UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

September 10, 2001

Mr. Dale E. Young, Vice President
Crystal River Nuclear Plant (NA1B)
ATTN: Supervisor, Licensing &
Regulatory Programs
15760 West Power Line Street
Crystal River, FL 34428-6708

SUBJECT: CRYSTAL RIVER UNIT 3 - NRC INSPECTION REPORT 50-302/01-06

Dear Mr. Young:

On August 3, 2001, the NRC completed a safety system design and performance capability inspection at your Crystal River 3 Plant. The enclosed report documents the inspection findings which were discussed on August 3, 2001, with you and other members of your staff.

This 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. The team reviewed selected procedures and records, observed activities, and interviewed personnel.

No findings of significance were identified.

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).

Sincerely,

/RA/

Mark S. Lesser, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-302
License Nos. DPR-72

Enclosure: (See page 2)

Enclosure: NRC Inspection Report
No. 50-302/01-06 w/Attachment

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No:	50-302
License No.	DPR-72
Report No:	50-302/01-06
Licensee:	Florida Power Corporation (FPC)
Facility:	Crystal River Unit 3
Location:	15760 West Power Line Road Crystal River, FL 34428-6708
Dates:	July 16 - August 3, 2001
Inspectors:	M. Scott, Senior Reactor Inspector (Leader) M. Maymi, Reactor Inspector N. Merriweather, Senior Reactor Inspector R. Moore, Reactor Inspector C. Payne, Senior Operations Engineer R. Reyes, Resident Inspector (Turkey Point) K. VanDoorn, Senior Reactor Inspector
Approved by:	Mark S. Lesser, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000302-01-06, on 7/16 - 8/03/2001, Florida Power Corporation, Crystal River Unit 3, safety system design and performance capability.

This inspection was conducted by a team of region-based inspectors and one resident. No findings of significance were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at http://www.nrc.gov/NRR/OVERSIGHT/index.html.

A. Inspector Identified findings

None

B. Licensee Identified Violations

None

Report Details

1. **REACTOR SAFETY**
Cornerstone: Initiating and Mitigating Systems

1R21 Safety System Design and Performance Capability (71111.21)

Introduction

The objective of the inspection was to verify aspects of the Mitigating Systems and Barrier Integrity cornerstones for which there are no indicators to measure performance. The adequacy of the design and performance capability of the selected systems or components for specific scenarios was inspected. Based on a review of the licensee's past component history and the Probability Risk Analysis documentation, the team selected the Loss of Offsite Power (LOOP) with a Station Blackout (SBO) as scenarios. Further review determined a population of components that could initiate or mitigate the selected scenarios. The selected components were: 230 kilovolts (KV) switchyard breakers that provide offsite power; transformers (startup (SUT), Backup (BEST), Offsite (OPT)) that supply the emergency safety buses or the plant service loads; the breakers that attach to the engineering safeguard (ES) buses; critical emergency onsite distribution 4160 voltage alternating current (VAC) breakers; emergency diesel generators (EDG) and support systems; risk important 480 VAC breakers; 120 voltage direct current (VDC) inverters, controls, and busses; Auxiliary and Emergency Feedwater (AFW and EFW) suction, discharge, flow regulating valves, selected pumps, and system controls (EFW instrument and controls (EFIC)); 4160 and 480 VAC motor control center room air handling fans; steam atmospheric dump valves (ADV); and associated operating experience, maintenance records, and corrective action program component records.

.1 System Needs

a. Inspection Scope

Energy Source

The team reviewed design documentation, drawings, calculations, technical manuals, test documentation, and installed equipment to verify that offsite power sources, including major 230 KV switchyard breakers and transformers, fed the plant in a reliable manner. The inspectors reviewed maintenance schedules and discussed yard problems with offsite power distribution staff.

The team reviewed switchyard to ES bus interfaces against: the Maintenance Rule; 10 CFR 50, Appendix B; the Updated Final Safety Analysis Report (UFSAR); Technical Specifications (TS); the licensee's Quality Assurance Program; and design basis relaying, voltage stability, and voltage limitation requirements.

EDG Motive Force

EDG Diesel Fuel Oil

The team reviewed design documentation, TSs, drawings, calculations, vendor manuals, test documentation, and surveillance and operating procedures for the installed equipment to verify that the sizing of storage tanks and the design of the fuel oil transfer pumps were adequate to provide the fuel requirements to operate the EDGs for the period of time assumed in the accident analysis. This included hydraulic and net positive suction head (NPSH) requirement calculations for the fuel oil transfer pumps, calculations that determine the fuel consumption rate and calculations determining the fuel oil volume required for seven days operation. Additionally, the team reviewed test data sheets, TS, and the station acceptance criteria for fuel oil quality to verify these were consistent with the EDG vendor recommendations and applicable industry standards.

EDG Starting Air

The team reviewed design documentation, drawings, surveillance procedures and deficiency reports to verify that the air start system capabilities were consistent with design basis assumptions. This included test documentation to verify multiple start capability and air start system check valves' inclusion in periodic testing.

EDG Heat Removal

EDG Internal Lubrication and Cooling System

The team reviewed design documentation, vendor manuals, test documentation, and equipment specifications to verify that the internal cooling systems for the engine cooling and lubricating oil were adequate to maintain EDG operation within vendor specifications. This included surveillance data sheets, lube oil chemistry testing and station acceptance criteria documentation to verify these were consistent with the EDG vendor recommendations and applicable industry standards.

EDG Ventilation - Intake and Exhaust System and Equipment Space Heating, Ventilation, and Air Conditioning

The team reviewed design documentation, vendor manuals, drawings, modification records, and calculations for the ventilation design of the EDG spaces to verify that the systems were capable of maintaining ambient conditions within the ranges specified for equipment operation. This included the electrical equipment space ventilation and the EDG intake and exhaust ventilation systems.

Station Blackout Coping - Mechanical Equipment

The team reviewed the design and capability of mechanical systems and equipment required to support an SBO event. This review included design documentation, vendor manuals, drawings, calculations, modification records, UFSAR and related NRC Safety

Evaluation Reports. The systems included: the AFW; EFW; main steam; and ADV compressed air supply.

EDG and Safeguard Buses Controls

The team reviewed elementary and one-line diagrams which depicted the permissives and interlocks for EDG starting, load shedding, and load sequencing during degraded and loss of voltage conditions on the safety-related 4160 VAC ES buses. The team also reviewed the design of the degraded voltage and loss of voltage relay logic to verify that upon sensing a valid degraded or loss of voltage condition on the 4160 VAC ES buses, the EDGs would start and restore power to the boards with a LOOP with loads being automatically sequenced onto the boards. The review included: an examination of the design of the start and stop controls for EDG support system components such as fuel oil transfer pumps and auxiliary fuel pumps; EDG output breaker permissives and interlocks; and EDG protective instruments (e.g., fuel header and lube oil pressure switches, lube oil "keep warm" thermostats, and EDG protective relays) setpoint and calibration documents. The objective of the above reviews was to verify that the EDGs were capable of performing their design functions during a LOOP event consistent with the licensing and design basis for the plant.

