

APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-313/92-09
50-368/92-09

Licenses: DPR-51
NPF-6

Dockets: 50-313
50-368

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

Facility Name: Arkansas Nuclear One (ANO), Units 1 and 2

Inspection At: ANO Site, Russellville, Arkansas

Inspection Conducted: May 10 through June 20, 1992

Inspectors: L. J. Smith, Senior Resident Inspector
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Section A, Division of Reactor Projects

7/13/92
Date

Inspection Summary

Inspection Conducted May 10 through June 20, 1992 (Report 50-313/92-09;
50-368/92-09)

Areas Inspected: This routine resident inspection addressed items of regional interest, monthly maintenance observation, bimonthly surveillance observation, operational safety verification, followup on corrective actions for violations, onsite followup of licensee event reports, and Three Mile Island Action Plan Requirement followup.

Results:

Strengths

An alert operator identified a design flaw in the diverse emergency feedwater actuation system (DEFAS) which would have prevented its actuation. The temporary modification to restore DEFAS to service was prompt and acceptable. (Section 3.3.1)

The Unit 2 auxiliary operator was knowledgeable during rounds and the new computerized log taking system was excellent. (Section 6.4)

The inspector observed portions of several maintenance and test activities which were performed well:

Unit 1 repair of the fuel handling ventilation Radiation Monitor RX9830 (SPING-03). (Section 4.2)

Unit 1 semiannual diesel fire pump engine inspection. (Section 4.3)

Unit 2 preventive maintenance on a low-pressure safety injection mini recirculation valve. (Section 4.5)

Unit 2 monthly emergency diesel generator surveillance tests. (Section 5.1, Section 5.3, Section 5.5)

Unit 2 moderator temperature coefficient test at power. (Section 5.2)

Unit 2 surveillance test of the Charging Pump 2P36A discharge dampener bladders. (Section 5.6)

Unit 1 surveillance test of the steam driven emergency feedwater pump. (Section 5.4 and Section 5.8)

Weaknesses

A previously undiscovered design flaw in Unit 2 DEFAS had rendered the system inoperable since installation during Refueling Outage 2R8. This was a violation of 10 CFR Part 50.62(c)(1). Even though anomalous system performance had been detected during postmodification testing, the test deficiency was not evaluated correctly or even documented in the test data package. (Section 3.3.1)

During Unit 2 emergency diesel generator surveillance testing an operator unlocked (but did not manipulate) the discharge valve from the starting air tank rather than opening the vent valve from the startup air filter as required by the procedure. (Section 5.3)

The Unit 2 isolation boundary for the component cooling water line to the instrument air cooler was not properly defined for hold card installation. (Section 6.4)

Two industrial safety concerns were identified: (1) lifting the Unit 1 service water pump over a lift path which included an oxyacetylene compressed gas cylinder, and (2) inattention to detail regarding the completion of a confined space permit. (Section 4.4)

No method existed for determining operability of the offsite power supply for the situation where the design calculations relied upon the availability of the capacitor banks to adequately meet the design criteria and the capacitor bank was unavailable for service. After further discussions, the licensee agreed that in situations such as peak loading, when the capacitor banks could be relied upon to provide adequate offsite power, an operability determination needs to be made when either capacitor bank is unavailable for service. The licensee planned to view the capacitor banks as support equipment in the future and initiate a condition report for the purpose of making an operability determination. (Section 6.3)

The contamination control program for potentially contaminated areas 8 feet above the floor was not as conservative as the contamination control program for potentially contaminated areas at ground level. (Section 6.2)

DETAILS

1. PERSONS CONTACTED

- *J. Yelverton, Director, Nuclear Operations
- G. Ashley, Licensing Specialist
- *S. Boncheff, Licensing Specialist
- M. Cooper, Licensing Specialist
- S. Cotton, Manager, Radiation Protection/Radiation Waste
- R. Douet, Unit 1 Maintenance Manager
- W. Eaton, Director, Design Engineering
- R. Edington, Unit 2 Operations Manager
- *R. Fenech, Unit 2 Plant Manager
- *J. Fisicaro, Licensing Director
- L. Humphrey, Quality Assurance Director
- A. Jacobs, Supervisor, Surveillance Testing
- *R. King, Plant Licensing Supervisor
- R. Jones, Nuclear Chemistry Supervisor
- D. Mims, System Engineering Manager
- *U. Provencher, Quality Assurance Manager
- R. Sessoms, Central Plant Manager
- *J. Vandergrift, Unit 1 Plant Manager
- T. Weir, Materials and Purchasing Manager
- C. Zimmerman, Unit 1 Operations Manager

*Present at exit interview conducted on June 22, 1992.

The inspectors also contacted other plant personnel, including operators, engineers, technicians, and administrative personnel.

2. PLANT STATUS

2.1 Unit 1

At the beginning of the inspection period, Unit 1 was stabilized at 40 percent power for repair of a steam leak on the Main Feedwater Pump P1A low pressure steam chest and core physics testing. On May 11, at 9:22 a.m., Main Feedwater Pump P1A was placed back in service.

