

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Inspection Report: 50-313/93-29; 50-368/93-29

Operating Licenses: DRP-51; NPF-6

Licensee: Entergy Operations, Inc.  
Route 3, Box 137G  
Russellville, Arkansas 72801

Facility Name: Arkansas Nuclear One, Units 1 and 2

Inspection At: Russellville, Arkansas

Inspection Conducted: November 29 through December 3, 1993

Inspectors: Paula Goldberg, Reactor Inspector, Engineering Section  
Division of Reactor Safety

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Approved:

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Reactor Safety

12/14/93  
Date

Inspection Summary

Areas Inspected (Units 1 & 2): Routine, announced followup inspection of licensee actions in response to previously identified and reported issues.

Results (Units 1 & 2):

- The licensee's actions in response to the previously identified items were found to be good.
- The licensee's proposed additional improvement to the sources of offsite power and additional distribution system evaluations were considered to be indicative of a proactive corrective action program.
- The licensee's engineering documentation was found to provide a thorough and easy to understand design basis.

Summary of Inspection Findings:

- The following inspection followup items were closed:

313/9010-01  
313/9011-01  
313/9216-01  
313/9216-03  
313/9216-04  
313/9216-05  
313/9216-06  
313/9313-03  
313/9313-10  
313/9313-11  
368/9102-02  
368/9102-03  
368/9102-04  
368/9102-06  
368/9102-08  
368/9102-09  
368/9102-10  
368/9102-11  
368/9313-03  
368/9313-10  
368/9313-11

- The following unresolved items were closed:

313/9102-01  
368/9102-01  
368/9102-05

- Violation 313/9216-07 was closed

- The following licensee event reports were closed:

313/91-007  
313/91-009  
313/91-010  
313/91-011  
313/93-002  
368/01-011  
368/91-014  
368/92-006

- Inspection followup item 313/9216-02 remains open (paragraph 2.12)

Attachment: Persons Contacted and Exit Meeting

## DETAILS

### 1 INTRODUCTION

An inspection of the licensee's actions in response to items identified during the Electrical Distribution System Functional Inspections (EDSFIs) was conducted from November 29 through December 3, 1993. The Unit 2 (ANO-2) EDSFI was documented in NRC Inspection Report 50-313/91-02; 50-368/91-02, and the Unit 1 (ANO-1) EDSFI was documented in NRC Inspection Report 50-313/92-16; 50-368/92-16. The inspectors used the guidance of Temporary Instruction 2515/111, "Electrical Distribution System Followup Inspection" while conducting this inspection.

The inspectors also evaluated the licensee's actions in response to EDSFI related issues that were described in Licensee Event Reports and some other findings and reports that were not related to an EDSFI.

### 2 ELECTRICAL DISTRIBUTION SYSTEM FOLLOWUP INSPECTION (TI 2515/111)

#### 2.1 (Closed) Unresolved Item 313/9102-01; 368/9102-01: Acceptability of 161kV Offsite Power Supply

During the ANO-2 EDSFI, the licensee determined that adequate voltage levels from one of the two offsite electrical power supplies could not be assured under all operating conditions. The licensee provided detailed information of this condition in Licensee Event Report 313/91-010. Additional information and proposed corrective actions were provided in the licensee's letter dated July 24, 1992.

By letter dated May 24, 1993, the NRC notified the licensee that the condition that had existed was a violation of General Design Criteria 17. The letter also stated that the NRC found the licensee's corrective actions to be timely and acceptable. Therefore, based on the licensee's actions in response to the problem, the NRC decided that enforcement discretion was warranted.

By letter dated May 28, 1993, the licensee provided the details of additional improvement to both of the sources of offsite power to each unit. The inspectors found these additional actions to be indicative of a proactive corrective action program.

#### 2.2 (Closed) Inspection Followup Item 368/9102-02: AC System Voltage Drop Study

The ANO-2 EDSFI identified a concern with excessive voltage drops to various motor control centers. The licensee committed to reevaluate the voltage regulation conditions for the motor control centers and to replace any control power transformers that were determined to be undersized. By letter dated July 30, 1993, the licensee informed the NRC that the calculations had been completed and the control power transformers had been upgraded as necessary. The licensee also stated that a similar evaluation and control power transformer upgrade had been completed on the ANO-1 electrical system.