Operator Actions

The team reviewed the UFSAR, Design Basis Documents, and Emergency Operating Procedures (EOP) associated with: the EFW and AFW (the electric driven auxiliary feedwater pump EFP-7 with its alternate diesel driven power source, MTDG-1 diesel generator) systems and the EDGs to verify the procedures were consistent with design and control features and with the required operator actions for accident conditions during a LOOP and an SBO. EOP attachment procedures to line up and crosstie various water suction sources for the EFP and AFP systems were reviewed to verify that the procedures for control of the various sources were available and to verify the correct valve lineups were identified.

Operations' Procedural Controls

The team reviewed details and application of EOPs. Under the guidance of NUREG-1021, the licensee had broken down discreet EOP tasks into the job performance measure (JPM) documents. The team reviewed the JPMs for LOOP and SBO scenarios to verify that the measures were as described in the EOP set point documents, accident analysis calculations, and supportive documentation. The team observed operators simulate performance of two JPMs in the nuclear plant (ADV air backup supply initiation and the steam driven EFP-2 trip and throttle reset) to verify the tasks could be completed within the specified times for the tasks. The team observed an operating crew's response to a station blackout scenario on the Crystal River Unit 3 off-site control room simulator. During the scenario, manual operator actions, which were required to be initiated from the control room within predefined times, relating to

the EFP and AFP, MTDG-1, and opening of the EFIC cabinets for adequate cooling, were verified to be performed as described in the EOPs. Operator workarounds were reviewed for applicability to the EFW and AFW systems operation during EOP usage.

SBO Water Sources

The team reviewed the availability and capacity of the water sources required for secondary side cooling during an SBO event for the EFPs and the AFP. These water sources included the EFW tank (EFT-2), condensate storage tank (CDT-1) and the fire service tanks (FSTs 1&2). Documents reviewed included design documentation, calculations, operation procedures, tank and piping drawings, and test documentation. Calculations for the required volume and NPSH were reviewed to verify the basis for the capacity and volume assumptions contained within the calculations.

Steam Sources for the Steam Driven EFP-2 Pump

The team reviewed the steam supplies to EFP-2. The steam supply piping and capabilities were verified to be per plan and in agreement with the design basis. The backup steam supply from Crystal River Units 1 and 2 was included in this review.

b. Findings

No findings of significance were identified.

.2 System Conditions and Capability

a. Inspection Scope

Installed Configurations

Electrical

Power Distribution

The team conducted a walk down of the safety-related 4160 and 480 VAC electrical distribution system, 230 KV Switchyard (including both OPT and BEST), and the 125/250 VDC systems. This review was performed to assess material condition, assess lightning protection and grounding, identify degraded equipment, and verify the installed configuration was consistent with design drawings and calculation design inputs.

Mechanical

EDG

The team performed a field review of accessible equipment related to the EDGs and their support systems. This review was to assess the material condition, identify degraded equipment and verify the installed configuration was consistent with design drawings and calculation design inputs.

EFW and AFW Pumps: EFP-2 , EFP-3, EFP-7, and EFP-7's MTDG-1

The team performed a field walkdown of accessible equipment related to the operation of the EFW and AFW systems required to support the SBO coping period. The walkdown included the EFW and AFW pumps, the discharge lines, water sources, and steam supply lines, EFT-2, CDT-1, and the FSTs. This review was performed to assess material condition, identify degraded equipment and verify the installed configuration was consistent with design drawings and calculation design inputs. Selected risk significant valves and their alignments were reviewed to ensure the positions were consistent with design documents, plant line up procedures and drawings. Plant work orders and caution tags on components were reviewed and discussed with the responsible System Engineers and the Operations Supervisor to independently assess equipment operability. Additionally, a walk down of the main control room emergency and non-safety but risk-important AFW and MTDG-1 controls was conducted to verify they were consistent with design requirements and procedural controls.

Design

Electrical

Power Distribution

The team reviewed design calculations to determine if steady state voltage and current values at safety-related buses and end devices were adequate during accident and non-accident scenarios, under degraded grid and normal voltage conditions. In addition, the team reviewed the “as-found” and “as-left” relay calibration records for the protective relays associated with 4160 VAC ES bus incoming breakers, EDGs, and 4160 VAC ES buses degraded and under voltage relays to verify that the settings were consistent with setpoint calculations and relay setting sheets.

The team reviewed the technical adequacy of sizing calculations for breakers, overload heaters, and fuses for selected EDG related motors. For those cases reviewed, the team also verified that coordination existed between the feeder breaker or fuse and the supply breaker. Mechanical EDG design review is addressed in report Section 1R21.1.

The team reviewed the 125/250 VDC battery pilot cell and ambient room temperature data recorded during the period from October 2000 to February 2001 to verify that actual minimum expected temperatures were consistent with those assumed in battery sizing calculations.

The team reviewed the Crystal River Unit 3 Grid Stability Study of June 14, 2001, and portions of the 1998 Crystal River 230 KV Critical Clearing Time Study in order to verify that the transmission grid in the vicinity of Crystal River Unit 3 would be stable and that the loss of offsite power would be unlikely for severe grid disturbances.

Switchyard Lightning Protection

The team reviewed drawings of lightning protection arresters and masts and observed these components in the switchyard to confirm the licensee had implemented a lightning protection scheme for the switchyard.

Station Blackout Loads

The team reviewed design documentation, calculations, and equipment specifications for a sample of end devices (EDGs, ADV, and EFIC cabinets) required for recovery after a four hour blackout event to verify that the dedicated shutdown loads could be adequately supplied by the 125 VDC system. The team verified the batteries were adequate to supply the required emergency loads for the design duty cycle. The loads reviewed included DG output breaker 3209; DPDP-6A, Switch 14 (DG 1A relays and field flash); DPDP-6B (DG control panel loads); and AS1-EGV-36-SV (air start solenoid valve for DG 1A). The team specifically verified that adequate voltage would be available at the end of the 4-hour SBO coping duration for one EDG start attempt.

Mechanical

EFW Flow Restriction Orifice

The team reviewed the UFSAR, design basis documentation, vendors' calculations, the licensee's test data, and operating procedures to verify the flow restriction orifices on the discharge of the EFW pumps maintained a limited maximum flow rate to the steam generators under single pump or dual pump operation during an accident.

EFIC Cabinet Doors

The team reviewed the design basis documentation and supporting licensee analysis and temperature calculations, and EOP instructions for consistency relating to the requirements to open the EFIC cabinet doors within 30 minutes for adequate cooling during a station blackout.

AFW Valves FW-216 And FW-217 Flow Coefficient (C_V)

AFW flows through piping separate from the EFW system up to the point of injection. Two independent manual valves, FW-216 and 217, regulate AFW flow instead of EFIC. The team reviewed the C_V calculations for the original sizing of the valves and compared it to the C_V of the installed valves to determine that the installed valves were acceptable to limit the maximum flow into the steam generator as described in the UFSAR.

EFP Suction Line Check Valves, EFV-116 and EFV-143

The team reviewed the analysis and supporting calculations and documentation relating to check valves EFV-116 and EFV-143 during low flow conditions to evaluate adequate minimum flow to the EFPs during long term cooling when the pumps take suction from the EFT-2 and CDT-1. The team reviewed past operability relating to EFV-116 and a

subsequent modification, which installed the diesel driven EFP, to assess the adequacy of previous operability documentation.

Control Complex Space Air Handling Fan Motors

The team reviewed design and maintenance documentation and maintenance rule activity on air handling motor problems that had been occurring at the site. These problems were reviewed with the engineering staff. Further review was carried out under report Section 1R21.3.