On May 11, at 10:30 p.m., a power decrease commenced to repair a boot on the isophase bus to the Unit 1 auxiliary transformer. The main turbine was taken off line on May 12 at 12:31 a.m. The Unit 1 auxiliaries were switched from the Unit 1 auxiliary transformer to Start-up Transformer No. 1, and on May 12, at 9:35 a.m., the unit commenced a power increase at 3 percent per hour. On May 13, at 4:02 p.m., reactor power reached 10 percent.

On May 15 at 6:40 p.m., a power runback was initiated at 10 percent per minute due to an unisolable electrohydraulic control oil leak at the main turbine

trip solenoid valve block. Reactor power reduction was stopped at approximately 40 percent power because Main Feedwater Block Valve CV-2625 to Steam Generator E24A did not automatically ramp fully closed. Main Feedwater Block Valve CV-2675 to Steam Generator E24B did close 100 percent causing a cross-limit condition in the integrated control system. The operators manually closed Valve CV-2625 and, at the same reactor power hold point, the electrohydraulic control leak was stopped. At 7:30 p.m., the unit commenced a power increase to 100 percent power. Reactor power reached 100 percent power on May 16 and remained at 100 percent throughout the remainder of the inspection period.

2.2 Unit 2

The unit began the inspection period at 100 percent power.

On May 17, at 4:13 a.m., the unit commenced a power reduction to 72 percent to repair a condenser tube leak. At 6:15 p.m., the unit commenced a power increase and reached 100 percent power at 10:30 p.m. the same day.

On May 22, at 7 p.m., the unit commenced a power reduction to 95 percent to support moderator temperature coefficient testing. On May 23, at 5:40 p.m., the unit commenced a power reduction per system dispatcher request to 72 percent power.

On May 24, at 8:15 a.m., the unit commenced a power increase at 10 percent per hour and reached 100 percent power at 12:20 p.m. the same day.

On June 5, at 9 p.m., the unit commenced a power reduction to 30 percent power per system dispatcher request. On June 7, the unit commenced a power increase to 100 percent at 5 percent per hour. On June 8, at 7:14 a.m., the unit reached 100 percent power and remained at 100 percent throughout the remainder of the inspection period.

3. FOLLOWUP (92700, 92701, 92702 & Temporary Instruction 2515/65-01)

3.1 Followup on Corrective Action for Violations and Deviations (92702)

3.1.1 (Closed) Violation 313/9205-01: "Inadequate Procedure Implementation Results In Reactor Protection System Channel C Trip"

This violation involved the inadvertent placing of Channel C of the Unit 1 reactor protection system in shutdown bypass rather than manual bypass. Further, the deviation from procedures was not immediately reported to the shift supervisor.

The licensee restored Reactor Protection System Channel C to normal and completed the surveillance. The operations staff was notified of the error. The licensee initiated Condition Report CR-1-92-0048 in response to the violation. As part of the licensee's corrective action, maintenance personnel of all disciplines performed a documented review of the occurrence. The

review was to encourage use of self-verification, leader/learner observations, and prompt operations notification in order to prevent recurrences of this inattention to detail type error. The licensee's quality assurance personnel have included the use of self-verification by craftsmen and exercising of control of test/activity by lead craftsman in their surveillance checklists for all future maintenance activities.

Based on the inspector's review of the licensee's corrective actions this item is closed.

3.2 Onsite Followup of Licensee Event Reports (LERs) (92700)

3.2.1 (Closed) LER 313/90-013: "Location of Safety Related Service Water Piping in Close Proximity to a High Energy Main Feedwater Line as a Result of Inadequate Design Interface Created the Possibility of Failure of Both Loops of the Service Water System"

During the performance of a walkdown of the Unit 1 service water system in response to Generic Letter 89-13, the licensee determined that safety-related service water common return header piping from the intermediate cooling water cooler was located in close proximity to the main feedwater line from Main Feedwater Pump P1A. The licensee concluded that a high energy line break of the main feedwater piping in the vicinity of Service Water Check Valve SW-9 could cause an unisolable breach in the service water piping downstream of the valve and could compromise the operability of the service water system.

The licensee initiated Condition Report CR-C-90-115 and Design Change Package 89-1045, which relocated Service Water Check Valve SW-9 downstream of its previous location to a new location below a Seismic Category I floor slab. This provided separation from the main feedwater line in the event of a high-energy line break. The licensee also conducted walkdowns of the Unit 2 service water piping and found no high-energy line break concerns.

Based on the inspector's review of the LER, the licensee's corrective actions, and the review documented in previous NRC Inspection Report 50-313/90-42 this item is closed.

3.3 Items of Regional Interest (92701)

3.3.1 Unit 1 - Licensee Identified DEFAS Rendered System Inoperable Since Installation

On June 5, during the performance of surveillance testing, an operator observed that the position indicating lights for the diverse scram system contactor behaved anomalously. After a review of the drawings, he determined that a design flaw existed in the diverse scram system DEFAS interface. The identification of the design flaw by the operator was viewed as a strength.