The inspectors verified that the voltage drop study had been completed and that the control power transformers had been replaced as necessary. The inspectors also verified that the ANO-1 control power transformers had been upgraded. The inspectors found the voltage drop calculations to be thorough and easy to understand. The licensee's self-assessment of the ANO-1 electrical system was considered to be indicative of a proactive corrective action program.

### 2.3 (Closed) Inspection Followup Item 368/9102-03: AC System Short Circuit Study

The EDSFI noted shortcomings in the licensee's short circuit calculations. The licensee had identified similar problems and had initiated steps to correct the calculations. The licensee's program was provided in a letter dated December 20, 1991.

The inspectors reviewed Calculations 92-E-0037-02, "Cable AC Impedance," dated April 9, 1993, and 92-E-0037-03, "ANO AC Equipment Models for Short Circuit and Load Flow Studies," dated May 28, 1993. These calculations were found to be acceptable and were verified to have been used as inputs into the short circuit calculation. Calculation 92-E-0037-05, "ANO Unit 2 Short Circuit Study," dated October 1, 1993, was performed using the computer programs DAPPER and AFAULT. The inspectors found the assumptions and methodology to be acceptable.

The inspectors also reviewed Calculation 92-E-0037-08, "ANO Unit 2 Equipment Short Circuit Rating Study," dated October 21, 1993. This calculation verified the adequacy of the momentary withstand and the interrupt capability of all of the involved electrical equipment with the exception of the 6.9kV feeder circuit breakers. Since these were nonsafety-related circuits that were verified to not effect the safety-related circuits, the inspectors found the equipment to be acceptable.

### 2.4 (Closed) Inspection Followup Item 368/9102-04: Voltage Drop Study

During the EDSFI, the licensee was in the process of upgrading the dc system voltage drop studies.

During this inspection, Calculations 92-E-0072-01, "ANO Unit 2, Class 1E, 125VDC, Train 1, DC Voltage Drop Study," Revision 0, and 92-E-0072-02, "ANO Unit 2, Class 1E, 125VDC, Train 2, DC Voltage Drop Study," Revision 0 were reviewed. The inspectors found the methodology used in these calculations to be consistent with industry practices and acceptable. The inspectors also reviewed Calculation 91-E-0093-01, "120V Vital AC System Voltage Drop," Revision 0, and found the methodology to also be consistent with industry practices and acceptable.

2.5 (Closed) Unresolved Item 368/9102-05: Acceptability of Removing the Power Supply to Certain Postaccident Monitoring Instruments

During the EDSFI, the team noted that the licensee postulated load shedding one of the two safety-related inverters on each of the batteries. The load shedding was necessary under loss of all ac power conditions to maintain adequate battery voltage and capacity for other critical loads. The team was concerned, however, because some of the loads being shed included certain postaccident monitoring instruments. Following the EDSFI, the licensee conducted a further review of the design and qualification criteria for postaccident monitoring instrumentation. By letter dated July 24, 1992, the licensee provided the results of the review to the NRC. The licensee's submittal discussed the team's concern of removing power to certain instruments and provided a justification for those proposed actions.

By letter dated August 23, 1993, the results of the NRC review were sent to the licensee. The NRC found the ANO-1 and -2, design to be in conformance with, or justified in deviating from, the guidance of Regulatory Guide 1.97, "Instrumentation for Light Water Cooled Nuclear Power Plants To Assess Plant And Environs Conditions During And Following An Accident," Revision 3.

2.6 (Closed) Inspection Followup Item 368/9102-06: Emergency Diesel Generator (EDG) Fuel Oil System Modifications

During the ANO-2 EDSFI, the team found that the licensee's self-assessment had identified a lack of measurement instrumentation for the differential pressure across the fuel oil transfer pump suction strainer. The self-assessment had also identified that there was no control room indication of the fuel oil storage tank level other than an alarm when the volume dropped below 22,500 gallons.

The licensee evaluated the two concerns and determined that modifications were not needed to improve the reliability of the system. The licensee's determination that it was not necessary to measure the differential pressure across the strainers was based on the facts that the strainers were cleaned each refueling outage and there was no work history of the strainers becoming clogged. In addition, fine filters were installed on the inlets of the storage tanks, downstream cross-connects were provided to facilitate cross-connecting the EDG fuel oil systems in an emergency, and a differential pressure alarm was located across each transfer pump.

