UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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June 10, 1999

C. Randy Hutchinson, Vice President
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Arkansas Nuclear One
Entergy Operations, Inc.
1448 S.R. 333
Russellville, Arkansas 72801-0967

SUBJECT: NRC INSPECTION REPORT NO. 50-313/99-05; 50-368/99-05

Dear Mr. Hutchinson:

This refers to the inspection conducted on April 11 through May 29, 1999, at the Arkansas Nuclear One, Units 1 and 2, reactor facility. The enclosed report presents the results of this inspection.

During the 7-week period covered by this inspection, your conduct of activities at the ANO facility was generally characterized by safety-conscious operations, sound engineering and maintenance practices, and careful radiological controls.

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,

/s/

P. Harrell, Chief
Project Branch D
Division of Reactor Projects

Docket Nos.: 50-313
50-368
License Nos.: DPR-51
NPF-6

Enclosure:
NRC Inspection Report No.
50-313/99-05; 50-368/99-05

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E-Mail report to Document Control Desk (DOCDESK)
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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket Nos.:	50-313; 50-368
License Nos.:	DPR-51; NPF-6
Report No.:	50-313/99-05, 50-368/99-05
Licensee:	Entergy Operations, Inc.
Facility:	Arkansas Nuclear One, Units 1 and 2
Location:	1448 S. R. 333 Russellville, Arkansas 72801
Dates:	April 11 through May 29, 1999
Inspectors:	K. Weaver, Acting Senior Resident Inspector
Approved by:	P. Harrell, Chief, Project Branch D Division of Reactor Projects
Attachment:	Supplemental Information

EXECUTIVE SUMMARY

Arkansas Nuclear One, Units 1 and 2
NRC Inspection Report 50-313/99-05; 50-368/99-05

This routine announced inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a 7-week period of resident inspection.

Operations

- Due to the expedient response (approximately 9 minutes from identification to isolation) by the Unit 2 control room personnel to an 8 gpm packing leak on reactor coolant system letdown flow control Valve 2CV-4816, the reactor coolant system inventory leakage into the upper south piping penetration room was limited to approximately 80 gallons (Section O1.2).

- The Unit 2 control room operators demonstrated good command and control by stopping work in the control room and limiting control room access, while isolating and restoring reactor coolant system letdown flow for maintenance activities. Nonlicensed operators in the field demonstrated good communications with the control room personnel during the evolutions (Section O1.2).

Maintenance

- Knowledgeable maintenance technicians used approved procedures to perform routine maintenance activities in a safety-conscious manner. Maintenance craft demonstrated good attention to detail during the disassembly of Reactor Coolant System Letdown Flow Control Valve 2CV-4816 and obtained needed information to assist engineering staff in determining the reason for the failure of the valve's packing (Section M1.1).

- Operations, maintenance, and engineering personnel demonstrated good communications and attention to detail during the observed surveillance activities (Section M1.2).

Engineering

- The recovery of the Unit 1 spent fuel assembly that became stuck during loading of the Unit 1 dry cask on May 21, 1999, was well planned and executed by the engineering personnel involved. The prejob briefing for this recovery was comprehensive and thorough and included all necessary precautions (Section E2.1)

Plant Support

- Poor radiation worker practices were demonstrated when a maintenance technician was observed reaching into a contamination area to perform work and was contacting structural components with his bare forearms. The health physics technician providing coverage for this work demonstrated a lack of attention to detail in that he had to be prompted by the inspector to ensure that the worker had not become contaminated (Section M1.1).

- Security personnel were properly posted at the vital area barrier breach during the maintenance activities on Unit 2 Service Water Pump 2P4C (Section S1.1)

