June 16, 1995

Entergy Operations, Inc.
ATTN: J. W. Yelverton, Vice President
Operations, Arkansas Nuclear One
1448 S.R. 333
Russellville, Arkansas 72801-0967

SUBJECT:
NRC INSPECTION REPORT 50-313/95-20; 50-368/95-20 , 72-13/95-01

This refers to the inspection conducted by Messrs. Charles J. Paulk and Lawrence E. Ellershaw of this office on May 22-26, 1995. The inspection included a review of activities authorized for your Arkansas Nuclear One, Units 1 and 2, facility. At the conclusion of the inspection, the findings were discussed with those members of your staff identified in the enclosed report.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress. The results of this inspection are documented on page 1, in the enclosed report.

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

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

/RA/

Thomas P. Gwynn, Director
Division of Reactor Safety

Dockets: 50-313
50-368

Licenses: DPR-51
NPF-6

Enclosure: (see next page)

Enclosure:
NRC Inspection Report
50-313/95-20; 50-368/95-20
w/attachment

cc w/enclosure:
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E-Mail report to D. Sullivan (DJS)
E-Mail report to NRR Event Tracking System (IPAS)

bcc to DMB (IE01)

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Branch Chief (DRP\TSS)
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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-313/95-20
50-368/95-20

Licenses: DPR-51
NPF-6

Licensee: Entergy Operations, Inc.
1448 S.R. 333
Russellville, Arkansas

Facility Name: Arkansas Nuclear One, Units 1 and 2

Inspection At: Russellville, Arkansas

Inspection Conducted: May 22-26, 1995

Inspectors: Lawrence E. Ellershaw, Reactor Inspector, Maintenance Branch
Division of Reactor Safety

Charles J. Paulk, Reactor Inspector, Maintenance Branch
Division of Reactor Safety

Approved: _____

Dr. Dale A. Powers, Chief, Maintenance Branch Date
Division of Reactor Safety

Inspection Summary

Areas Inspected (Units 1 and 2): Routine, announced inspection of licensee activities for previously identified items.

Results (Units 1 and 2):

Plant Operations

- There was no assessment of this area during the inspection.

Engineering

- Design and system engineering's actions related to addressing the inspection followup items and violations were good.

Maintenance

- The response of responsible maintenance personnel related to addressing the inspection followup items was good.

Plant Support

- There was no assessment of this area during the inspection.

Management Overview

- There was no assessment of this area during the inspection.

Summary of Inspection Findings:

- Inspection Followup Item 313/9216-02 was closed (Section 2.1).
- Inspection Followup Item 368/9317-02 was closed (Section 2.2).
- Inspection Followup Item 313/9321-01 was closed (Section 2.3).
- Violation 313/9424-01; 368/9424-01 was closed (Section 2.4).
- Inspection Followup Item 313/9326-02 was closed (Section 2.5).
- Violation 313/9409-03 was closed (Section 2.6).
- Violation 368/9420-02 was closed (Section 2.7).

Attachment:

- Attachment - Persons Contacted and Exit Meeting

DETAILS

1 PLANT CONDITIONS

Both units were operating at power during this inspection period.

2 FOLLOWUP - MAINTENANCE (92902)

The purpose of this inspection was to followup on licensee activities related to previously identified items.

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

During the electrical distribution system functional inspection for Unit 1 conducted in 1992, this inspection followup item was opened to ensure the proper completion of an evaluation of the electrical penetration assemblies' protective devices that was being conducted by the design engineering organization. The evaluation was being performed to demonstrate that Unit 1's protection scheme would meet the guidance provided in Regulatory Guide 1.63, "Electrical Penetration Assemblies in Containment Structures for Water-Cooled Nuclear Power Plants." While Unit 1 was not required to comply with the guidance of Regulatory Guide 1.63, this evaluation was requested through the initiation of Engineering Assistance Request 92-285.

Associated with this item was a similar item for Unit 2, identified during the electrical distribution system functional inspection conducted in 1991. A technical assistance request was generated by Region IV for the project office to review the Unit 2 protection scheme, and the Office of Nuclear Reactor Regulation performed the evaluation. By letter dated February 23, 1994, the NRC accepted a deviation from the guidance of Regulatory Guide 1.63 pending generic resolution of the safety significance of overload currents for containment electrical penetration overcurrent protection.

On the basis of the NRC's acceptance of the licensee's electrical penetration assembly overcurrent protection scheme, this item is closed.