The licensee determined that the fuel oil storage tank low level alarm was not required because the fuel oil transfer pump differential pressure would alarm if the differential pressure increased to 25 psid. This alarm would come in if the EDG fuel oil storage tank level was low or the strainer was clogged. The inspectors reviewed Calculation 11-E-0107-11, "EDG Transfer Pump Delta Pressure Alarm or Low Fuel Oil," Revision 0. This calculation determined that the transfer pump had at least 55 minutes of running time left, after the pump's differential pressure alarm came in, prior to exceeding the pumping requirements.

The inspectors concluded that the 55 minutes of running time allowed sufficient time for operator action and that the licensee had met all regulatory requirements.

2.7 (Closed) Inspection Followup Item 368/9102-08: Evaluation of Ambient Temperature Effects on Electrical Components Located in the EDG Rooms

The EDSFI noted that electrical components located in the EDG rooms were qualified for 40 years of normal use in environments up to 55°C (131°F). The EDSFI also noted that the licensee had calculated that the temperatures the components could experience under worst case conditions could exceed the qualified temperatures.

During this inspection, the licensee's actions were reviewed. The licensee determined that the components would have to be subjected to 65°C (149°F) for a relatively long period to significantly reduce the qualified life. The inspectors determined that the electrical components were not normally subjected to temperatures in excess of their design and, therefore, their qualified lives would not be adversely affected.

2.8 (Closed) Inspection Followup Item 368/9102-09: Battery Room Ventilation

During the ANO-2 EDSFI, the licensee identified a shortcoming in the circuitry design for the low ventilation flow alarm of a battery room. A loss of power to the battery room exhaust fan would also disable the low flow alarm because the alarm circuitry was powered from the fan's control power.

Design Change Package 88-2111, "ANO Annunciator Upgrade Phase II (Unit 2)," modified the circuit for the battery room exhaust fan. The circuit modification replaced the time delay energized alarm relay with a time delay de-energized alarm relay and rewired components to support the logic changes. This modification provided for an alarm upon loss of power to the exhaust fan or low air flow. The modification was completed during Refueling Outage 2R9, September 4 through October 21, 1992. The inspectors determined that the modification had corrected the problem.

2.9 (Closed) Inspection Followup Item 368/9102-10: Fuse Control Program

During the EDSFI, the team noted that the licensee did not have a formal fuse control program.

The inspectors reviewed Procedure 1025.056, "Fuse Control," Revision 0. The procedure required fuses to be replaced in accordance with the fuse lists in the procedure or "like-for-like" if the fuse was not listed. The inspectors were informed that the fuse lists represented approximately 40 percent of the fuses in both units. The licensee had performed a physical inspection of approximately 4 percent of the fuses on the fuse lists. The licensee found several discrepancies during their inspections, however, no operability concerns were identified.

2.10 (Closed) Inspection Followup Item 368/9102-11: Boric Acid Piping in EDG Room

During the ANO-2 EDSFI, the team found that there were boric acid transfer pumps, piping, and valves located within the "A" EDG room. The team also noted that there were no physical barriers between the boric acid piping and EDG equipment to prevent damage to the EDG equipment from potential leaks and the spray of boric acid. The licensee initiated Licensing Information Request (LIR) L91-0293 to evaluate if boric acid spray shields were necessary in the EDG A room.

The inspectors reviewed Letter ANO-93-00646 dated March 25, 1993, which stated that, from a safety analysis basis, licensing basis, and risk basis, the addition of boric acid shields was not required. In addition, the inspectors reviewed Calculation 92-E-0076-01, "Boric Acid Pumps 2P-39A and 2P-39B Spray Shields to Protect EDG Control Panel 2C11 and Flood Alarm Switch 2L5-2803," Revision 1, dated July 15, 1993. The purpose of the calculation was to determine if it was prudent to install boric acid spray shields in the EDG A room. The conclusion of the calculation was that it was not prudent to install the shields since the boric acid system had been designed in seismic Class I, and EDG B would be available to supply the power demand if EDG A was not available due to boric acid spray.

The inspectors concluded that the licensee had met all regulatory requirements.