Report Details

Summary of Plant Status

Unit 1 began the inspection period at 100 percent power. On April 14, 1999, operators reduced reactor power to approximately 97 percent due to Turbine Throttle Valve 2 failing closed. Operators returned Unit 1 to 100 percent power the same day following replacement of the electrohydraulic control (EHC) servo positioning valve for Turbine Throttle Valve 2. On April 22, operators reduced reactor power to approximately 97 percent to replace the EHC servo positioning valve for Turbine Throttle Valve 1 and returned Unit 1 to 100 percent power on April 23. On April 23, operators again reduced reactor power to approximately 97 percent to replace the EHC servo positioning valves for Turbine Throttle Valves 3 and 4. Operators returned Unit 1 to 100 percent power the same day. On April 24, operators reduced reactor power to approximately 85 percent to replace the EHC servo positioning valves for Turbine Governor Valves 1, 2, and 4. Operators returned Unit 1 to 100 percent power the same day following the maintenance activities. On May 28, operators reduced reactor power to perform turbine throttle valve and governor valve testing and to repair the Feedwater Heater E1B level control valve. Operators returned Unit 1 to 100 percent power the same day. Unit 1 remained at or near 100 percent power through the remainder of this inspection period.

Unit 2 began the inspection period at 100 percent power. On April 16, 1999, operators reduced reactor power to approximately 75 percent for condenser tube leak identification and repair. On April 17, operators returned Unit 2 to 100 percent power following the maintenance activities. Unit 2 remained at or near 100 percent power through the remainder of this inspection period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

The inspector observed various aspects of plant operations, including compliance with Technical Specifications (TS), conformance with plant procedures and the Safety Analysis Report, and shift manning. The inspector also observed the effectiveness of communications, management oversight, proper system configuration and configuration control, housekeeping, and operator performance during routine plant operations and surveillance testing.

The conduct of operations was professional and effective. Control room personnel were knowledgeable of the conditions associated with the plant and alarming control board annunciators. Evolutions were generally well controlled and performed according to procedures. Specific events and noteworthy observations are detailed below.

O1.2 Excess Reactor Coolant System (RCS) Leakage (Unit 2)

a. Inspection Scope (71707)

The inspector reviewed the operator actions taken on May 7,1999, in response to the excess RCS leakage from the packing on RCS Letdown Flow Control Valve 2CV-4816. In addition, the inspector observed operator performance while isolating and restoring RCS letdown flow before and after maintenance activities to repair this valve.

b. Observations and Findings

On May 7, 1999, at approximately 6:05 p.m., Unit 2 operators received a fire annunciator alarm for the upper south containment piping penetration room. Simultaneously, the control board operator noted that the volume control tank level was decreasing. Control room operators immediately entered Abnormal Operating Procedure 2203.016, "Excess RCS Leakage," Revision 8, and TS 3.4.6.2 due to RCS unidentified leakage >1 gpm. Control room personnel promptly dispatched a nonlicensed operator to the upper south piping penetration room. The operators identified that RCS Letdown Flow Control Valve 2CV-4816 had developed a packing leak of approximately 8 gpm. The control room operators isolated RCS letdown flow and the excess RCS leakage was stopped. The operators had isolated the RCS leakpath approximately 9 minutes after the leak occurred.

The inspector noted that, based on review of Abnormal Operating Procedure 2203.016, TS 3.4.6.2, and Procedure 1903.010, "Emergency Action Level Classification," Revision 34, operators properly responded in accordance with the procedures and TS. The inspector also noted that due to the expedient response (approximately 9 minutes from identification to isolation) by the control room personnel on shift during this event, the RCS inventory leakage into the upper south piping penetration room was limited to approximately 80 gallons.

On May 12, 1999, the inspector observed control room operators isolate RCS letdown flow for maintenance craft to remove Valve 2CV-4816 from the system piping. The licensee staff made the decision to isolate RCS letdown flow to reduce the area radiation levels during these maintenance activities. The inspector observed that control room personnel stopped work in the control room and limited personnel access before commencing isolation of RCS letdown flow. The inspector observed that control room personnel demonstrated good command and control during the evolution. Nonlicensed operators were stationed at the upper south piping penetration room and the charging pump rooms to monitor any possible system leakage and to identified any abnormal equipment operation. The inspector noted that the operators stationed at the applicable equipment demonstrated good communication with the control room personnel. Following removal of RCS Letdown Flow Control Valve CV-4816, the inspector observed that the RCS letdown flow was restored through the other parallel system path in accordance with procedures with no abnormalities.

c. Conclusions

Due to the expedient response (approximately 9 minutes from identification to isolation) by the Unit 2 control room personnel to an 8 gpm packing leak on the RCS letdown flow control Valve 2CV-4816, the RCS inventory leakage into the upper south piping penetration room was limited to approximately 80 gallons.