Testing

Breaker Maintenance and Testing

The team reviewed breaker maintenance, testing capabilities, and test results against the UFSAR, TS, industry guidance, and vendors' documentation. Also, the team observed test equipment in use and simulation of a PM procedure on a 480V breaker in the new breaker test facility.

Transformers

The team reviewed the chemistry sampling, general testing, and functionality checks made on the SUT, OPT, and BEST transformers against design, vendor, and industry standards. In addition, the team reviewed test and calibration records for protective relays associated with the 230 KV breakers and transformers in the Crystal River Unit 3 230 KV offsite power supply for consistency with design and setpoint values.

Degraded and Loss of Voltage Relays

The team reviewed completed calibration and functional test procedures on the degraded and loss of voltage relays. The completed procedures were reviewed to verify that the subject relays had been calibrated and tested in accordance with design output documents and TS. The team also assessed whether identified test deficiencies or out of tolerance conditions were properly evaluated and corrected by the licensee. The team reviewed the last two completed calibrations to determine if instruments were continuously drifting outside the allowable response band between calibrations. In addition to the above, the team reviewed records for the last two calibrations performed on selected EDG protective relays; voltmeters and ammeters; lube and fuel oil pressure switches; level switches; and lube oil temperature switches.

Surveillance Procedures/Complex Surveillances

The team reviewed surveillance procedures for the EFW and AFW systems, EDGs, and safety-related batteries to verify that the design bases, UFSAR and TS surveillance requirements were adequately specified on the procedure test acceptance criteria. Completed procedures were reviewed to verify that the appropriate data was being collected and reviewed by required personnel. The testing effectiveness was indirectly

corroborated against the review of work orders, maintenance rule evaluations, and corrective action program documents.

b. Findings

No findings of significance were identified.

.3 Selected Components

a. Inspection Scope

Component Inspection

The team reviewed maintenance and testing documentation and evaluations to assess the licensee's actions to verify and maintain the safety function, reliability and availability of selected components associated with the EDGs as well as other mechanical equipment required to support the SBO coping period. Selected associated components included the diesels, fuel oil storage tanks, heat exchanger thermostatic control valves, coolant pumps, EDG radiators and associated fans, and air start system boundary check valves. SBO equipment reviewed included AFW and EFW pumps, EFIC, Main Steam ADVs and safety valves, and the ADV valve backup air supply.

Component Degradation

The team reviewed the preventive maintenance (PM) program related to the EFW and AFW systems; EDG, air handling, and ADV components; and breakers and batteries to verify potential degradation was monitored or prevented. Vendor data, specifications and prints, were reviewed to verify adequate preventive maintenance on the components was specified and that replacement of components was consistent with in-service equipment life expectancy and PM performance did not increase component morbidity. Recently performed periodic performance test data was reviewed with system engineers, and plant work orders specifying PM activities were reviewed to verify the PM program was being implemented as described in the system PM procedures.

The team reviewed selected preventive maintenance (PM) records and associated procedures for 230KV switchyard breakers (numbers 1691, 1692, 4900, and 4902) and selected 4160V and 480V safety-related breakers to determine if industry guidance standards and vendor guidance were utilized in conjunction with licensee experience. Also, the minor and major 230 KV substation maintenance practices were also reviewed to verify that passive switchyard components (e.g., arresters, coupling capacitors, potential transformers, and current transformers) were being inspected and tested on a periodic basis to maintain reliability in the offsite power system. Licensee maintenance histories and corrective action documents were reviewed to determine licensee experience. A self-assessment of breaker reliability maintenance recommendations and associated corrective actions was reviewed.

The team reviewed the PM program for the Class 1E battery chargers to verify that it included necessary parts replacement on a cycle consistent with the qualifications of the chargers. The team reviewed the last two PM work orders that had been implemented on Battery Charger DPBC-1B. These work orders performed charger cleaning, setpoint checks, and calibration of indicators.

The team reviewed a recent EGDG-1B ERC relay failure and the maintenance history for the relay attempting to identify significant failure trends. The team reviewed calibration records for selected pressure, temperature, and level switches associated with both EDGs and compared them to specification data sheets for consistency and accuracy.

Operating Experience

The team reviewed the licensee's evaluation for OE 9616, "Incorrect Calculation of Voltages at 480V and 4kV Switchgear Closing Coils." The review was performed to verify that the issue had been properly assessed for impact on the plant and that, if applicable, appropriate corrective actions had been taken or planned to resolve the issue. The team reviewed breaker related corrective action documents associated with operating experience items to verify applicability and implementation of appropriate corrective actions.

Design Changes

The team reviewed equipment design changes accomplished through the licensee's design change process and component level design changes accomplished via the procurement process to verify that system and equipment function was appropriately evaluated and maintained. Documents were reviewed for modifications made on the EDGs and support equipment as well as 480 Volt and switchyard breakers.

b. Findings

No findings of significance were identified.

.4 Identification and Resolution of Problems

a. Inspection Scope

The team reviewed corrective action program documents for component problems that had occurred with equipment relied on for a LOOP and/or SBO to verify that appropriate corrective actions were either planned or implemented to resolve the concerns and prevent recurrence. Additionally, the program documents were reviewed to verify adequate root cause evaluations had been performed and that operability justifications were written when required. Corrective action items were reviewed to determine if they were completed in a timely manner and were appropriate for the issues described to prevent recurrence. Plant work orders describing corrective maintenance activities were reviewed for repeatability of issues and to assess the basic system health.

Maintenance Rule scoping documents were reviewed for safety related and risk significant components to verify each was appropriately scoped and tracked for availability and reliability where required. Corrective maintenance work orders and condition reports for risk significant components used in EOPs were reviewed to evaluate the adequacy of the Maintenance Rule assessments. Functional failures, maintenance preventable functional failures, and goal setting criteria were independently assessed on the AFW system and the MTDG-1 Diesel to determine if they were adequately being identified and dispositioned by engineering.

The team also reviewed selected reports which documented the results of the licensee's periodic self-assessments performed on the in-scope equipment and related systems required to mitigate the LOOP/SBO events. The team reviewed the corrective action program items that had been initiated by the licensee resulting from the self-assessment findings.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA6 Management Meetings

The lead inspector presented the inspection results to Mr. D. Young and other members of FPC management at the conclusion of the inspection on August 3, 2001. The licensee acknowledged the findings presented. Proprietary information was not included in the inspection report.

PARTIAL LIST OF PERSONS CONTACTED

Florida Power Company

S. Barkofski, Design Engineering Electrical and I&C Supervisor
M. Biswara, Technical Services Engineering Superintendent
C. Gurganus, Acting Plant General Manager
J. Holden, Director Site Operations
S. Powell, Supervisor, Licensing
J. Terry, Engineering Manager
D. Young, Vice President, Crystal River Nuclear Plant

NRC

Mark Lesser, Chief Engineering Branch 2
Scott Stewart, Senior Resident Inspector

APPENDIX

LIST OF DOCUMENTS REVIEWED

Corrective and Review/action Documents Initiated as a Result of this Inspection

NCR [non-conformance report] 45102: BEST and OPT temperature alarms and fan initiation switches are calibrated by a different organization (off-site) than the Auxiliary Start-up and Step-up transformers (on-site).