2.11 (Closed) Inspection Followup Item 313/9216-01: Acceptability of Startup Transformer Surge Protection

The ANO-1 EDSFI noted that an analyses of the startup transformer's surge protection was not available. By letter dated August 3, 1992, the licensee committed to perform an evaluation to verify the adequacy of the surge protection.

During this inspection, Calculation 93-E-0027-01, "Surge Protection," dated June 21, 1993, was reviewed and found to be acceptable.

2.12 (Open) Inspection Followup Item 313/9216-02: Adequacy of Protective Devices of the Containment Electrical Penetration Assemblies (EPAs)

The EDSFI team noted that the licensee had not conducted a formal evaluation of the thermal and mechanical protection for the EPAs. The ANO-1 design predated the guidance contained in Regulatory Guide 1.63, "Electrical Penetration Assemblies in Containment Structures for Water-Cooled Nuclear Power Plants." However, the licensee had initiated Engineering Assistance Request 92-285 on May 15, 1992, to perform an evaluation.

During the NRC staff review of the ANO-2 dc system overcurrent protective features, concerns were raised about the protective devices for the ANO-2 EPAs. The licensee provided an initial response to the concerns by letter

dated April 30, 1993. The staff reviewed the licensee's submittal and transmitted a request for additional information to the licensee by letter dated June 18, 1993. By letter dated August 20, 1993, the licensee responded to the latest staff questions. The response was under review at the time of this inspection.

The licensee's April 30, 1993, letter also informed the NRC that the ANO-1 EPA evaluation would be deferred until April 29, 1994, to allow time to complete an evaluation that considered all of the aspects being considered for the ANO-2 EPAs. This item remains open pending completion of the licensee's evaluation.

2.13 (Closed) Inspection Followup Item 313/9216-03: EDG Loading Considerations

The ANO-1 EDSFI noted several problems with the licensee's EDG loading calculations. By letter dated August 3, 1992, the licensee committed to recalculate the EDG loading and evaluate conditions that would occur during potential load sequencing overlaps.

The inspectors reviewed Calculation 86-E-0002-01, "Diesel Generator Load Study," Revision 6 dated November 8, 1993. Attachment 1 to the calculation contained a tabulation of EDG loads. The total loads on the EDGs were determined to be within the EDG load ratings for the period that the loads would be connected to the EDG. The concerns with frequency dips when starting the auxiliary feedwater pump had been resolved by changing the loading sequence. The load sequencing overlap concerns had, for the most part, been resolved by the replacement of pneumatic timers with more accurate solid state timers. The potential for containment spray pump and containment fan coolers to overlap had been evaluated and determined to only be problem under a unique reactor coolant system break size. The licensee concluded that the unlikely occurrence of the unique break size would result in the loss of only one of the EDGs and was, therefore, acceptable. The inspectors found the licensee's calculation and associated evaluations to be acceptable.

2.14 (Closed) Inspection Followup Item 313/9216-04: Unit 1 DC System Voltage Drop Study

During the EDSFI, the team noted that the licensee had identified the lack of adequate dc voltage drop calculations.

The inspectors reviewed Calculation 92-E-0021-06, "Unit 1, Class 1E, 120 Volt Vital AC System Voltage Drop Analysis," Revision 0. The inspectors found the methodology to be the same as that used for ANO-2 (see paragraph 2.4) and considered this calculation to be acceptable also. The licensee had not completed Calculation 92-E-0021-08, "ANO Unit 1, Class 1E, 125V dc, Train 1, Voltage Drop Study," or Calculation 92-E-0021-09, "ANO Unit 1, Class 1E, 125 V dc, Train 2, Voltage Drop Study." However, the inspectors noted that the methodology was the same as used for the ANO-2 dc voltage drop study and found it acceptable.

2.15 (Closed) Inspection Followup Item 313/9216-05: EDG Fuel Oil System Improvements

The ANO-1 EDSFI found that the EDG day tanks were not protected against accidental overflow as recommended by ANSI N195-1976. The EDSFI also found that a single level switch on each day tank controlled the operation of the fuel oil transfer pump and the low level alarm. The licensee had identified that the EDG day tank vent pipes were subject to possible "pinch off" by tornado missiles. In addition, the licensee identified a lack of measurement instrumentation for the differential pressure across the fuel-oil transfer pump suction Y-strainers.