The deficiency was identified on Condition Report CR-2-92-0140. The condition report stated that the permissive signal to enable DEFAS to actuate cannot be

satisfied when an anticipated transient without scram (ATWS) event occurred. DEFAS was designed and installed by AND to comply with 10 CFR Part 50.62 "ATWS Rule." DEFAS was a backup system in the event the plant protection system failed. DEFAS was not addressed in the Technical Specifications.

10 CFR Part 50.62(c)(1) requires in part that "each pressurized water reactor must have equipment from sensor output to final actuation device, that is diverse from the reactor trip system, to automatically initiate the . . . emergency . . . feedwater system . . . under conditions indicative of an ATWS."

During an ATWS, the diverse scram system was expected to actuate. When the motor generator output diverse scram system contactors open, the power supply to the motor generator excitation field would be lost and, as a result, control power to Auxiliary Relays 29X-5 and 29X-6 would be lost. Since these relays were intended to be energized to enable the DEFAS to actuate, DEFAS would likely not actuate during an ATWS. This condition has existed since installation during Refueling Outage 2R8. This is an apparent violation of 10 CFR Part 50.62(c)(1) (368/9209-01).

Jumpers were installed to bypass the auxiliary relay contacts so DEFAS would always be enabled, regardless of the status of the diverse scram system. The inspector concluded that the licensee's remedial actions were prompt and acceptable.

Interviews with the licensee staff revealed that, even though anomalous system performance was detected during postmodification testing, the test deficiency was not evaluated correctly or even documented in the test data package. This was viewed as a weakness.

3.3.2 Removal of "Once-through Steam Generator A BTU LIMIT" Annunciator Card

On May 26, the inspector noticed that the annunciator card for "Once-through Steam Generator A BTU LIMIT" was removed due to an unexpected alarm being generated in Instrument and Control System No. 46 Cabinet. The licensee stated that the card was pulled in accordance with Procedure 1015.028, Revision 1, "Operations Annunciator Control." The inspector verified that the associated control room window number (K07, E2) was logged into the annunciator out of service index, and the window marker was installed in accordance with the aforementioned procedure.

The inspector questioned the licensee as to whether the action was considered a temporary modification to an existing system, thereby requiring a 10 CFR Part 50.59 review. Annunciator card removal was viewed as a method for taking the alarm out of service until repairs could be safely accomplished and was, therefore, not considered a temporary modification. The licensee stated that immediate repair of the circuit had the potential of adversely impacting the plant while operating at 100 percent power and that removing the annunciator card eliminated an alarm distraction to the control room operators.

Maintenance for the circuit was planned during Refueling Outage 1R11. The inspector confirmed that the procedure incorporated provisions to ensure that the annunciator would be repaired. The inspector agreed with the assessment and concluded licensee actions were acceptable.

3.4 Three Mile Island Action Plan Requirement Followup (Temporary Instruction 2515/6a-01)

3.4.1 (Closed) Unit 2 Three Mile Island Action Item II.G.1, "Power Supplies for Pressurizer Relief Valves, Block Valves and Level Indications"

II.G.1 identified the need for providing vital power to pressurizer level indications. The Unit 2 design does not include power supplies for pressurizer relief valves or block valves which were also addressed in this item.

The inspector reviewed electrical drawings and the Final Safety Analysis Report to determine that the pressurizer level indications were capable of being supplied from either the offsite power source or the emergency power source when offsite power was not available. The Final Safety Analysis Report stated that two channels of pressurizer level indication were powered from a Class 1E power supply. The licensee stated that Pressurizer Level Indicators 2LI-4627-1 and 2LI-4627-2B were the indicators for the channels.

Based on the inspectors' review, the licensee has addressed Three Mile Island Action Item II.G.1 for Unit 2. This item is closed.

4. MONTHLY MAINTENANCE OBSERVATION (62703)

Station maintenance activities for the safety-related systems and components listed below were observed to ascertain that they were conducted in accordance with approved procedures, regulatory guides, and industry codes or standards, and in conformance with the Technical Specifications.

4.1 Unit 2 - Repair of Charging Pump 2P36B (Job Order (JO) No. 869939)

On June 3, the inspector observed performance of a portion of approved Procedure 2402.032, Revision 16, "Unit 2 Mechanical Charging Pumps." The maintenance activity observed was plunger replacement and repacking. The system was verified to be isolated and hold carded in accordance with Station Administrative Procedure 1000.27, Revision 16, "Hold and Caution Card Control." The inspector verified Category E valves listed in the Category E Log Index were in the correct position. The inspector noted qualified workers demonstrating appropriate as low as reasonably achievable (ALARA) practices and using calibrated measuring and test equipment (M&TE) during performance of the job. The inspector verified that plungers and packing were installed in accordance with Procedure 2402.032. Quality control personnel verified system cleanliness accountability and torquing sequence. The inspector observed a portion of system restoration in accordance with the procedure and did not

observe any operator errors. The licensee stated that the pump passed the required postmaintenance testing.