NCR 45875: Clarification is required on the final resolution of PCs 98-1371 and 00-1222 (ES bus alignments)

NCR 45207: NU 0365185 performed a complete PM-101 instead of refurbishment of the breaker.

NCR 45476: Cannot locate breaker setting calculations for DCP-1A/1B (FCS-13495).

NCR 45506: There is a newer version of the EPRI/NMAC breaker maintenance guidance than referenced in the preventive maintenance procedure.

NTM [Nuclear Task Management items] 45754:Present REA 00-0392 to mini-PMRG for surge suppressors on various relays and solenoids for inhibiting EMF to EFIC control module.

NTM 45790: No documentation exists detailing size and type of thermal overload relay he aters for DFP3A/3B.

NTM 45883: DFP-3A/3B MCCBs are not in MCCB Program.

NCR 45977: Should low voltage testing be performed on EDG output breakers?

NTM 45004: SBO calculations M-88-0036 and M-88-0037 contain outdated references.

NCR 45692: SBO Calculation M-88-0037, Rev. 2, was not revised completely.

NCR 45899: Wording Inconsistencies between the EDG System Enhanced Design Basis Document and the Vendor Manual for the Diesel Fuel Oil Specifications.

NCR 45113: No procedural guidance exists to align FWP-7 to EFT-2.

NCR 45807: PC 00-2227 closed incorrectly (MTDG-1 periodic testing)

NCR 45984: EFV-116 CV in M-99-0027 may be overestimated.

NCR 46267: Maintenance Rule data was fully transferred into the Maintenance Rule Manager Program [Progress Energy new tool]

NTM 41910, Assignment #1: Due date was rescheduled from 8/30/01 to 2/15/02.

NTM 41326, Assignment #6:Assignment was revised to require individual reliability criteria for FWP-7 and MTDG-1.

Operations Procedures

AR-702, SSF Annunciator Response, Rev. 19
transformer annunciators
breaker trips annunciators
degrading grid annunciators

OP-103F, Tank Volumes, Rev. 16

OP-707, Operation of the ES Emergency Diesel Generators (NOCS 090060), Rev. 60

General Procedures

PM-106, Dry Type Transformers, Rev.11

MP-499, EDG Engine Engine Inspection/Maintenance, Rev.12, (8/29/97 and 9/30/97)

AI-1803, Safety Standards For Ladders, Scaffolds, and Ancillary Equipment, Rev. 16

AI-505, Conduct Of Operations During Abnormal and Emergency Events, Rev. 7

ADM-NGGC-0101, Maintenance Rule Program, Rev. 13

PM-180A, Check Valve Predictive/Preventive Maintenance Program Non-Intrusive Examination Techniques, Rev. 4

PM-133, Equipment Lubrication And General Inspection, Rev. 52

PM-102, Calibration of Protective Electrical Relays, Rev. 22

MP-423, Maintenance of Switchboard Meters and Transducers for Emergency Diesel Generators, Rev. 3

Substation Major Maintenance and Power Factor Test Guide, issued 9/97

Chemistry transformer test per instruction ASTM D3613, Standard Practice for Sampling Insulation Liquid for Analysis and Determination of Water Content

Major Maintenance and Power Factor Test; September, 1997

Minor Maintenance and Substation Inspection; September, 1997

PM-101, 4.16kV and 6.9 KV Switchgear, Rev. 31

PM-107, 480V Breakers, Rev. 27

MP-461, ABB HK Medium Voltage Breaker Refurbishment, Rev. 0

MP-462, 480 Volt Breaker Refurbishment, Rev. 0

Surveillance Procedures

SP-169D, Diesel Generator Instrumentation Calibration, Rev. 6

SP-746A, Diesel Fuel Oil Testing Surveillance Program : EDG Fuel Storage Tank DFT-1A, Rev.2

SP-746B, Diesel Fuel Oil Testing Surveillance Program : EDG Fuel Storage Tank DFT-1B, Rev.2

SP-746C, Diesel Fuel Oil Testing Surveillance Program : EDG Fuel Day Tank DFT-3A, Rev.2

SP-746D, Diesel Fuel Oil Testing Surveillance Program : EDG Fuel Day Tank DFT-3B, Rev.2

SP-354A, Monthly Functional Test of the Emergency Diesel Generator EGDG-1A, Rev. 66

SP-354B, Monthly Functional Test of the Emergency Diesel Generator EGDG-1B, Rev. 60

SP-349C, EFP-3 and Valve Surveillance, Rev. 4

SP-348A, AFW Pump (FWP-7) Testing and MTDG-1 Surveillance Testing, Rev. 11

SP-146A, EFIC Monthly Functional Test, Rev. 23

SP-349B, EFP-2 and Valve Surveillance, Rev. 45

SP-349C, EFP-3 and Valve Surveillance, Rev. 4

SP-381, Position Verification Of Locked/Sealed Valves, Rev. 72

SP-416, Emergency Feedwater Automatic Actuation, Rev. 31

SP-620, ISI Check Valve Inspection, Rev. 7

System Descriptions

Emergency Feedwater Initiation And Control System, Rev. 1

Emergency Operating Procedures/Documents

EOP-01, EOP Entry Conditions, Rev. 3

EOP-02, Vital System Status Verification, Rev. 5

EOP-03, Inadequate Sub-cooling Margin, Rev. 7

EOP-04, Inadequate Heat Transfer, Rev. 6

EOP-07, Inadequate Core Cooling, Rev. 7

EOP-09, Natural Circulation Cool down, Rev. 3

EOP-10, Post Trip Stabilization, Rev. 4

EOP-12, Station Blackout, Rev. 4

EOP-13, Emergency Operating Procedure Rules, Rev. 5

EOP-14, Enclosures, Rev. 7

AP-770, Emergency Diesel Generator Actuation, Rev. 30

ESD-01, EOP Set point Document for Station Blackout, Rev. 4

ESBD-01, EOP Set point Bases Document, MUP Lube and Gear Oil Pumps For SBO, Rev. 4

EM-225F, Long Term Emergency Feedwater Management, Rev. 1

Job Performance Measures (revision number associated with EOP changes)

JPM-004, Perform required action for a loss of a 4160V ES Bus

JPM-025, Respond To Loss Of Air Header Pressure

JPM-033, Respond to a loss of Reactor Coolant Pump Seal Injection

JPM-48, Synchronize in off-site power and unload/shutdown EDG-1A using AP-770

JPM-058, Operate The Emergency Feedwater System (Reset EFP - 2)

JPM-113, Operate The Atmospheric Dump Valves Locally

JPM-132, Perform required actions for a loss of a 4160V Bus

JPM-133, Perform required actions for a loss of a 4160V Bus

JPM-134, Perform required actions for a loss of a 4160V Bus

JPM-135, Perform required actions for a loss of a 4160V Bus

JPM-169, Operate The Emergency Feedwater System

JPM-260, Recover a failed EDG

JPM-273, Perform MTDG-1 Emergency Operations, Startup the Aux Feed Water System

JPM-287, Comply with EOP rules and Enclosure 7

JPM-299, During emergency Operations, Startup the Control Complex Chillers per EOP 14, enclosure 17

JPM-9811, Recover from an EDG fail to start (AP-770)

Maintenance Rule Scoping Documents (7/01)