2.2 (Closed) Inspection Followup Item 368/9317-02: Rosemount Flow Transmitter

During a previous inspection, this item was identified as the result of a records review and discussions with plant personnel about the maintenance history of the low-pressure safety-injection pump Flow Transmitter 2FT-5091. The inspector was concerned that inadequate maintenance or installation practices contributed to the continuing problems with this transmitter.

During this inspection, the inspectors discussed this issue with design and system engineers who were familiar with the problem. The inspectors found that the problems identified with the transmitter occurred only after the performance of a surveillance test, which required the system be aligned differently from the normal alignment for response to an accident. For the test alignment, a design engineer determined that entrained air caused a pressure surge which could over-range the transmitter and cause a zero shift. The system engineer and another design engineer found that the latest problem occurred after securing shutdown cooling without performance of a flush of the system. (The flush was not required by procedure for the plant conditions.) Also, the engineers found that the venting of the system did not remove all of the entrained air.

The inspectors noted that the engineers had documented the concerns identified during review of the transmitter problems. The system engineer had initiated a procedure change to require a flush and vent when securing shutdown cooling. The design engineer stated that the addition of vent and drain valves was also being considered to aid in the flushing and venting of the system.

The inspectors considered the engineers' actions to have been good. This item is closed.

2.3 (Closed) Inspection Followup Item 313/9321-01: Review of Gap Clearances on Circuit Breakers

During a previous inspection, this concern was identified as a result of investigating a breaker failure. The concern was where the 0 to 0.125 in (0 to 3.175 mm) gap was to be measured.

During this inspection, the inspectors found that the electrical maintenance personnel had discussed the gap measurement with the vendor and had determined what actions were necessary to properly measure the gap clearances. The electrical maintenance personnel had inspected all breakers, manufactured by this vendor, in Unit 1, with the exception of two buses. The Unit 2 breakers were scheduled for the next refueling outage.

The electrical maintenance personnel had determined that the plunger, which operated the auxiliary contacts, had to move a specific distance to actuate the contacts. The first distance of movement was that required to open the normally opened 'b' contacts. The electrical maintenance personnel scribed the plunger at that distance. The second distance was that required to close the normally closed 'a' contacts. This distance was also scribed on the plunger. These marks were used as a go/no-go indication of breaker operability. With respect to the gap, the electrical maintenance personnel provided the operators a 0.125 in (3.175 mm) thick gauge. If the gauge would fit into

the gap, the breaker would be considered inoperable. Additionally, the maintenance procedures were being revised to reflect the information for the plunger movement and gap measurement.

The inspectors reviewed the results for the breakers inspected to date and found that no other breaker had been identified with an unacceptable gap. The inspectors considered the performance of the electrical maintenance personnel to have been good. This item is closed.

2.4 (Closed) Violation 313/9424-01; 368/9424-01: Failure to Generate a Temporary Modification Package and a Design Change Document

During an inspection of engineering activities conducted in October 1994, a violation was identified for failure to generate a temporary modification for the repair of the decay heat removal pump room cooler, and for the failure to generate a design change document, with a safety evaluation, for machining the upper threads of the high-pressure safety-injection pump motor mounting bolts to allow movement of the motor for alignment purposes. The licensee responded to the violations by letter dated February 21, 1995.

The licensee attributed the cause of both examples to be a lack of understanding by engineering personnel on the appropriate response to plant engineering action requests. As a result of the lack of understanding, engineers had inappropriately performed a temporary modification and a design change in response to plant engineering action requests. To correct this problem, the procedure for performing plant engineering action requests was revised and engineers were provided training on the revised procedure.

The inspectors reviewed Procedure 1032.001, "Plant Engineering Action Requests," Revision 12, and found that the licensee addressed the issues related to the causes for the violation. The inspectors found that the procedure would allow changes to the plant without a modification package, or a temporary modification package, only for repairs and or replacement with equivalent components. For repairs and equivalencies, the engineer would have to comply with the procedural requirements for an on-line leak repair or an engineering equivalency evaluation.

The inspectors found that the corrective actions had been completed as detailed in the February 21, 1995, letter. This item is closed.

2.5 (Closed) Inspection Followup Item 313/9326-02: Polar Crane Issues

During the 11th refueling outage for Unit 1 (September 7 to October 19, 1993), the polar crane cable slipped downward while attempting to raise the reactor vessel head

from a suspended position above the reactor vessel. Licensee personnel, assisted by representatives of the crane manufacturer, evaluated the condition and developed an action plan to address the identified performance. Licensee personnel informed the inspectors that the action plan would be completed prior to reusing the crane to replace the reactor vessel head.