The Unit 2 control room operators demonstrated good command and control by stopping work in the control room and limiting control room access, while isolating and restoring RCS letdown flow for maintenance activities. Nonlicensed operators in the field demonstrated good communications with the control room personnel during the evolutions.

O2 Operational Status of Facilities and Equipment

O2.1 Walkdown of Clearance Boundary Valves for Removal of Decay Heat Pump P34A from Service for Maintenance (Unit 1)

a. Inspection Scope (71707)

The inspector walked down the clearance tagout in effect for the Decay Heat Pump P34A maintenance activities. Since the safety-related tagout required that instrument air be isolated from Decay Heat Room Vault A, the inspector verified that the associated valves that would be effected by the loss of instrument air were positioned and locked in their fail safe positions. In addition, the inspector performed a walkdown of the Decay Heat Pump P34B system to verify its operability.

b. Observations and Findings

On April 28, 1999, the inspector observed that Hold Card Authorization Form 9-1-09283 was properly prepared and authorized. The inspector performed a walkdown of the components identified on the clearance tagout and verified that the components were in the required position and were properly tagged in place. The inspector performed a walkdown of the isolated instrument air system header in Decay Heat Room Vault A and noted that all components effected by the insolation of instrument air had been identified on Hold Card Authorization Form 99-12-09283 and were properly placed, locked, and tagged in the fail safe position. The inspector also noted that, as an added precaution, control room operators had logged in the station logs that the applicable valves had been placed and locked in the fail safe positions. In addition, the inspector noted during a walkdown of the opposite safety system train that the component material condition was good, all accessible valves were in there proper position, and no other work was ongoing in the area that could adversely affect the safety system's operability.

c. Conclusions

Unit 1 operations staff properly prepared and authorized the clearance tagout for the Decay Heat Pump P34A maintenance activities. Operations personnel properly

positioned and locked all the associated valves impacted by the isolation of instrument air. The material condition of the opposite safety train, the Decay Heat Pump P34B system, was good and no other work in the area was ongoing that could adversely affect the system operability.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (62707, 71750)

The inspector observed all or portions of the following maintenance activities, as identified by the following maintenance activity instructions (MAI):

- MAI 7827, Replace Starter Motor KMA-4 on EDG 1, performed on April 29 (Unit 1)
- MAI 0618, Remove and replace Temperature Elements TE1423 and TE-1424, performed on April 28 (Unit 1)
- MAI 1259, Clean, inspect, and verify proper operation of Decay Heat Pump A bearing cooler inlet Valve CV-3840 performed on April 28 (Unit 1)
- MAI 5658, Remove, repack, and install RCS Letdown Flow Control Valve 2CV-4816 performed on May 12 (Unit 2)

b. Observations and Findings

During the maintenance activities, the inspector observed that the maintenance technicians were knowledgeable of the equipment and performed the activities using approved procedures in a safety conscious manner. The inspector noted good attention to detail by the maintenance craft performing the maintenance activities on RCS Letdown Flow Control Valve 2CV-4816. During disassembly of the valve, the maintenance craft obtained and provided needed information to the engineering staff concerning the condition of the valve's internals.

In general, the inspector observed good radiological worker practices during the maintenance activities, with the exception of the work performed on Decay Heat Pump P34A Bearing Cooler Inlet Valve CV-3840. Specifically, on April 28, the inspector observed that the technician performing the maintenance activities was utilizing latex gloves while reaching into the posted contamination area boundary. The inspector noted that the technician was coming in contact with the structural components inside the boundary with the skin on his bare forearms. Additionally, the inspector observed on several occasions that the maintenance technician brought his gloved hands back out of the posted contamination area without first removing the gloves.

The inspector brought this to the attention of the health physics technician who was covering the job. After being prompted by the inspector, the health physics technician requested that the worker leave the job site and frisk his arms for contamination. Fortunately, no contamination was found on the skin of the worker's forearms. The health physics technicians provided the maintenance technician with larger gloves before he returned to work again inside the contamination area boundary. Subsequently, due to the configuration of the equipment, the worker had to utilize a full set of anticontamination clothing to complete the work. The inspector informed health physics supervisory personnel concerning the observed poor work practices and the fact that the inspector had to prompt the health physics technician covering the job of the potential for worker contamination.