Emergency Feedwater System

Emergency Feedwater Initiation And Control

Auxiliary Feedwater Pump

Work Orders (1996 to 1999)

WR 364879, WR 369745 SUT Temperature Indicating Switches

WR 318554, SUT and BEST Transformer Protective relays

WR 349175, Replace Fan and Insulators on Transformer MTSW-3G

WR 338290, MTSW-3H Voltmeters

WR 354021, MTSW-3G-3B DCP-1B Breaker Repair

WR 350858, MTSW-3F-3C A ES 480V Breaker Repair

WR 369745, Startup Transformer Temperature Switches

WR 346028, Temperature Switches for 480 Volt ES Transformers

WR 357210, BEST and Startup Differential and Breaker Failure Protection

WR 357221, Breaker Failure Protection

WR 362880, Remove, Inspect and Reinstall Fan Drive Shaft for EGDG-1B

WR 357667, Emergency Diesel Generator EGDG-1A Stand By Jacket Coolant Pump DJP-3 Motor/Pump Replacement to Eliminate Seal Leak

WR 361588, Emergency Diesel Generator EGDG-1A Stand By Jacket Coolant Pump DJP-3 Motor/Pump Replacement to Eliminate Seal Leak

WR 361887, Emergency Diesel Generator EGDG-1A Stand By Jacket Coolant Pump DJP-3 Motor/Pump Replacement to Eliminate Seal Leak

WR 368965, EGV-21 and 22 Replacement

WR 332710, Inspect and Repair or Replace Foot Valve for Storage Tank DFT-1B

WR 356787, Lubrication Addition/Inspection/Maintenance and Removal/Inspection of Fan Vertical Drive Couplings for EGDG-1A

WR 357138, Lubrication Addition/Inspection/Maintenance on EGDG-1B

WR 361643, EGDG-1B Multi-point Exhaust and Turbo Temperature Indicator

WR 362917, Reassemble all Parts for Inspection Regarding Fan Drive Shaft

WR 342279, Perform Maintenance on DLV-39, (replace AMOT power elements)

WR 342389, Replace DJV-68, Thermostatic 3-way Bypass Valve for EGDG-1B

NU 0354046, MTDG-1 North Engine Block Heater Does not Appear to be Working Correctly

NU 0355784, MTDG-1 the Battery Terminals Need to be Cleaned

NU 0370314, EFV-2 Short on the EFV-2 Open Indicator on MCB with Valve in Closed Position

NU 0359997, MULTI-TAG PC 98-5410 Documented that in Response to the FWP-7 Failure

NU 0360620, ASV-5 EFP-2 Iinlet Isolation Valve Leaks by Seat When Closed

NU 0361083, MTDG-1 During Performance of Weekly PM-110 C-F Battery Cell # 4 and D-F Battery Cell 2 Failed Specific Gravity Acceptance Value

NU 0362451, EFP-3 Install Packing in Valves Installed by EFP-3 Project

NU 0362593, MTDG-1, Per PM-110 Battery C-F Cell #3 Failed the Required Specific Gravity of 1.245

NU 0362884, EFP-3, REA #99-1529 Requires the Fabrication and Installation of a Temporary Strainer to be used Facilitate a Flush of the system

NU 0363206, EFV-1, Closed Indication for EFV-1 at MCB not working

NU 0363223, EFP-1 Wiring Error Found

NU 0363698, CHV-108 C/H Selected to Open When AHF-54A is running Because the Start Open Relay has Failed

NU 0363726, EFP-1, 2 Flex conduits are Damaged and Need Replacing

NU 0363751, EEP-2, Provide I&C Support as Needed to Temporarily Install Test Equipment

NU 0364007, MTDG-1 Battery Failed PM-110

NU 0364327, EFP-3 Higher that What is Considered Normal Vibrations on Right Angle Fan

NU 0364491, EFP-3 Oil Analysis Indicates Oil contamination on Outboard Bearing

NU 0364946, EFP-3 Radiator Coolant Leaking from 1' Tubing Joint

NU 0365152, EFP-3 WRs 363764 AND 362553 will Remove Power from EFP-3

NU 0365773, MTDG-1 Fuel Leak on Fuel Canister on Rear

NU 0366154, MTDG-1 North and South Engine Fuel Filter are dripping while MTDG-1 is running

NU 0367071, MTDG-1 Oil Leak from North End of Engine

NU 0367856, MTDG-1 Battery B-R Failed PM-110 Low Specific Gravity

NU 0368937, MTDG-1, Exhaust Tail Pipe Flaps Currently are not Weighted to Ensure Closure Upon Securing the Engine

NU 0369161, EFV-32 Red Indicator Lamp on Mail Control Board is Blowing RSB-1-FB

WR 0356311, Perform Meter and Transducer Maintenance/Calibrations on EGDG-1A

WR 0329737, Calibrate EGDG-1A Metering / Transducers in Accordance with MP-423

WR 0341368, Calibration of EGDG-1A Metering / Transducers

WR 0342109, Calibrate EGDG-1B Metering / Transducers in Accordance with MP-423

WR 0357033, Calibrate EGDG-1B Metering / Transducers in Accordance with MP-423

WR 0361746, Perform Setpoint Checks, Clean Charger and Calibrate Indicators on Class 1E Battery Charger DPBC-1B

WR 0366522, Perform Setpoint Checks, Clean Charger and Calibrate Indicators on Class 1E Battery Charger DPBC-1B

WR 334966, Breaker 3391 PM

WR 309276, Breaker 3205 PM

WR 355844, Breaker CDP-1B PM

WR 309658, Breaker 3211 PM

WR 363499, Breaker 3208 PM

WR 310479, Breaker 3206 PM

WR 362901, Breaker 3220 Refurbishment

WR 365185, Breaker 3207 PM

WR 359213, Breaker DCP-1A PM

WR 342747, Breaker 3351 PM

WR 356910, Breaker 3212 PM

Licensee's Completed Documents

Surveillance SP-417, Refueling Interval Integrated Plant Response to an Engineered Safeguards Actuation, Rev. 42, completed 11/4/99

Doble Two-Winding Transformers Insulations Tests, completed 8/17/99

Preventive Maintenance PM-102, Calibration of Protective Electrical Relays, Rev. 17, completed 8/17/99

Transformer chemistry results, for last three years

Surveillance Procedure, SP-370, Quarterly Cycling of Valves (EGV 21, 22), Rev. 77, completed 11/08/00

Surveillance Procedure, SP-370, Quarterly Cycling of Valves (EGV 23, 24), Rev. 77, completed 01/12/01

Surveillance Procedure, SP-206, System In Service or Functional Pressure Test of Class 2 & 3 Systems, Rev. 7, completed 08/05/99 and 08/12/99

Preventive Maintenance Procedure, PM-105, Inspection Testing & Maintenance of Electrical Motors, Rev. 18, completed 08/04/99 and 08/11/99

Maintenance Procedure, MP-142A, Diesel Generator's Jacket Water Circulation Pump (DJP-3 and DJP-4) Maintenance, Rev. 2, completed 08/11/98

Maintenance Procedure, MP-499, EDG Engine Inspection/Maintenance for EGDG 1-A/B, Rev. 19, completed 10/99

Startup, BEST, and Offsite transformers internal gas analysis history trend, last three years