During the week of October 4, 1993, the reactor vessel head was lifted from its stand. Again, the reactor vessel head slipped when lifted from a suspended position. The reactor vessel head was replaced on the reactor vessel. The licensee's representatives indicated that they suspected the crane problem was attributable to the crane's logic circuitry.

During a subsequent NRC inspection conducted August 29 through September 15, 1994, the inspectors performed followup inspection activities which were documented in NRC Inspection Report 50-313/94-22; 50-368/94-22. The inspectors learned that the licensee had identified other crane anomalies that had occurred in the past and had been addressed only to the extent necessary to solve immediate problems. For example, the auxiliary hoist that was rated at 25,000 lb (11,340 kg) had not been able to lift more than 15,000 lb (6804 kg) in the recent past. This had not been considered a problem because the main hoist was available for these lifts, if necessary.

Licensee personnel initiated Condition Report 1-93-0349 to evaluate, investigate, determine the root cause, and correct the problems. Vendor assistance was obtained to assist in the review of procedures, technical information, vendor drawings, and the hoist control system configuration.

Subsequently, licensee personnel discovered that the polar crane control system setup procedure did not agree with the vendor-supplied technical manual and drawings for the installed configuration of the hoist control system, nor did it contain all steps required to align the hoist control system. As a result, both polar crane system setup procedures were revised to agree with vendor recommendations. Additionally, the responsible licensee engineers, in conjunction with the crane manufacturer representatives, developed the correct control system setup procedures for both hoists of the Unit 1 polar crane. To address the generic implications, other cranes onsite supplied by the same vendor were checked. (The Unit 2 polar crane had a different hoist control system, but this was not recognized by the licensee's engineers or the vendor representatives at the time.)

This item was not closed during the 1994 inspection since the licensee had not validated the successful performance of crane hoist capability under loaded conditions.

During this inspection, the inspectors learned that the evaluation in Condition Report 1-93-0349 concluded that the most probable cause of the polar crane condition to be

improper tuning of the control circuit. This resulted in the establishment of Workplan 1409.566, "1R12 Reactor Vessel Head Lift." The workplan was intended to coordinate the reactor vessel head lift with the setup of the polar crane controls.

The licensee and vendor representative found, while performing the workplan during the 12th refueling outage for Unit 1, that no amount of tuning would allow the polar crane to lift the suspended reactor vessel head without slippage. Specifically, on February 22, 1995, the head was lifted off the vessel and a suspended lift was attempted. During this effort, it was found that the polar crane could not lift a suspended capacity load despite every effort by licensee and vendor representatives to correct the deficiency with control system tuning. For the next several days, additional troubleshooting and testing was performed, including vendor-suggested, locked-rotor testing that simulated a full-load condition.

During the locked-rotor testing on February 26, 1995, the saturable reactors were found to be unable to reach saturation. The saturable reactors control the amount of current flow through the rotor circuit; directly controlling motor torque. Since the saturable reactors were not reaching saturation, rotor current was limited. From further testing and discussions with the vendor, it was determined that the saturable reactors were improperly sized for the Unit 1 polar crane. The polar crane auxiliary hoist was also found to have improperly sized saturable reactors.

Since the root cause determination from Condition Report 1-93-0349 was found to be incorrect, Condition Report 1-95-0183 was initiated on March 1, 1995, to document the root cause for the polar crane's inability to properly lift a suspended reactor vessel head. New saturable reactors of an enhanced design were ordered for both Unit 1 polar crane hoists. These were received and installed on March 13, 1995. All post-modification testing (except the required three consecutive lifts with the reactor vessel head suspended) was successfully completed. Later, on March 18, 1995, the polar crane successfully performed three consecutive lifts of the suspended reactor vessel head. Supply voltage was varied and additional tests were performed to conservatively demonstrate the functionality and operability of the polar crane hoists.

The Unit 2 polar crane design was also reviewed for generic considerations. It was determined that during the construction of the Unit 1 polar crane, between August 1969 and May 1970, the vendor changed the design of the saturable reactors in April 1970. This design change was not incorporated into the Unit 1 polar crane, but was incorporated into the Unit 2 polar crane. Review of documentation by licensee engineers showed that the new saturable reactors installed in the Unit 1 polar crane were identical to the ones installed in the Unit 2 polar crane; however, the hoist control system was different from the Unit 1 hoist control system. The Unit 1 hoist control system had an anti-hunt module and the Unit 2 system had a stability module. As a result, Procedure 1412.047, "Containment Polar Crane Motor and Controller Lubrication

and Inspection," was revised to address only the Unit 1 polar crane, and Procedure 2412.075 was initiated to address the Unit 2 polar crane.