4.2 Unit 1 - Repair of Fuel Handling Ventilation Area Monitor RX-9830
(JO No. 872155)

On June 1, the licensee entered a 30-day action statement per Technical Specification 3.5.7.3 due to inoperability of Fuel Handling Ventilation Area Monitor RX-9830. The inspector observed a portion of the maintenance activity to restore the monitor to operable service in accordance with Procedure 1304.139, Revision 11, "Calibration of Fuel Handling Monitor RX-9830 (SPING-03)." The inspector verified that calibrated equipment was used to troubleshoot and repair the monitor and that shift supervisor approval was obtained prior to working the job. The licensee stated that a faulty flow transmitter and power supply rendered the monitor inoperable. The licensee stated that the system was restored to operable status, and Technical Specification 3.5.7.3 limiting condition for operation was exited on June 6. The inspector concluded repair of SPING-03 was effectively performed well within Technical Specification allowed time.

4.3 Unit 1 - Semiannual Inspection of Diesel Fire Pump Engine K-5
(JO No. 870800)

On June 3, the inspector observed the licensee perform a semiannual inspection and preventive maintenance of Engine K-5 for Diesel Fire Pump P6B. A maintenance crew performed the inspection in accordance with Procedure 1306.27, Revision 10, "Unit 1 K-5 Diesel Fire Pump Engine Surveillance Inspection."

Required isolation and hold carding of the fire pump's discharge valves and diesel day tank supply valves were executed correctly as were lifting and hold carding of the battery bank leads. The engine oil was sampled, drained, and replaced with the correct substitute. In addition, engine oil was inspected for contamination by metallic particles or moisture intrusion. Procedure 1306.27 had sufficient guidance for determining if oil degradation had occurred. M&TE used for the work had been calibrated within the required calibration period. The associated work package had the required quality control and supervisory approvals.

During the inspector's review, the licensee identified significant leakage from the diesel fire pump engine water pump gasket. A job request was initiated to correct the degradation prior to returning Diesel Fire Pump P6B to service.

4.4 Unit 1 - Removal of Service Water Pump P4A (JO No. 872514, 872515)

On June 8, the licensee tagged out Service Water Pump P4A for overhaul due to identified degraded pump hydraulic performance. Service Water Pumps P4B and P4C were confirmed operable during performance of the job. Excellent security measures were invoked while the missile shield and grating above the pump was

removed. Guards remained at their respective posts even during adverse weather conditions.

The inspector observed two industrial safety concerns: (1) The service water pump was lifted over a lift path which included an oxyacetylene compressed gas cylinder. Oxyacetylene was flammable. The inspectors brought this to the attention of the supervisor and the supervisor indicated that the incident will be addressed at the next supervisory meeting. The inspector initiated a Non-radiological Hazards Data Sheet in accordance with Regional Office Policy Guide 0756, "Implementation of Memorandum of Understanding Between the NRC and Occupational Safety and Health Administration (OSHA)." However, the licensee contacted OSHA and they stated that no requirements were violated. The licensee did concur during the exit meeting that compressed gas cylinders need to be handled with special care; (2) The confined space entry permit initiation time was incorrectly logged. Further investigation revealed that the expiration and initiation times were reversed. The initiation time was also documented in the body of the permit and confirmed that the workers were not working under an expired permit.

The inspector concluded that, otherwise, removal of the pump was well coordinated and that no personnel errors were identified.

The licensee stated that the pump was installed. Postmaintenance testing on the pump indicated that the pump continued to operate below the limiting range for operability based on baseline curve used for that pump. The licensee continued to investigate potential root causes for degraded pump performance. One possibility considered was that the application of liquid metal in the pump bowls for corrosion prevention over consecutive overhauls may have contributed to pump performance degradation. The licensee stated that one of the pump bowls was sent to Kansas City for bench testing. Consecutive applications of liquid metal to the pump bowls could have generic implications and, therefore, will remain as an inspection followup item pending the results of the bench test. The review of the root cause evaluation will be tracked as Inspection Followup Item 313/9209-02.

The licensee performed an operability determination on the installed pump and concluded that the installed pump was operable provided that the lake temperature remains below 88°F and the emergency cooling pond remains below 94°F. Service water flow test data gathered during Refueling Outage 1R10 was corrected to account for a 10 percent reduction in pump performance per the inservice testing limit. The correction was sufficient to account for the shift in the baseline curve but did not account for error or pump degradation. With the restrictions on the lake and emergency cooling pond design maximum temperature, sufficient cooling capacity would be provided by the service water system. This restriction was implemented via a temporary change to Procedure 1104.029, Supplement 1, "Service Water and Auxiliary Cooling System." A 3-week time limit was placed on the temporary change. The licensee planned to replace the degraded pump with a rebuilt pump prior to the expiration of the temporary change on July 6. The inspector concluded that the assessment was acceptable.