The inspectors reviewed Letter ANO-93-00796, dated May 21, 1993, from the design engineering department to the licensing department. The subject of the letter was the resolution of the ANO-1 EDG day tank vent vulnerability from a tornado missile. The letter stated that a modification could be performed at a relatively low cost; however, the relative benefit would not justify the expenditure. The resolution of the issue was administrative actions to address vent damage after a tornado. The inspectors reviewed Procedure 1203.025, "Natural Emergencies," Revision 11, which added followup actions requiring the EDG day tank vents to be inspected for damage and, if damage was found, to initiate corrective action to clear the damage as quickly as possible.

The inspectors reviewed LIR L92-0233, dated August 8, 1992, and the response dated February 5, 1993, concerning modifications to the fuel oil day tank low level switch and the addition of a high level alarm. The response stated that no appreciable plant safety improvements would be achieved by adding a high level alarm to the day tanks. The response stated that the only risk involved would be during manual fuel oil transfer operation. The inspectors reviewed Procedure 1104.036, "Emergency Diesel Generator Operation," Revision 32, which added a caution note that manual operation of the fuel oil transfer pump could cause day tank overflow. In addition, the response to LIR L92-0233 stated that the existing day tank level control and alarm scheme met the requirements of all pertinent ANO design criteria. The response also stated that ANO-1 was not committed to meet the requirements of ANSI N195-1976.

The inspectors reviewed Letter ANO-93-00546, dated February 15, 1993, concerning the lack of differential pressure measurement across the fuel oil transfer pump suction strainers. The letter stated that differential pressure measurement was not required because monthly tests were conducted to ensure that the transfer pumps were performing adequately and monthly fuel oil samples were analyzed. The licensee stated that, if the filters became clogged, the EDG day tank low level alarm, located on the local panel in the EDG rooms, would alert the operator of a problem. The action in response to this alarm was for the operator to verify that the transfer pump was operating. If the level continued to drop, the operator was referred to Procedure 1104.036 for emergency cross-connecting of the fuel oil systems. The cause of low flow would be determined after flow was restored through cross-connection of the fuel oil systems.

The inspectors concluded that the licensee had met all regulatory requirements.

2.16 (Closed) Inspection Followup Item 313/9216-06: EDG Air Exhaust Vent Stacks Tornado Missile Protection

During the ANO-1 EDSFI, the team found that the EDG exhaust piping extended above the concrete barriers for tornado missile protection. The team was concerned that the exhaust pipes and associated exhaust hoods could become crimped and limit the EDG's capability.

The inspectors reviewed LIRs L91-0231, dated August 6, 1992, and L92-0334, dated December 17, 1992, for ANO-1 and -2, which requested tornado missile studies to evaluate the actions required in the event of an on-site tornado. The responses to both LIRs stated that abnormal operating procedures should be revised to require inspection and clearing of any damage to the exhaust piping after a tornado.

The inspectors reviewed ANO-1 Procedure 1203-025, "Natural Emergencies," Revision 11, Change PC-2. The procedure was revised to include statements to inspect the exhaust piping for damage and clear the piping as quickly as possible, if damaged. The inspectors noted that ANO-2 Procedure 2203.008, "Natural Emergencies," Revision 4, Change PC-1 was also revised to clear the EDG exhaust piping as quickly as possible if damaged by a tornado.

The inspectors concluded that the licensee had met all regulatory requirements.

2.17 (Closed) Violation 313/9216-07: Failure to Properly Update Plant Procedures

During the EDSFI, the team identified two procedures that had not been made inactive after biennial reviews indicated revisions were necessary. This was determined to have been in violation of the licensee's procedures.

The licensee acknowledged the violation by letter dated August 3, 1992. The inspectors verified that the actions described in the response letter had been completed. The inspectors also noted that the licensee cancelled the procedure for biennial review of procedures as a result of receiving permission from the NRC to reduce the commitment to ANSI N18.7-1976. The licensee placed administrative requirements for biennial review of station administrative and engineering administrative procedures in Procedure 1000.006, "Procedure Control," Revision 37, Change PC-2.

