, 2000
E20-2-94-218	Remove 10" Air Volume Damper, Air Duct to Generator, April 15, 1994
E20-2-96-261	Replace Emergency Diesel Generator Fuel Oil Filter/ Strainer with New Design, May 12, 1999
E20-2-98-214-002	Remove Vibration Trip from Diesel Generator, October 9, 1998
E20-2-98-230	Replace Emergency Diesel Generator Exhaust Stack Rupture Disk, September 1, 1998
M20-1-86-003	Add Diesel Generator Breaker Control Switch (Interlock Automatic Close Circuitry for the Diesel Generator Breaker), March 25, 1987
M20-1-88-001	Replace the Agastat 4EX3 Emergency Mode Master Relay, February 22, 1988
M20-1-94-005	Emergency Diesel Generator Governor System Upgrade, September 28, 1998
P20-2-92-653	Emergency Diesel Generator Jacket Water Header Standpipe Isolation, September 25, 1992

Nuclear Design Information Transmittals

BYR-96-017	Documentation of Certain Design Basis Parameters for Input to Design Calculations for Byron and Braidwood Emergency Diesel Generators Jacket Water Standpipes, March 1, 1996

Operability Determinations

94-012	Issues Regarding Crosstie Between Essential Service Water Supply Lines for Diesel Generator Jacket Water Coolers, February 23, 1994
95-012	Air Intake Piping Housing Support As-built Discrepancy, April 7, 1995
95-019	2B Auxiliary Feedwater Pump Clutch Oil Quality Questioned, July 1, 1995

95-021	1B Auxiliary Feedwater Pump Turbine Outboard Bearing Temperature above Expected Temperature (210° versus 200°), July 14, 1995
95-079	Diesel Generator Exhaust Silencer Rupture Disc Degradation, November 14, 1995
95-082	Agastat Relays in 2DG01KA/B - This Issue Resulted from Three Byron Agastat Relays, November 28, 1995
97-006	Diesel Generator Rupture Disk Burst Pressure May Be Too High to Ensure Conformance with Updated Final Safety Analysis Report, September 26, 1997
97-024	Auxiliary Feedwater Battery Calculation Discrepancies, March 25, 1997
97-154	Jacket Water Leak from 9R Cylinder Head, November 20, 1997
97-162	1A Diesel Generator Jacket Water Heat Exchanger Leak, December 19, 1997
98-023	Auxiliary Feedwater Pump Diesel Overspeed Calculation Concerns, March 18, 1998
99-007	Diesel Generator Lube Oil Cooler Connections/ Inadequate Thread Engagement, February 12, 1998
99-016	2B Auxiliary Feedwater Diesel Wetted Due to Leaking of Mechanical Floor Seal Located Above the Diesel, June 16, 1999
99-021	2B Auxiliary Feedwater Diesel Essential Service Water Booster Pump Mechanical Seal Leak, August 19, 1999
99-023	1B Auxiliary Feedwater Diesel Driven Pump Failed to Start, September 10, 1999
01-002	Air Intake for the Unit 1 Auxiliary Feedwater Pump Diesel is Degraded, February 13, 2001

Pre-Operational Tests (completed)

DG-50	Diesel Generator 2A, Revision 0
VD-50	Diesel-Generator Ventilation, Revision 1
DG-52	Simultaneous Loss of Offsite power and Essential Safety Feature Actuation Signal Pre-operational Test for 2A Diesel Generator, Revision 0
VD-55	Integrated Diesel Generator Miscellaneous Electrical and Switchgear Room Ventilation, Revision 1

Procedures

1BwCA-0.0	Loss of All Alternating Current Power Unit 1, Revision 1
1BwVSTRM 2.7.a.1	Unit 1 Auxiliary Feedwater Diesel Prime Mover Performance Surveillance, Revision 2
2BwVSR3.8.1.19-2	2B Diesel Generator Emergency Core Cooling System Sequencer Surveillance, Revision 1
BwHS4002-091	Time Delay Relay Surveillance, Revision 6
BwOP VD-5	Diesel Generator Room Ventilation System Operation, Revision 5E2
BwOP VD-6	Manual Operation and Blocking of Diesel Ventilation Vent Fan (VD01CA/B) Fire Dampers, and Subsequent Diesel Ventilation System Restoration, Revision 0
NES-EIC-20.4	Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy, Revision 3

NES-MS-04.1	Seismic Pre-qualified Scaffolds, Revision 2
NSWP-M-12	Safety/Relief Valve Testing, Revision 1

Pump Curves

35485	Performance Curve for Essential Service Water Pump
37224L	Test Performance Curve for Unit 2 Coolant Charging Pump B, April 22, 1977
A-24040	Performance Curve for Component Cooling Pump
N-837	Test Performance Curve for Unit 2 Residual Heat Pump A, September 22, 1976

Self-Assessments

Engineering Self-Assessment in Preparation for NRC Safety System Design Inspection Braidwood Station, January 17, 2001

Setpoint Change Requests

87-058	Diesel Fuel Oil Storage Tank 1A Level Switch Change Setpoint to 10 Inches and Reset to 8 Inches
92-022	Diesel Fuel Oil Storage Tank 2B Level Switch Change Setpoint to 7.75 Inches
93-002	Diesel Generator 1A Starting Air Compressor Pressure Switch Change Start Setpoint to 240 Pounds per Square Inch Gage, Stop to 250 Pounds per Square Inch Gage
00-038	Diesel Generator 2A Starting Air Compressor Pressure Switch Change Start Setpoint to 225 Pounds per Square Inch Gage, Stop to 235 Pounds per Square Inch Gage
SM-DO033	Diesel Oil Day Tank Level Switch 1DO02TA, Revision D
SM-DO034	Diesel Oil Day Tank Level Switch 1DO02TA, Revision B
SM-DO036	Diesel Oil Day Tank Level Switch 1DO02TB, Revision D
SM-DO037	Diesel Oil Day Tank Level Switch 1DO02TB, Revision B