4.5 Unit 2 - Preventive Maintenance on Low Pressure Safety Injection B Mini-Recirculation Valve 2CV-5124-1 (JO No. 867945)

On June 17, the inspector observed performance of a portion of Procedure 1412.001, Revision 4, "Preventive Maintenance of Limitorque MOV," for Mini-Recirculation Valve 2CV-5124-1. MOV is an acronym for motor-operated valve. The inspector verified appropriate use of calibrated equipment for megger checking the associated breaker and the use of qualified grease for lubricating the MOV. Mechanics indicated that there were no abnormalities to the MOV internals. The breaker was properly hold carded and the control room pump handswitch was in pull-to-lock. The control room log book and status board indicated that the pump was inoperable and listed the applicable Technical Specification. Mechanics were very knowledgeable and conscientious while performing the job. The system was appropriately restored and the valve passed the stroke test.

4.6 Summary of Findings

The inspector observed portions of several maintenance activities which were performed well:

Unit 1 repair of the fuel handling ventilation Radiation Monitor RX9830 (SPING-03).

Unit 1 semiannual diesel fire pump engine inspection.

Unit 2 preventive maintenance on a low-pressure safety injection mini recirculation valve.

Two industrial safety concerns were identified: (1) lifting the Unit 1 service water pump over a lift path which included an oxyacetylene compressed gas cylinder, and (2) inattention to detail regarding the completion of confined space permit.

5. BIMONTHLY SURVEILLANCE OBSERVATION (61726)

The inspectors observed the Technical Specification required surveillance testing on the systems and components listed below and verified that testing was performed in accordance with Technical Specifications and the licensee's implementing procedures.

5.1 Unit 2 - Monthly Surveillance Testing of Emergency Diesel Generator 2DG1 (JO No. 869241)

On May 13, the inspector observed the performance of a portion of Procedure 2104.036, Revision 34, "Emergency Diesel Generator Operations," Supplement 1, "2DG1 Monthly Test." The auxiliary operator's logs were verified for accuracy of recording diesel generator operating parameters for pressure and temperature. The control room operator's logs reflected emergency diesel generator inoperability during the performance of the

required steps when the emergency diesel generator was declared inoperable. No discrepancies were noted in either the auxiliary or control room operator's logs. The licensee stated that the emergency diesel generator passed the surveillance.

5.2 Unit 2 - Moderator Temperature Coefficient Test at Power

On May 23, the inspector observed the preparation for the conduct of Procedure 2302.009, Revision 16, "Moderator Temperature Coefficient at Power." The licensee lowered power to 95 percent and achieved equilibrium xenon and equilibrium boron prior to commencing the test. A crew brief was conducted with the test performers. No problems were identified.

5.3 Unit 2 - Monthly Surveillance Testing of Emergency Diesel Generator 2DG1 (JO No. 870930)

On May 27, the inspector witnessed a portion of Emergency Diesel Generator 2DG1 Surveillance in accordance with approved Procedure 2104.036, Revision 36, "Emergency Diesel Generator Operations." Prior to emergency diesel generator startup, Step 2.15 of the procedure required the auxiliary operator to determine which air system was to be tested by the engine start. The procedure directed the auxiliary operator to open the vent valve from Startup Air Filter 2F-210A, but the auxiliary operator proceeded to unlock Category E Discharge Valve 2ED-10A from Starting Air Tank 2T-31A. When the inspector questioned the auxiliary operator about unlocking Valve 2ED-10A, the auxiliary operator referenced the procedure and confirmed that it was an incorrect valve and proceeded to relock Valve 2ED-10A. The auxiliary operator took appropriate action by notifying the control room and the control room logged the valve in the Category E log book. The valve was independently verified to be locked in its correct position in accordance with Station Administrative Procedure 1000.27, Revision 16, "Hold and Caution Card Control." The inspector viewed unlocking of a Category E Valve without proper authorization (i.e., shift supervisor approval or controlled document) and inattentiveness to procedural requirements as a weakness.

The inspector confirmed that all M&TE required for the job had been calibrated within the required calibration periodicity. The emergency diesel generator was successfully started, and the inspector verified that operating parameters required by the procedure were accurately recorded in the auxiliary operator surveillance log. The inspector did not notice any system abnormalities during the observed portion of the run. The inspector confirmed that the operator logged the correct time frame when the emergency diesel generator was declared inoperable. The licensee stated that the emergency diesel generator successfully passed the surveillance.

5.4 Unit 1 - Surveillance Test of Steam Driven Emergency Feedwater Pump P7A (JO No. 871908)

On May 29, the inspector witnessed the performance of Procedure 1106.06, "Emergency Feedwater Pump Operations," Supplement 2. The test was being

performed to diagnose a higher than normal variation in differential pressure at full flow. All readings were still within the normal acceptable range but the variation had increased. During the testing, the licensee determined that Yarway Recirculation Valve FW-10A was leaking by at approximately 140 gallons per minute with full discharge pressure through the recirculation path. The valve was designed to provide bypass flow at low flow rates to protect the pump but was supposed to close at high flow rates. In a normal alignment, full flow including recirculation flow was approximately 700 gallons with a discharge pressure of 1500 psig. Based on the test results, the licensee determined that the surveillance performance requirement of 500 gallons per minute at 1200 psig could be achieved with the current pump performance. Condition Report CR-1-92-G391 was initiated to document the operability determination. A job order was initiated to repair Recirculation Valve FW-10A.