**3 ADDITIONAL EDSFI IDENTIFIED ISSUES (2515/111)**

Paragraph 2.2.2, "Coordination and Protective Relays," of the NRC ANO-2 EDSFI Inspection Report (50-368/91-02) discussed a concern with the separation of non-Class 1E loads from Class 1E dc distribution panels. As stated in the

report, this issue was referred to the NRC Office of Nuclear Reactor Regulation for further review.

By letter dated June 18, 1992, the licensee was informed that the existing configuration would not impact the safe operation of the facility. However, to preclude future misunderstandings, the licensee was requested to revise Section 8.3.2.1.4, "Distribution Panels," of the Updated Safety Analysis Report. The inspectors verified the text had been modified to discuss the remote possibility that an inadvertent battery discharge could result if a fault on a non-Class 1E distribution panel coincided with the failure of the Class 1E circuit breaker protecting the faulted circuit.

#### 4 ONSITE REVIEW OF LICENSEE EVENT REPORTS (92700)

##### 4.1 (Closed) Licensee Event Report 313/91-007: Inadequate Fuse/Circuit Breaker Coordination

On June 14, 1991, the licensee identified that the fuses between the emergency batteries of both ANO-1 and -2 and their associated dc control centers were not fully coordinated with the control center's load circuit breakers. The licensee determined that this condition would occur only at the upper range of available fault current and could, under certain conditions, result in the loss of the entire control center before the affected load circuit breaker would trip. The cause of the problem was design inadequacies related to design changes made in 1984 and 1986.

The inspectors verified that the licensee had revised the design change program such that these problems should be eliminated. The inspectors also verified that the correct fuses were installed by reviewing work packages JO 847774 and 847775 (ANO-1) and JO 847396 and 847397 (ANO-2).

##### 4.2 (Closed) Licensee Event Report 313/91-009: 480V Load Centers in Nonseismic Configuration

During the ANO-2 EDSFI, the team identified that 480V Load Centers 2B5 and 2B6 were not in a seismically qualified configuration. The licensee investigated ANO-1 and found that Load Centers B5 and B6 were in the same configuration as the ANO-2 load centers. Lifting trolleys used to aid in installation and removal of circuit breakers were found mounted on their guide rails and were not secured in place. The licensee determined that the load center vendor had not seismically qualified the equipment with the trolleys on their guide rails in place.

The licensee's initial corrective action was to remove the lifting trolleys and rails from the load centers and store them in a remote area. The inspectors reviewed the job orders that removed the trolleys. In addition to removing the lifting trolleys and rails, the licensee performed a walkdown of both units which determined that no other safety-related load centers were affected by this condition.

The licensee prepared Limited Change Packages 92-5001, "Seismic Restraint of Jib Trolley for Load Centers B5 and B6," Revision 1, for Unit 1 and 92-6003, "Seismic Restraint of Jib Trolley for Load Centers 2B5, 2B6, and 2B7," Revision 0, for Unit 2. The inspectors reviewed these modifications and found that two separate anchoring devices were used to anchor the lifting trolley assemblies to the load centers. By implementing these modifications, the lifting trolleys were seismically qualified in a stowed position. The ANO-1 modification was installed during Refueling Outage 1R10 and the ANO-2 modification during Refueling Outage 2R9.

The licensee issued Procedure 5220.002, "Equipment/Component Seismic Evaluation," Revision 0, which provided the method for evaluating equipment and components for seismic qualification. The inspectors reviewed the procedure and concluded that clear and specific instructions were provided.

The inspectors reviewed Memorandum ESU-91-00348, dated October 16, 1991, which provided interim guidance to design engineering personnel concerning the review of vendor documentation for seismic qualification requirements. The memorandum stressed careful review of any documents that could effect seismic qualification.

The inspectors also reviewed a training plan that was presented to the ANO technical staff during the fourth quarter of 1991 and found that it discussed the configuration control problem for the load centers.

The inspectors concluded that the licensee had implemented complete and thorough corrective actions for this issue.

#### 4.3 (Closed) Licensee Event Report 313/91-010: Adequacy of Offsite Power Supply

The licensee's actions in response to this issue are discussed in paragraph 2.1.