SP-300, Operator Readings, Operating Daily surveillance Log, Rev. 175
Transformer operator rounds data sheets

SP-169D, Enclosure 3, Diesel Generator Instrumentation Calibration, Rev. 6, completed 12/7/97

Pilot Cell and Battery Voltage Data Sheets for the period 10/30/00 through 2/26/01

PM-102, Enclosure 1: pages 115 thru 125, 185 &186 ,189, and 199, Revs. 15 and 16, completed 3/6/96 and 9/10/97; pages 59, 60, and 70, Revs. 15 and 16 completed 3/16/96 and 8/11/97; pages 74, 84, and 85, Rev. 16 completed 10/29/97; pages 73, 83, and 84, Rev. 19, completed 10/14/99; pages 126 thru 136, 187 &188, 190, 200, Rev.15 completed 3/29/96; pages 125 thru 129, 132, 134 &135, 186 &187, 189, 199, Rev. 17, completed 10/16/99; pages 130, 131, and 133, Rev. 19, completed 10/16/99; pages 140 thru 144, 200 thru 201, Rev. 17, completed 10/19/99; page 153, Rev. 19, completed 10/19/99

Meter Calibration Data Sheet for ES “B” Bus Voltmeters completed 3/23/96

Meter Calibration Data Sheet for Bkr 3210 EGDG-1B completed 10/25/99

SP-169D, Diesel Generator Instrument Calibration, Rev. 5, completed 10/97 and 12/97

SP-169D, Diesel Generator Instrument Calibration, Rev. 6, completed 3/00

SP-907A, Monthly Functional Test of 4160 V ES Bus A Undervoltage & Degraded Grid Relaying, Rev. 23, completed 6/20/01

SP-907B, Monthly Functional Test of 4160 V ES Bus B Undervoltage and Degraded Grid Relaying, Rev. 21, completed 7/5/01

SP-901, 4160 V ES Bus “B” Undervoltage Trip Test And Auxiliary Relay Calibration, Rev. 16, completed 11/28/97

SP-901, 4160 V ES Bus “B” Undervoltage Trip Test And Auxiliary Relay Calibration, Rev. 18, completed 10/21/99

SP-902, 4160 V ES Bus “3A” Undervoltage Trip Test and Auxiliary Relay Calibration, Rev. 19, completed 12/15/97

SP-902, 4160 V ES Bus “3A” Undervoltage Trip Test and Auxiliary Relay Calibration, Rev. 20, completed 11/4/99

SP-904A, Calibration of 4160 V ES “A” Bus Undervoltage and Degraded Grid Relays, Rev. 1, completed 2/2/99

SP-904A, Calibration of 4160 V ES “A” Bus Undervoltage and Degraded Grid Relays, Rev. 1, completed 11/8/00

SP-904B, Calibration of 4160 V ES “B” Bus Undervoltage and Degraded Grid Relays, Rev. 1, completed 1/20/99

SP-904B, Calibration of 4160 V ES “B” Bus Undervoltage and Degraded Grid Relays, Rev. 1, completed 10/24/00

Maintenance Records for Breaker 4902 dated 5/24/1999 and 10/20/1997

Maintenance Record for Breaker 4900 dated 10/23/1997

Maintenance Record for Breaker 1692 dated 9/09/1999

Maintenance Record for Breaker 1691 dated 9/09/1999

Surveillance SP-521, Quarterly Battery Check, Rev. 30 completed 5/10/2001

Surveillance SP-522, Station Batteries Inspection and Battery Charger Load Test, Rev. 22 completed 11/14/2000

Surveillance SP-523, Station Batteries Service Test, Rev. 32 completed 11/01/1999

Surveillance SP-524, Battery Modified Performance Discharge Test, Rev. 19 completed 10/17/1997

Surveillance SP-525, Battery Surveillance, Rev. 0 completed 7/18/2001

Precursor Cards (PCs), Nonconformance Reports (NCRs), Action Requests (Ars), and Problem Reports (PRs)

3C98-2522, Transformer Gas Levels High

3C98-3171, SP-321 Breaker Alignment

3C00-2023, Spurious Trip of Fire Deluge on Best Transformer

3C99-2645, Elevated Water in SUT [main generator to 230 KV yard] Transformer Oil

3C99-3769, Oil Leak on SUT

3C01-0583, Elevated Dissolved Gas in Oil of Auxiliary and Startup Transformers

3C00-1222, Licensing Discussion on Offsite Power Sources

3C00-1567, PRA Upgrade Problem

3C99-2907, Modeling of EFV-116

3C98-3310, Exterior Residue on EDG Jacket Water Tubing

3C98-3307, Deficient Guidance in EDG Surveillance Test for Frequency Testing

3C98-0597, EFV-34 Failed The Acceptance Criteria in Calculation M96-0063

NCR 99-0671, FWP-7 Inboard Pump Bearing Oil Bubbler Nearly Empty

3C00-3364, Review INPO OE 11657, Fairbanks Morse Diesel Generator Blowdown/Pressure Indicating Valve Mounting Stud Failure

3C98-5363, FWP-7 Pump Bearing Exceeded Its Temperature Limit

3C00-0261, FWP-7 Inboard Pump Bearing Degraded

AR/NCR 00044603, EGDG-1B Start Failure

C99-2870, EGDG-1B Governor Power Cable Routed to Lie on Diesel Exhaust Manifold

C99-2869, EGDG Governor Cable Fire

3C99-2847, B Battery Bus Ground and EGDG-1B Output Breaker Trip

3C00-0998, Level Switch DF-1-LS, Switch #1 Found Out of Tolerance, 03/29/00

3C00-3086, EGV 21 & 22 Inbody Valve Seats Do Not Meet Acceptance Criteria, Valves are Leaking, 11/08/00

3C00-2108, Air Receiver Check Valve, EGV-21, Failed SP-370, 07/29/00

3C00-2895, Air Receiver Check Valve, EGV-22, Failed SP-370, 10/20/00

3C98-3027, DJP-4 (EGDG-1B Stand By Jacket Coolant Pump) has Repeatedly Developed Shaft Seal Leaks, 06/19/98

3C01-0208, Wrong Lubricating Oil Added

3C01-0424, The NAS Assessment Team Identified Multiple Industrial Safety Issues

3C01-0734, Cost/benefit of Maintaining MTDG-1, Standby Diesel Generator

3C01-0951, Further Guidance Needed to Determine Liquid Temperature

3C01-1275, EFV-7 & 8 Required Approximately 3000 Turns to Open

3C00-0234, Clearance Requirements for MTDG-1

3C00-0261, FWP-7 Inboard Bearing Degradation

3C00-0287, FWP-7 Bearing Failure

3C00-0316, NOD-31 Table 1 Identifies FWP-7 (and MTDG-1) as Equipment

3C00-0338, FWV-215 Valve Operator Failed

3C00-0360, FWV-215 Operator

3C00-0380, EFP-1 And Associated Flow Path

3C00-0618, Preparations for Running MTDG-1

3C00-0620, Why does SP-348A have Operations Perform a System Valve Lineup

3C00-0625, Layout of Steps of SP-348A Induces Unwarranted “Time Pressure”

3C00-1092, Manual Emergency Trip Of EFP-3

3C00-1312, EFV-57 & 58 Inadvertently Cycled

3C00-1509, ANIWC was Required to SP-348A

3C00-2096, EFV-55 was Identified To Be Closed

3C00-2200, EFV-34 Initially Failed The Open

3C00-2227, SP-9348A, “Auxiliary Feedwater Pump (FWP-7) Testing and MTDG-1

3C00-2847, SP-349A Aborted Run Of EFP-1.