5.5 Unit 2 - Monthly Surveillance Testing of Emergency Diesel Generator 2DG2 (JO No. 871852)

On June 3, the inspector observed a portion of monthly surveillance on Emergency Diesel Generator 2DG2 in accordance with Supplement 2 of Procedure 2104.036, Revision 34, "Emergency Diesel Generator Operations." The inspector confirmed that calibrated test equipment was used by the auxiliary operator during the run. No discrepancies were noted between diesel generator operating parameters recorded by the auxiliary operator and operating parameters observed by the inspector. The licensee stated that all operating parameters were within acceptable tolerances. Consistency was observed between the control room operator logs and the procedure regarding the time that the diesel was declared inoperable. The licensee stated that the diesel passed the surveillance. The inspector concluded that the surveillance was performed satisfactorily.

5.6 Unit 2 - Quarterly Surveillance of Charging Pump 2P36A (JO No. 869317)

On June 3, the inspector observed quarterly mandatory preventive maintenance in accordance with Repetitive Task Instruction No. 2411.013, Revision 1, Attachment 1, "Charging Pump Dampener Pressure Check." The mandatory preventive maintenance verified suction and discharge pulse dampeners (2M-115A and 2M-116A, respectively) inflation pressure and was used to ensure there were no leaks on the charging pump which would render it inoperable. Leaks associated with Charging Pump P36C, which were identified in 1982, were reported on LER 82-007. The preventive maintenance was written as a corrective action for LER 82-007 to provide for early detection of similar leaks.

The gages used to check the dampener bladder nitrogen inflation pressure were verified within their required calibration dates. Both suction and discharge dampener bladders required a charge of nitrogen. The inspector verified both bladders were charged to within the required pressure tolerances as specified in the task instruction. The inspector noted that hold cards installed on suction and discharge valves required the valves to be closed. The qualified

technicians were knowledgeable and demonstrated appropriate ALARA practices during performance of the job. A health physics technician was present to swipe and survey all equipment exiting the contaminated boundary. No errors were identified by the inspector during performance of this mandatory preventive maintenance.

5.7 Unit 2 - Power Range Linear Channel C Calibration (JO No. 871682)

On June 9, the inspector observed a portion of Channel C excore calibration in accordance with Procedure 2304.032, Revision 14, "Power Range Linear Amplifier Calibration at Power." The inspector verified that calibrated electrical test equipment was used to perform the calibration. The inspector confirmed that the values recorded from core protection calculator monitors for percent power calculations were accurate, and the percent power calculations performed by the qualified instrument and control technicians were acceptable. In Step 8.3.1, the procedure directed the technician to "N/A" the point not used in Step 8.1.3 to obtain calculated power from the on-line critical applications program systems computers. The inspector noted that plant-smoothed power was provided and reactor coolant system Delta T Power was not "N/A"d. The licensee stated that all channels were within acceptable tolerances.

5.8 Unit 1 - Surveillance Test of Turbine Driven Emergency Feedwater Pump P7A (JO No. 87220)

On June 15, the inspector observed performance of a portion of approved Procedure 1106.006, Revision 45, Supplement 2, "Emergency Feedwater Pump Operations." The licensee stated and the inspector confirmed appropriate alignment to Condensate Storage Tank T41B for recirculation during the test and that oil levels were satisfactory prior to pump operations. Following emergency feedwater pump startup, the licensee noted a small steam leak from the stem of Governor Valve CV-660. As the valve packing was wetted, the packing swelled and the steam leak diminished. The licensee stated that the pump passed the surveillance.

5.9 Summary of Findings

The inspector observed portions of several test activities which were performed well:

Unit 2 monthly emergency diesel generator surveillance tests.

Unit 2 moderator temperature coefficient test at power.

Unit 2 surveillance test of the Charging Pump 2P36A discharge dampener bladders.

Unit 1 surveillance test of the steam driven emergency feedwater pump.

During Unit 2 emergency diesel generator surveillance testing, an operator unlocked (but did not manipulate) the discharge valve from the starting air tank rather than opening the vent valve from the startup air filter as required by the procedure. When the inspector questioned the operator about unlocking the wrong valve, the operator confirmed that it was an incorrect valve, relocked the discharge valve and notified the control room.

6. OPERATIONAL SAFETY VERIFICATION (71707)

The inspectors routinely toured the facility during normal and backshift hours to assess general plant and equipment conditions, housekeeping, and adherence to fire protection, security, and radiological control measures. Ongoing work activities were monitored to verify that they were being conducted in accordance with approved administrative and technical procedures and that proper communications with the control room staff had been established.

During tours of the control room, the inspectors verified proper staffing, access control, and operator attentiveness. Technical Specification limiting conditions for operation were evaluated. The inspectors examined status of control room annunciators, various control room logs, and other available licensee documentation.

6.1 Unit 1 - Inoperable Decay Heat Removal Valves

On May 14, the licensee performed routine valve stroke time testing on Decay Heat Cooler Bypass Valve CV-1433 and Decay Heat Lube Oil Cooler Valve CV-3840. Both valves failed to meet the stroke time requirements. The licensee declared the valves inoperable, was unable to meet the requirements of Technical Specification 3.3.1(d), and as a result entered Technical Specification 3.3.6. The licensee locked both valves in their engineered safeguards actuated position and exited the Technical Specification. A job order was initiated.