#### 4.4 (Closed) Licensee Event Report 313/91-011: Inadequate Procedure for Setting Lube Oil Pressure Control Valve

On October 9, 1991, following an overhaul of High Pressure Injection Pump P36A, the licensee observed an oil leak of approximately 236 ml/min (8 oz/min) from the outboard pump bearing area. The licensee noted a similar condition on Pump P36C. The licensee determined that this condition rendered the pumps inoperable.

The inspectors reviewed the licensee's root cause evaluation and corrective actions. The inspectors found the proposed actions to have been adequate and completed as described in the event report.

4.5 (Closed) Licensee Event Report 368/91-011: Reactor Trip During Surveillance Testing

On April 15, 1991, during the performance of surveillance testing, an automatic reactor protective system trip occurred. The licensee contributed the cause of the trip to a procedural inadequacy.

The inspectors reviewed the licensee's evaluation and proposed corrective actions. The inspectors found the corrective actions to have been adequate and complete as stated in the event report.

4.6 (Closed) Licensee Event Report 368/91-014: 4160V Circuit Breakers in Nonseismic Configuration

The licensee determined that four circuit breakers routinely positioned in the racked-down position were not seismically qualified in that position. The licensee determined that the root cause of the condition was incomplete information concerning seismic qualification in the licensing basis documents. The licensee immediately removed all of the breakers in the switchgear rooms that were in the racked-down position and stored them in another area.

The inspectors reviewed System Operating Procedure 2107.002, "ESF Electrical System Operation," Revision 7, Change PC-2. The inspectors determined that this procedure was revised to delete the requirement for maintaining the circuit breakers in the racked-down position.

The licensee conducted an evaluation to determine if additional procedural guidance was necessary for performing maintenance activities with circuit breakers in a racked-down position. The inspectors reviewed the evaluation, which stated that the circuit breakers were operable in the racked-down position for maintenance purposes only if racked-down and then racked-up by 1 inch above the floor. Calculation 91-E-0089-01, Revision 0, qualified the circuit breakers for this condition. The inspectors verified that the maintenance and operating procedures had been revised to specify when and for how long the circuit breakers could be kept in the racked-down position.

4.7 (Closed) Licensee Event Report 368/92-006: Inadvertent Start of EDG

During the replacement of a relay in the engineered safety features actuation system of ANO-2 on September 9, 1992, in accordance with a special work plan, four other relays were deenergized.

The inspectors reviewed the circumstances of this event and found that the licensee utilized technicians to develop the work instructions for the task. The technicians were not familiar with the equipment and the wiring information from the vendor. This unfamiliarity led to the technicians missing the "daisy chain" of connections. As a corrective action, the licensee required an engineering evaluation prior to performing any additional relay replacements. The inspectors considered these actions to be acceptable due to the uniqueness of the special work being performed.

4.8 (Closed) Licensee Event Report 313/93-002: Automatic Start of an EDG

On March 9, 1993, ANO-1 was operating at 100 percent power when a 4160 volt engineered safeguards bus was deenergized during the transfer of power sources from an off-site supplied startup transformer to the unit auxiliary transformer. The circuit breakers from the startup transformer and the unit auxiliary transformer did not operate properly during the transfer.

During this inspection, the inspectors reviewed the licensee's corrective actions and found them acceptable.

5 FOLLOWUP (91701)

The inspectors also reviewed the licensee's actions in response to previously identified findings that were not related to the EDSFIs.

5.1 (Closed) Inspection Followup Item 313/9010-01: Service Water Structure Ventilation

Problems with the ventilation system for the ANO-1 service water structure were identified in Condition Report 1-89-453. The ventilation systems for both unit's service water structures was subsequently included in the licensee's service water integrity plan.

During this inspection, the inspectors reviewed the licensee's actions in response to Condition Report 1-89-453 and the additional licensee evaluations. The licensee had implemented acceptable interim corrective actions in response to the condition report. The licensee initiated Limited Change Package 93-5015 on July 8, 1993, to upgrade the ventilation systems for both structures. The change package provided instructions for replacing the solid security doors with doors containing manually operated dampers and other enhancements to improve structure cooling. The inspectors found the proposed changes to be acceptable. The inspectors observed portions of the in-progress work and were informed that the changes were scheduled to be completed by December 20, 1993.