3C00-2899, FWB-269 Leaking By

3C00-3265, As Found On EF-18-PS OOS

3C00-0360, Operator for FWV-215 was Discovered Broken on 2/1/2000

3C99-0298, Battery From Store Would Not Take A Charge

3C99-0340, Repeat Maintenance - WR 0353493 Identifies Oil Leaks on FWP-

3C99-0671, FWP-7 Inboard Pump Bearing Oil

3C99-1301, Spare Battery for MTDG-1 Failed Specific Gravity Check

3C99-1321, Received Mislabeled Parts From Ocala Stores

3C99-1324, FWP-7/MTDG-1 Exceeded Its Maintenance Rule Limit

3C99-2017, This PC is being Written to Suggest the Trailer Enclosure

3C99-2695, Diesel Fuel Delivery Delayed

3C99-2907, Modeling Of EFV-116, Safety Class

3C99-3738, Pillow Block Bearing And The Rig

3C99-3739, Speed Increaser On EFP-3

3C99-4681, Found One Battery Cell On MTDG-1 Slightly Out Of Spec

3C99-4709, MTDG-1 (FWP-7diesel) is Very Difficult to get Into and Out

3C98-0063, MTDG-1 Crankcase Levels Out of Spec

3C98-2307, EFV-1 & EFV-2 Needs to be Evaluated by Engineering as “Repeat

3C98-2634, EFV-35 Failed the Acceptance Criteria of SP-349B

3C98-2638, Evaluate EFV-35 As A Repeat Maintenance Item

3C98-3758, During Performance of SP-349B, EFV-35 Failed It’s Check Valve

3C98-3807, IWCC Written on a SP-348A, FWP-7 and MTDG-1 Surveillance

3C98-3816, FWV-216 Open p/b Sticking, Causing FWV-216 to Stay Open

3C98-3880, FWV-216 and FWV-217 Position Indicator Lights

3C98-4332, Misprint/Typo Error on the 208-040 print/sheet MT-145

3C97-6632, Fuel for FWP-7 Diesel is Charged .50 Extra for Road Taxes

3C97-7332, During the Course of the Assessment Some Problems were Noted

3C97-8215, Pre-Starts on the Diesel Found High Oil Levels on Both Crankcase Indicators

3C97-8224, MTDG-1 Engine Oil Levels were Found Above the Full Mark

3C97-8358, Long-Time Trip Setting of 480V Breaker Feeding ES MCC 3A2 is Set Too Low

3C98-0345, Many of the Calculations do not Reflect the “As-Built” Condition of the Plant

3C98-3171, SP-321 does not Assure Independence of Electrical Alignment

3C98-3300, EGDG-1B does not Control Frequency within Specs Upon Start

3C99-0168, Varistors Installed Across Relay Coils Where Bill of Material Shows thyristors

3C99-0877, Revise Procedures to Incorporate New Battery Connection Resistance Values

3C99-1018, Incorrect DC Voltage Used to Calculate Voltages at 4KV Switchgear Closing Coils

3C99-4100, Maximum EGDG-1A RPM of 1025 was Exceeded

3C00-1312, EFV-57 & 58 Inadvertently Cycled During SP-332

3C00-2827, EFV-57 Cycled Closed then Back Open

3C00-3045, EFV-57 Observed Stroking Partially Closed

AR 00041546, Circuit Breaker Fault Resulted in Fire (SEN 218)

AR 00040544, Breakers with Chipped Phenolic at the Auxiliary Switch (OE11575)

AR 00041416, Breaker Failed to Trip Causing Fire (OE11851)

AR 00041890, Weaknesses in Followup of SOER 98-02 Concerning Breaker Maintenance

AR 00042456, Functional Failure of B CRD Feeder Breaker

3-C98-3415, Followup of Industry Breaker Maintenance Issues

3-C98-4411, Followup of SOER 98-02 Concerning Breaker Maintenance Issues

3-C98-5442, Breaker Maintenance Self-Assessment Actions

AR 00039791, Breaker Did not Open

AR 00039540, Breaker Tripped Free and Would Not Close During PM

AR 00038145, Breaker Failed PM

AR 00037772, Breaker Failed to Close

AR 00037818, Found Breakers Open not in Accordance with Procedure

AR 00036418, Breaker Lockout Circuit Problem

AR 00035879, Two Breakers would not Trip

AR 00035848, Breakers Difficult to Operate

AR 00035606, Battery Bus Ground

AR 00035483, Breaker Failed PM

AR 00035118, Breaker Settings did not Match Drawing

3C98-2193, Breaker Slow Close would not Work

3C98-5352, Audit Finding Regarding Vendor Information not in PM Program

3C00-2445, BEST and OPT Lightening Arrestor Issue

PR 93-0073, Salt Contamination on Insulators

PR 93-095, Salt Intrusion on Cable Trenches

AR 97-8499, Vital Bus Regulating Transformers Found Operating Below Nominal Power Factor

Drawings

FD-302-082, Emergency Feedwater, Rev. 60

FD-302-282, Emergency Diesel Generator Compressed Starting Air & Engine Exhaust, Rev. 31

FD-302-283, EGDG-1A/B Jacket Coolant Flow Diagram, Sheets 1-2, Rev. 33, 9

FD-302-284, EGDG-1A/B Air Cooler Coolant Flow Diagram, Sheets 1-2, Rev. 25, 13

FD-302-285, EGDG-1A/B Lube Oil Piping System Schematic Diagram, Sheets 1-2, Rev. 21, 7

1-869-C1, Emergency Diesel Generator Fuel Storage Tanks 3A & 3B, Rev. 4

6-090-A1X, Emergency Diesel Generator Tank & Turbine Oil Storage Tanks, Rev. 0

11865949, Fuel Oil System Schematic, Rev. 8

11866364, Fuel Oil Day Tank, Rev.8

CR3-M-309, EDG Fuel Oil Day Tanks DFT-3A, 3B Seismic Supports, Rev. 1

97-B300801-1, EDG Fuel Oil Storage Tank Vessel Data, Rev. 0

97-B300801-2, EDG Fuel Oil Storage Tank Assembly, Rev. 0

97-B300801-3, EDG Fuel Oil Storage Tank Fittings, Rev. 0

97-B300801-4, EDG Fuel Oil Storage Tank Name Plate, Rev. 0

97-B300801-5, EDG Fuel Oil Storage Tank Saddle, Rev. 0

97-B300801-6, EDG Fuel Oil Storage Tank Ladder, Rev. 0

GV-815/0324W110 (GAI 4203-86-71-0), Emergency Diesel Generator EGDG-3A, 3B Fuel Oil Transfer Pumps, 03/24/71

FD-302-281, Emergency Diesel Generator Fuel Oil Transfer, Rev. 37

K-1139-B, Crane Co. Bronze Foot Valve, Rev. B

14356 6925, 3A Diesel Generator Room AHF-22A, 22B, Rev. J

14356 5925, 3B Diesel Generator Room AHF-2C, 22D, Rev. G

FD-302-082, Emergency Feedwater, Rev. 60

FD-302-081, Feedwater, Rev.13

FD-302-011, Main and Reheat Steam, sheet 1 and 2, Rev. 61 and 58 respectively
ENERFAB Inc. Dwg. 4346-1-1, Dedicated Emergency Feedwater Tank Assembly and Details, Rev. 3