6.2 Unit 2 - Category E Valve Alignment Verification (JO No. 869038)

On May 15, the inspector accompanied an auxiliary operator on a walkdown to verify a portion of Category E valve position and status in accordance with Plant Operating Procedure 2102.001, Revision 37, "Plant Heatup and Precritical Checklist," Attachment E.

During the walkdown, the auxiliary operator donned cotton liners and rubber gloves to verify valve alignment in the overhead space in High Pressure Safety Injection Pump Room C. Before exiting the room, the auxiliary operator removed the rubber gloves and cotton liners and proceeded to High Pressure Safety Injection Pump Room A to dispose of the protective clothing. The inspector asked the auxiliary operator what would happen if the protective clothing were dropped on the floor on the way to High Pressure Safety Injection Pump Room A. The auxiliary operator stated that the gloves were turned inside out prior to exiting High Pressure Safety Injection Pump Room C. Subsequent interviews with the health physics supervisor and the auxiliary

operator determined that a step off pad and disposal basket were not required because the contaminated area was greater than 8 feet above the floor and that the normal acceptable practice for glove disposal was to turn the gloves inside out and dispose of the articles in the closest radwaste disposal basket. The inspector noted that the contamination control program for potentially contaminated areas 8 feet above the floor was not as conservative as the contamination control program for potentially contaminated areas at floor level.

The inspector cross-checked a portion of the valve status and position with a portion of the valve position and status listed by the auxiliary operator in the attachment and confirmed listings as accurate. The qualified operator was knowledgeable of valve locations and components associated with the plant. No errors were noted by the inspector.

6.3 Units 1 & 2 - Plant Operations During Repair of Capacitive Coupling Device On 500 KV Side of Switchyard Autotransformer

The system dispatcher noted erroneous 500 KV line voltage readings on May 20. The capacitive coupling device, which was used to provide step down voltage for metering the 500 KV line and for input to the long distance protective relaying, was determined to be degraded. On May 22, with both units at full power the licensee planned replacement of the capacitive coupling device.

The licensee developed Work Plan 1409.148, "Autotransformer 500 KV Outage," Revision 0, to provide operational guidance during the maintenance evolution. Replacement of the capacitive coupling device involved disconnecting the autotransformer from the 500 KV supply. The autotransformer remained energized throughout the evolution via the 161 KV supply. However, the condition where the autotransformer was fed only from the 161 KV supply had not been previously analyzed. To prevent operation in an unanalyzed configuration both Units 1 and 2 feeder breakers from Startup Transformers SU1 and SU3 to the 4160 V and 6900 V busses were maintained in pull to lock.

Startup Transformers SU1 and SU3 normally provided the immediate source of offsite power to Units 1 and 2, respectively. To comply with Unit 1 Technical Specifications 3.7.2.A and 3.7.2.B, Unit 1 personnel verified the operability of both emergency diesel generators prior to placing the feeder breaker handswitches in pull-to-lock. Similarly, to comply with Technical Specification 3.8.1.1, Unit 2 personnel verified the operability of both emergency diesel generators prior to placing the feeder breaker handswitches in pull-to-lock. The evolution extended past the 8-hour limit in the Unit 2 Technical Specification, so Unit 2 personnel again verified operability of both emergency diesel generators. The repairs were successfully completed May 22 with one weakness noted.

Although not included in Work Plan 1409.148, the licensee planned to place the local capacitor bank in service on the 161 KV line prior to disconnecting the 500 KV tie to the 161 KV system via the autotransformer. The capacitor bank had been installed to enable the system dispatcher to raise the 161 KV line

voltage, if necessary. The licensee was not initially able to place the capacitor bank in service due to a fuse failure. This was of concern, because of previous licensee claims to be able to routinely and quickly place this capacitor bank in service.

Further investigation by the licensee revealed that the factory supplied control power fuses should have been replaced with fuse links during the original installation to conform with the approved design. Electrical protection in the capacitor bank control circuit was provided by molded case circuit breakers rather than fuses. The licensee corrected the installation to conform with the design and was then able to place the capacitor bank in service. The individuals that performed the incorrect installation were notified of the error.

The licensee did not initiate a condition report because the switchyard was viewed by the licensee as outside the scope of the formal corrective action program. The inspector was concerned that no method existed for determining operability of the offsite power supply for the situation where the design calculations relied upon the availability of the capacitor banks to adequately meet the design criteria and the capacitor bank was unavailable for service. The capacitor banks which were recently installed to be used in certain cases to meet the requirements of General Design Criteria 17 were not initially viewed as having an impact on the operability of the offsite power supplies. After further discussions, the licensee agreed that in situations such as peak loading, when the capacitor bank could be relied upon to provide adequate offsite power, an operability determination needs to be made when the capacitor bank is unavailable for service. The licensee planned to view the capacitor banks as support equipment in the future and initiate a condition report for the purpose of making an operability determination. The change in approach was discussed with the operating crews during crew brief.