5.2 (Closed) Inspection Followup Item 313/9011-01: Battery Testing Requirements

The battery testing requirements contained in the ANO-1 Technical Specifications were found to be inconsistent with the actual testing being conducted at the facility and were less than currently considered acceptable. The licensee was in the process of revising the battery testing requirements contained in the ANO-2 Technical Specifications and committed to upgrade the ANO-1 requirements to be consistent with the ANO-2 requirements when they were finalized.

During this inspection, the licensee's Technical Specification Change Request 1-91-25 was reviewed and found to satisfy the inspection concern. Since the change request will be reviewed as part of a licensing action to

ensure that the latest staff guidance has been incorporated, the inspectors had no further questions on this item.

5.3 (Closed) Inspection Followup Item 313; 368/9313-03: Spring Pack Test Device Accuracy

During an inspection of the licensee's motor-operated valve program, it was noted that the licensee did not compensate for the inaccuracies associated with the spring pack tester.

During this inspection, the inspectors reviewed the licensee's actions to address this issue. The inspectors found that the licensee did not have information related to the accuracy of the spring pack tester and had requested the information from the vendor. The vendor informed the licensee that there was no formal data relating to the accuracy of the tester; however, the vendor provided informal data to the licensee. Although the value provided for the accuracy of the tester was extremely small (0.28 percent), the inspectors verified that the licensee had incorporated the information into the motor-operated valve testing program.

5.4 (Closed) Inspection Followup Item 313; 368/9313-10: Placement of Open Torque Switch Bypass

During an inspection of the licensee's motor-operated valve program, it was noted that the torque switch bypass settings for ANO-1 motor-operated valves were typically set at lower opening positions than those in ANO-2.

During this inspection, the inspectors verified that the licensee had reviewed the settings of all valves in the motor-operated valve program at ANO for consistent and conservative settings. The inspectors noted that the licensee did not identify any valves with a nonconservative bypass setting. The inspectors also found that the licensee was consistent in the methodology used for setting the bypass switches.

5.5 (Closed) Inspection Followup Item 313; 368/9313-11: Review of Diagnostic Traces by Second Engineer

During an inspection of the licensee's motor-operated valve program, concerns were identified regarding the licensee's control of the diagnostic testing process. The concerns were based on two instances where a presumed differential pressure was little more than a static test and one instance where the test data was severely scattered. As a result of those concerns, the licensee committed to review all of the other differential pressure traces to identify any similar problems. The licensee also committed to initiate a second engineer's review of diagnostic traces.

The inspectors verified that the licensee had revised the procedures to require a second engineer's review of the diagnostic traces to ensure the data was valid. The inspectors also verified that the licensee reviewed all motor-operated valve test data during differential pressure testing to ensure all

traces were marked correctly and conservatively. The inspectors found that the licensee had paid particular attention to points for flow initiation and flow cutoff. The licensee changed the marks on 36 of the 46 differential pressure tests as a result of the review. The licensee also eliminated three tests due to questionable data. The licensee was in the process of completing the engineering reviews and no problems had been identified.

## ATTACHMENT 1

### 1 PERSONS CONTACTED

#### 1.1 Licensee Personnel

- \* S. Bennett, Supervisor, Licensing
- \* M. Cooper, Licensing Specialist
- \* G. Dobbs, Design Engineering Supervisor
- \* R. Edington, Plant Manager, Unit 2
- \* B. Greeson, Acting Manager, Design Engineering
- \* R. Howerton, Manager, Engineering Support
- \* D. Macphee, Senior Engineer
- \* T. Ott, Design Engineering Supervisor
- \* M. Stroud, Design Engineering Acting Manager
- \* C. Turk, Engineer
- \* J. Vandergrift, Plant Manager, Unit 1

#### 1.2 NRC Personnel

- \* S. Campbell, Resident Inspector
- \* J. Melfi, Resident Inspector
- \* L. Smith, Senior Resident Inspector
- K. Weaver, Resident Inspector, Co-Op

In addition to the personnel listed above, the inspectors contacted other personnel during this inspection period.

\* Denotes personnel that attended the exit meeting.

### 2 EXIT MEETING

An exit meeting was conducted on December 3, 1993. During this meeting, the inspectors reviewed the scope and findings of the inspection. The licensee did not express a position on the inspection findings documented in this report. The licensee did not identify as proprietary, any information provided to, or reviewed by the inspectors.