Health physics supervisory personnel initiated Radiological Information Report (RIR) 99-018. Health physics supervisory personnel informed the inspector that discussions with both the worker and the health physics technician had been performed, which emphasized the importance of correcting unsound radiation worker practices and of utilizing the proper tools for the job. However, during review of RIR 99-018, the inspector identified that health physics supervisory personnel had counseled the wrong maintenance technician. In fact, the inspector had observed that the maintenance technician that was counseled had displayed good radiation worker practices during observed maintenance activities. The inspector informed health physics supervisory personnel of the fact that they had counseled the wrong individual. Health physics supervisory personnel revised RIR 99-018 and subsequently counseled the correct individual.

c. Conclusions

Knowledgeable maintenance technicians used approved procedures to perform routine maintenance activities in a safety conscious manner. Maintenance craft demonstrated good attention to detail during the disassembly of RCS letdown flow control valve and obtained needed information to assist engineering staff in determining the reason for the failure of the valve's packing.

Poor radiation worker practices were demonstrated when a maintenance technician was observed reaching into a contamination area to perform work and was contacting structural components with his bare forearms. The health physics technician providing coverage for this work demonstrated a lack of attention to detail in that he had to be prompted by the inspector to ensure that the worker had not become contaminated.

M1.2 General Comments on Surveillance Activities

a. Inspection Scope (61726)

The inspector observed all or portions of the following surveillance activities:

- Procedure 2104.040, Revision 32, "Low Pressure Safety Injection (LPSI) System Operations," Supplement 2, "2P-60B Quarterly Test," performed on May 4, 1999 (Unit 2).

- Procedure 2104.036, Revision 42, "Emergency Diesel Generator Operations," Supplement 1B, "2DG1 Monthly Test (Slow Start)," performed on April 30 (Unit 2)

b. Observations and Findings

The inspector noted that these surveillance activities were performed in accordance with approved procedures by knowledgeable personnel using calibrated test equipment. The inspector observed that operations, maintenance, and engineering personnel demonstrated good communications and attention to detail during these surveillance activities when monitoring equipment performance both in the field and in the control room.

c. Conclusions

Operations, maintenance, and engineering personnel demonstrated good communications and attention to detail during the observed surveillance activities.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Stuck Spent Fuel Assembly During Loading of the Dry Storage Cask (Unit 1)

a. Inspection Scope (37551, 71707)

On May 22, 1999, the inspector observed the licensee activities to remove a stuck spent fuel assembly from a dry storage cask in the spent fuel pool.

b. Observations and Findings

On May 21, 1999, while operations personnel were loading the third spent fuel assembly for Dry Storage Cask 10, the assembly became stuck in the cask channel approximately 16 inches from the bottom. Engineering personnel contacted the vendor for assistance in evaluating the amount of force that could be used in extracting the stuck spent fuel assembly. After engineering personnel completed the evaluation, Procedure 1506.001, "Fuel and Control Component Handling, " Revision 18, was revised to include procedure instructions for removal of the stuck spent fuel assembly. The inspectors attended the Plant Safety Review Committee (PSRC) meeting that convened on May 22, 1999, to approve the procedure. Procedure 1506.001 provided instructions to allow up to 5000 lbs of force to be applied on the spent fuel pool bridge load cell vice 3000 lbs. The inspector observed that the PSRC members questioned engineering personnel extensively concerning the impact on the fuel assembly from the increase in applied force and the actions that would be taken if the assembly did not become dislodged with the additional applied force. Subsequently, the PSRC approved the procedure.

The inspector attended the prejob briefing that was conducted for removal of the stuck spent fuel assembly and found that the briefing was thorough and comprehensive and included all necessary precautions.

During removal of the stuck fuel assembly, the inspectors observed that operations personnel slowly hand cranked the assembly upward using the manual handwheel on the spent fuel pool bridge. The inspector also noted that reactor engineering personnel used underwater video cameras to observe the fuel assembly for any signs of damage as it was raised. Subsequently, operations and engineering personnel successfully dislodged the spent fuel assembly and returned it to the spent fuel storage pool.

c. Conclusions

The recovery of the Unit 1 spent fuel assembly that became stuck during loading of the Unit 1 dry cask on May 21, 1999, was well planned and executed by the engineering personnel involved. The prejob briefing for this recovery was comprehensive and thorough and included all necessary precautions.