This approach should ensure General Design Criterion 17 requirements are met while long-term licensing basis requirements are being discussed with the Office of Nuclear Reactor Regulation.

6.4 Unit 2 - Auxiliary Operator System Walkdown

On May 28, a Unit 2 auxiliary operator was provided a hold card record sheet to isolate "B" instrument air system for maintenance in accordance with Station Administrative Procedure 1000.27, "Hold and Caution Card Control." The hold card record sheet was generated by Operations utilizing piping and instrumentation diagrams as a guide to establish the isolation boundary for the component cooling water portion of the cooler. The auxiliary operator positioned the valves in accordance with the record sheet; however, Valve 2CCW-81 had been inadvertently omitted from the list. The auxiliary operator commenced draining a section of line that was presumed to be totally isolated. After approximately 10 minutes of draining, the auxiliary operator concluded that Valve 2CCW-81 had been omitted from the hold card record sheet. He closed the valve after obtaining control room permission. The valve was added to the hold card record sheet. After subsequent discussions with the

licensee, the inspector concluded that operations inadvertently omitted Valve 2CC4-81 from the valve line-up and the licensed operator missed the valve during the second verification. The inspector viewed the operator error as a weakness.

The auxiliary operator performed a routine tour of Unit 2. The inspector did not observe any discrepancies. The auxiliary operator was efficient and knowledgeable. The use of new computerized logtaking equipment was viewed as a strength.

6.5 Unit 2 - Use of "Swing" Battery Charger (2D34) During Normal Battery Charger (2D32) Outage

On June 3, the inspector noted that Battery Charger 2D32 was out of service for replacement of a defective ammeter (JO No. 840276). The licensee stated that the "Swing" Battery Charger (2D34) was used during Battery Charger 2D32 Outage. The licensee stated that voltage from the 480 V green train Motor Control Center No. 64 was used to charge the green train Battery Bus 2D02. The inspector verified that Motor Control Center No. 64 was aligned to the "swing" battery charger and that the breaker to the green train Battery Bus 2D02 was closed. The inspector confirmed that the licensee satisfied Technical Specification 3.8.2.3 for DC electrical source operability by providing Battery Charger 2D34 with proper alignment while Battery Charger 2D32 was out of service. This was acceptable.

6.6 Summary of Findings

The Unit 2 auxiliary operator was knowledgeable during rounds and the new computerized logtaking system was excellent.

The Unit 2 isolation boundary for the component cooling water line to the instrument air cooler was not properly defined for hold card installation. The operator realized the cooler was being drained rather than just the line. He isolated the line and corrected the hold card record sheet. Component cooling water was a nonsafety-related system.

No method existed for determining operability of the offsite power supply for the situation where the design calculations relied upon the availability of the capacitor banks to adequately meet the design criteria and the capacitor bank was unavailable for service. After further discussions, the licensee agreed that in situations such as peak loading, when the capacitor bank could be relied upon to provide adequate offsite power an operability determination, needs to be made when the capacitor bank is unavailable for service. The licensee planned to view the capacitor banks as support equipment in the future and initiate a condition report for the purpose of making an operability determination. The change in approach was discussed with the operating crews during crew brief.

The contamination control program for potentially contaminated areas 8 feet above the floor is not as conservative as the contamination control program for potentially contaminated areas at ground level. Specifically, gloves are turned inside out rather than placing them in a clear plastic bag for transport to the nearest radwaste bag for disposal.

7. SUMMARY OF OPEN ITEMS

The following is a synopsis of the status of all open items generated in this inspection report.

Violation 368/9209-01, "Previously Undetected Design Flaw Rendered Diverse Emergency Feedwater Actuation System Inoperable during ATW Conditions." was opened.

Inspection Follow up Item 313/9209-02, "Root Cause Evaluation for Unit 1 Service Water Pump Degradation with potential Generic Implications," was opened.

Violation 313/9205-01, "Inadequate procedure implementation results in reactor protection system Channel C Trip," was closed.

LER 313/90-013, "Location of service water piping near potential high-energy line break main feedwater piping," was closed.

Unit 2 Three Mile Island Action Item II.G.1, "Power supplies for Pressurizer Level Indications " was closed.

8. EXIT INTERVIEW

The inspectors met with members of the Energy Operations staff on June 22, 1992. The list of attendees is provided in paragraph 1 of this inspection report. At this meeting, the inspectors summarized the scope of the inspection and the findings.

ATTACHMENT

Acronyms and Initialisms

ANO Arkansas Nuclear One
ALARA as low as reasonably achievable
ATWS anticipated transient without scram
DEFAS diverse emergency feedwater actuation system
JO job order
LER licensee event report
M&TC measuring & test equipment
MOV motor-operated valve
OSHA Occupational Safety and Health Administration

10 CFR Part 2 Part 2, Title 10, Code of Federal Regulations
10 CFR Part 50.59 Section 59, Part 50, Title 10, Code of Federal
Regulations
10 CFR Part 50.62 Section 62, Part 50, Title 10, Code of Federal
Regulations

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