Fairbanks-Morse Dwg. 11901417, 5 inch Thermostatic Bypass Valve, Rev. 2

IC-308-313, Main Steam and Exhaust system Pneumatic Diagram, Main Steam Relief Valve Air Supply, Rev.13

COLTEC Dwg. 11916036, Radiator - EGDG Jacket Water, Rev. D

Dresser Dwg. 1900-D, Relief Valve, Rev.5

Velan Valve Dwg. D-35300-44, Bolted Bonnet Piston check Valve, Rev. 4

Fisher Dwg. AV3824, Diaphragm Actuator, Rev. A

Dresser Dwg. CP-1072, ASME Section III Maxiflow Safety Valves, 1500 psig class, Rev. 3

Brown Minneapolis Tank Dwg. 97-B300801, 2500 Gallon Capacity Tank Assembly, Rev. 0

B-208-020, DF-01, Elementary Diagram Emergency Diesel Generator EGDG-1A Fuel Oil System MTMC-4, Rev. 18

B-208-020, DF-02, Elementary Diagram Emergency Diesel Generator EGDG-1B Fuel Oil System MTMC-5, Rev.17

B-208-027, EG-01, Elementary Diagram Emergency Diesel Generator EGDG-1A Shutdown Relay (SDR) Energization, Rev.19

B-208-027,EG-02, Elementary Diagram Emergency Diesel Generator Shutdown Relay (SDR) Energization, Rev. 22

B-208-027, EG-03, Elementary Diagram Emergency Diesel Generator EGDG-1A Stop, Rev. 22

B-208-027, EG-05, Elementary Diagram Emergency Diesel Gen. EGDG-1A Start, Rev. 20

B-208-027, EG-07, Elementary Diagram Emergency Diesel Gen. EGDG-1A Alarm Relay (ALR) Energization, Rev. 11

B-208-027, EG-15, Elementary Diagram Emergency Diesel Gen. EGDG-1A Differ. Lockout & Auxiliary Relays, Rev. 22

B-208-027, EG-15A, Elementary Diagram Emergency Diesel Generator EGDG-1A Differ. Lockout & Auxiliary Relays, Rev. 4

B-208-040, MT-13, Elementary Diagram 4160V ES Bus 3A MTSW-2D-3A12, Bkr 3209 From Diesel Generator EGDG-1A, Rev. 19

B-208-040, MT-131, Elementary Diagram 4160V ES A Bus Degraded Voltage Relaying, Rev. 9

B-208-040, MT-65, Elementary Diagram 4160V ES Bus 3A (MTSW-2D-3A14, 3A13) Undervoltage Relaying, Rev. 14

B-208-041, MU-02, Elementary Diagram Makeup & Purification Pump 3B (MUP-1B) 4160V ES Bus 3A MTSW-2D-3A9, Rev.19

B-208-081, DL-01, Elementary Diagram Prelube PP3A DCP-1 & Standby Circ. PP3A DCP-5 & Lube Oil Heater 3A , Rev. 0

B-208-081, DL-02, Elementary Diagram Prelube PP3B DCP-2 & Standby Circ PP3B DCP-6 & Lube Oil Heater 3B DLHE-4, Rev. 0

EC-206-015, SH-1, Electrical One Line Diagram Generation & Relaying 4160V Eng. Safeguard Bus, Rev. 9

EC-206-011, Electrical One Line Diagram Composite, Rev. 50

EC-206-051, SH-1, Electrical One Line Diagram 250/125V DC System, Rev. 16

EC-206-051, SH-2, Electrical One Line Diagram 250/125V DC System, Rev. 6

EC-229-102, DC Elementary Breaker Control/Misc. Schemes 230 KV, Rev. A

EC-229-106, 230KV Substation Elementary Diagram 230KV Bus “6” Primary Diff. Crystal River Unit 3, Rev. A

1186077, Electric Schematic Static Exciter, Rev. E

SS-201-071, Electric Arrangement 250/125V DC ES Distribution Panel 3A, Rev. 5

400133, Schematic Switching Current Controller (Target Rock), Rev. 1

S-171-A1, Crystal River Plant Substation Three Line Diagram, Rev. 1

S-171-A119, 80' Lightning Mast, Rev. 4

S-171-D4, Crystal River Substation Electrical Plan (230KV), Rev. 15

S-171-D20, Crystal River Plant Substation Electrical Elevations, Rev. 4

Calculations

M-93-0024, Diesel Generator Fuel Oil Day Tanks (DFT-30/3B) NPSH & Vortex Level, Rev. 1

M-97-0105, Analysis for Rerating - Impact on EDG Support Systems, Rev. 0

M-97-0142, EGDG Radiator Fan Exhaust Fan Horsepower Requirement, Rev. 0

M-97-0124, EGDG Radiator Exhaust Fan Power Train, Clutch Drive Hub to Shaft Taper Shrink Requirement, 300 Hp Drive Capability, Rev. 0

M-94-0016, EDG Minimum Intake Air Temperature, Rev. 0

M-98-0008, Emergency Diesel Generator Radiator Fan System Analytical Pressure Drop, Rev. 3

I-87-0009, FPC Diesel Loading Evaluations, Rev. 6

M-97-0140, EGDG-1A & EGDG-1B Radiator Fan Flow Determination, Rev. 0

M-89-0012, Diesel Fuel Required for Turbo Blower Series Engine, Rev. 6

M-93-0026, Diesel Generator Fuel Oil Storage Tank (DFT-1A & DFT-1B) Volume, Rev. 2

I-95-0010, Emergency Diesel Generator Day Tank Level Instrumentation Uncertainty Calculation, Rev. 0

M-92-0031, DG Fuel Oil Transfer Pump Suction Pressure and Storage Tank Vortex Level, Rev. 1

M-93-0007, DFP Surveillance Test Hydraulic Acceptance Criteria (DFP-1A & DFP-1B), Rev. 1

H-93-0001, EDG Minimum Ventilation Design Basis, Rev. 2

M-97-0106, Design Input for Radiator Conversion, Rev. 1

H-97-0003, EDG Air Handling System Pressure Loss Calculation, Rev. 1

S-89-1185, EDG Combustion Air Intake Upgrade, Rev. 0

M-97-0056, EDG Radiator Exhaust Wind Tunnel Evaluation - Radiator Air Recirculation Problem, Rev. 0

M-97-0155, Additional Radiator/Fan Analysis, Rev. 1

M88-0036, NUMARC 87-00, Adequate Condensate Inventory for Decay Heat Removal During SBO Event, Rev. 3

M99-0089, EFP-3 Diesel Engine and Support Systems Sizing Calculations, Rev. 4

E-89-0002, Calculation for NUMARC 87-00, Required Coping Duration for SBO Event at CR-3, Rev. 0

E-00-0004, SBO Heat Load Margin for DAC 1-21, Rev. 0

F92-0002, Feedwater Inventory During Natural Circulation, Rev. 0

M86-1000, EFP-2 /discharge Piping Maximum Safe Working Pressure, Rev. 0

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