E2.2 Main Turbine Governor and Throttle Valve EHC Servo Positioning Valve Failures (Unit 1) (37551, 71707)

On March 23, 1999, during a Unit 1 power reduction, Turbine Governor Valve 3 started cycling erratically. The licensee's staff determined that the EHC servo positioning valve had failed and it was replaced. On April 14, Turbine Throttle Valve 2 failed closed, again the EHC servo positioning valve was determined to have failed and it was replaced. To preclude any further Unit 1 plant transients caused by failures of these valves, the licensee staff determined that all six of the remaining turbine governor and throttle valve EHC servo positioning valves would be replaced and, as of April 24, all the valves were replaced.

However, on May 28, the Unit 1 operators observed erratic behavior of Governor Valve 3 and determined the newly replaced EHC servo positioning valve had degraded and the licensee again replaced this valve. The licensee had previously initiated Condition Report 1-1999-0077 for the first valve failure. However, the licensee staff determined that the condition report would be upgraded to significant and would require a formal root cause evaluation. At the end of this inspection period, the Unit 1 engineering staff was in the process of performing a formal root cause determination of the failures of the valves and to identify and address any generic issues concerning these valves.

The Unit 1 engineering staff sent samples of the EHC fluid to the manufacturer for analysis and determined that the EHC fluid was within its required specifications. The licensee also returned three of the EHC servo positioning valves to the valve manufacturer to have a failure analysis performed. During disassembly and inspection of the EHC servo positioning valve on site, the licensee's engineering staff identified a residue on the valve internals and subsequently sent it to the EHC fluid manufacturer's laboratory for analysis. At the end of the inspection period, the engineering staff was in

the process of performing a root cause determination and awaiting the results of the valve manufacturer's failure reports and the EHC fluid laboratory analysis reports.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 General Comments

a. Inspection Scope (71750)

The inspectors routinely observed the licensee's radiological controls to verify conformance with TS and procedures.

b. Observations and Findings

During routine tours of the plant and observations of plant activities, the inspector found that access doors to locked high radiation areas were properly locked and areas were properly posted. In general, health physics personnel provided good support and personnel demonstrated proper radiological work practices, with the exception of the poor radiological work practices and poor health physics support identified in Section M1.1 of this report.

c. Conclusions

Locked high radiation areas were properly secured and areas were properly posted in both Units 1 and 2 radiological controlled areas.

S1 Conduct of Security and Safeguards Activities

S1.1 Service Water Intake Structure Vital Area Barrier Walkdown (Units 1 and 2) (71750)

On May 7, 1999, during the Unit 2 Service Water Pump 2P4C system outage, the inspector noted that security personnel were properly posted while the vital area barrier was breached. The inspector observed that the posted security guard was properly relieved by another security guard before leaving the vital area barrier breach.

Management Meetings

X1 Exit Meeting Summary

The inspector presented the inspection results to members of the licensee's staff at the conclusion of the inspection on June 1, 1999. The licensee acknowledged the findings presented.

The inspector asked the licensee whether any material examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

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J. Bradford, Unit 2 Instrument and Controls Superintendent
B. Beard, Unit 2 Electrical Superintendent
B. Bement, Unit 2 Plant Manager
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B. Gordon, Unit 2 Mechanical Superintendent
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T. Weir, Manager, Business Services
D. Yates, Acting Unit 1 Electric Superintendent
C. Zimmerman, Unit 1 Pant Manager

INSPECTION PROCEDURES USED

37551	Onsite Engineering
61726	Surveillance Observations
62707	Maintenance Observations
71707	Plant Operations
71750	Plant Support Activities

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
EHC	electrohydraulic control
gpm	gallons per minute
MAI	maintenance activity instruction
NRC	Nuclear Regulatory Commission
PSRC	Plant Safety Review Committee
RCS	reactor coolant system
RIR	radiological information report
TS	Technical Specification