To summarize, the polar crane problem had been occurring for an extended period of time, and corrections were being attempted when problems were identified. On several occasions during this time period, the polar crane performance and licensee plans were discussed with regional personnel by way of telephone conferences. The licensee's engineers initially concluded that the problem was an inadequate procedure that did not include all vendor required steps and addressed the wrong control module in the hoist control system. The procedure, which was used for both units, was revised to add the missing steps and to address the control module in the Unit 1 control system. Subsequent testing found the problem to have been improperly sized saturable reactors in the control system, and those saturable reactors were replaced. Additionally, the Unit 2 control system was found to have been different from that in Unit 1 during the performance of the corrective actions. The inspectors concluded that the licensee was slow to identify the cause of the performance problem for the polar crane, but has now properly resolved the problem. This item is closed.

The inspectors questioned the status of the auxiliary building crane because of its similarity of design and because of the licensee's plans to use it to move the spent fuel dry storage casks. This crane is rated at 100 tons (90.7 t), and the fuel casks are expected to weigh approximately 98 tons (88.9 t). The inspectors learned that the licensee, in preparation for the new dry cask storage system, load tested the crane in June 1994, at 120 percent of rated load, and a suspended lift was performed satisfactorily. Even though this testing was successful, the licensee, because of the problems associated with the polar cranes, initiated additional actions to assure the capability of the auxiliary building crane. On May 10, 1995, Action Item 01 was added to Condition Report 1-95-0183. This action item, with a due date of July 30, 1995 (which is prior to any expected movement of spent fuel dry storage casks), required the testing of the crane to demonstrate its ability to operate at all expected voltage levels by verifying that the saturable reactors properly saturate. This assures that the saturable reactors have sufficient design margin to operate properly throughout the expected range of the supply voltage.

The inspectors concluded that the licensee's actions related to the auxiliary building crane provided, with reasonable assurance, that the crane could safely lift and move the spent fuel dry storage casks.

2.6 (Closed) Violation 313/9409-03: Removal of Insulation on Heat-Traced Boric Acid Piping

During a previous inspection, this violation was identified for performing maintenance on the boric acid system with a procedure that was inappropriate to the circumstances.

The licensee responded to the notice of violation by letter dated February 3, 1995. Subsequent to that letter, the licensee revised the corrective actions to be taken by letter dated April 27, 1995. The proposed corrective actions were reviewed by regional personnel and found to be acceptable, as documented by letter from Mr. A. B. Beach to Mr. J. W. Yelverton, dated February 16, 1995.

The inspectors reviewed the actions taken by the licensee in response to this violation. The inspectors found that all actions had been completed as described in the two letters related to this violation. This item is closed.

2.7 (Closed) Violation 368/9420-02: Failure to Remove Ultrasonic Flow Test Instruments

During the inspection of the service water system, conducted in accordance with NRC Temporary Instruction 2515/118, Revision 1, "Service Water System Operational Performance Inspection (SWOPI)," a violation was identified for the failure to remove ultrasonic flow test instruments from Service Water Supply Line 2HCC-237-2 to Low-Pressure Safety-Injection Pump Seal Cooler 2E-52B. The corrective actions were taken during the inspection and no response to the violation was required.

Errors were noted in the Notice of Violation issued on October 6, 1994, related to the numbering of the violation. A correction letter was sent to the licensee on November 9, 1994, but the numbering error was not corrected. In both transmittals, this violation was identified as 368/9420-04 in the Notice of Violation and 368/9420-02 in the body of the report. The correct number should have been 368/9420-02.

The inspectors again reviewed the licensee's corrective actions and found them to be acceptable. Therefore, this item is closed.

ATTACHMENT

Persons Contacted and Exit Meeting

1 PERSONS CONTACTED

1.1 Licensee Personnel

D. Cottingham, Supervisor, Electrical and Instrumentation and Controls, Design Engineering
D. Fowler, Supervisor, Quality Assurance
M. Harris, Manager, Unit 2 Maintenance
R. King, Acting Director, Licensing
D. Lomax, Manager, Engineering Programs
D. McKinney, System Engineer, Unit 1 Balance of Plant
T. Ott, Supervisor, Electrical and Instrumentation and Controls, Design Engineering
S. Pyle, Licensing Specialist
M. Smith, Supervisor, Licensing
L. Waldinger, General Manager, Operations
C. Zimmerman, Manager, Unit 1 Operations

1.2 NRC Personnel

K. Kennedy, Senior Resident Inspector

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

2 EXIT MEETING

An exit meeting was conducted on May 26, 1995. During this meeting, the inspectors reviewed the scope and findings of the report. 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.