Surveillances

BwHS4002-091	Unit 1 Time Delay Relay Surveillance (Diesel Generator 1B Starting Air Compressor 1A Time Relay), January 25, 2000
BwVP 850-15	Heat Exchanger As-Found Inspection and Work Report (Attachment C), completed versions: 1A Emergency Diesel Generator (September 1998), 1B Emergency Diesel Generator (April 1997 and July 1999), 2A Emergency Diesel Generator (October 1999) and 2B Emergency Diesel Generator (October 1997 and February 2001)
1BwOSR 3.8.1.2-1	1A Diesel Generator Operability Monthly and Semi-annual Surveillance, Revision 2, completed January 10, 2001
1BwOSR 3.8.1.2-2	2B Diesel Generator Operability Monthly and Semi-annual Surveillance, Revision 2, completed January 3, 2001
1BwVSR 3.8.1.13-1	1A Diesel Generator Bypass of Automatic Trips Surveillance, January 12, 2000

1BwVSR 3.8.1.14-1	1A Diesel Generator 24 Hr Run and Hot Restart Test - 18 month, Revision 0, completed March 30, 2000
1BwVSR 3.8.1.14-2	2B Diesel Generator 24 Hr Run and Hot Restart Test - 18 Month, Revision 0, completed November 9, 2000
1BwVSR 3.8.1.19-1	1A Diesel Generator 24 Hour Load Test and Emergency Core Cooling System Sequences Surveillance, completed April 1, 2000
1BwVSR 5.5.8.DO.1	A Train American Society of Mechanical Engineers Surveillance Requirements for Testing the Diesel Oil Transfer System, Revision 3, completed January 11, 2001
Diesel Oil Tank Samples	Most Recent Tests for All Diesel Oil Tanks, December 27, 1999 - January 17, 2001

Special Tests

SPP-92-005	1A Diesel Generator Operability Monthly (Staggered), and Fuel Oil Consumption Information Collection Surveillance, Revision 0

Standards

NSAC 185	Heating, Ventilation, and Air Conditioning Systems and Nuclear Plant Safety, May 1992

Technical Specifications (Amendment 98)

3.3.5	Loss of Power Diesel Generator Start Instrumentation
3.7.5	Auxiliary Feedwater System
3.8.1	Alternating Current Sources - Operating
3.8.2	Alternating Current Sources - Shutdown
3.8.3	Diesel Fuel Oil

Texts

"Heat Transfer – Professional Version" by Lindon C. Thomas, 1993
"Marks' Standard Handbook for Mechanical Engineers" by Baumeister and Avallone, eighth edition
"Mechanical Engineering Reference Manual for the Professional Engineering Exam" by Michael R. Lindeburg, PE, tenth edition
"Medium and High Speed Engines for Marine Use" by S. H. Henshall, 1983

Training Documents

Chapter 9	Diesel Generator and Auxiliary System, Revision 2
Chapter 26	Auxiliary Feedwater System, Revision 1
Chapter 43D	Diesel Generator Facilities Ventilation System, Revision 0

Updated Final Safety Analysis Report Sections

3.5.1.4	Missiles Generated by Natural Phenomena
7.3.1.1.10	Diesel Generator Room Ventilation System Instrumentation and Control

8.3.1.1.2.2	Emergency Onsite Power Sources (Diesel Generators)
9.4.5.2	Diesel Generator Facilities Ventilation System
9.5.4	Diesel Generator Fuel Oil Storage and Transfer System
9.5.5	Diesel Generator Cooling Water Systems
9.5.6	Diesel Generator Starting System
9.5.7	Diesel Generator Lubrication System
9.5.8	Diesel Generator Combustion Air Intake and Exhaust Systems
Figure 9.4-6	Diesel Generator Facilities Ventilation System
Table 3.11-2	Plant Environmental Conditions
Table 8.3-5	Loading on 4160 Volt Essential Safety Feature Buses
Table 9.4-11	Diesel Generator Room Ventilation System Equipment Parameters

Vendor Manuals

L-0332	Service Nuclear Standby Diesel Generators Operation and Service Manual for Steel Housed Storage Unit Low Pressure Carbon Dioxide 1 - 12 ½ Tons, July 1978

Work Requests

960024598-01	1A Diesel Generator Overspeed Trip Test, April 15, 1997
960031998-04	1A Diesel Generator Differential Relay Calibrations, April 11, 1997
960079810	Stroke Verification and Adjustment for 1111 Hydramotor, December 3, 1996
970043660-04	1A Diesel Generator Differential Relay Calibrations, September 25, 1998
970043684-01	1A Diesel Generator Overspeed Trip Test, September 02, 1998
980099293-04	1A Diesel Generator Differential Relay Calibrations, January 12, 2000
980100079-01	1A Diesel Generator Overspeed Trip Test, March 14, 2000
980119774	Replace Diesel Generator Room 2B Fan 2VD01CB Temperature Controller, November 17, 1998
990000067	Oil Inspection for Hydramotor, April 22, 1998
990000232	Oil Inspection/Stroke Verification and Adjustment for Hydramotor, December 27, 1999
990233286	Maintenance on 1DG01SA-A Diesel Generator Air Compressor, November 20, 2000