UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

February 12, 2001

Craig G. Anderson, Vice President,
Operations
Arkansas Nuclear One
Entergy Operations, Inc.
1448 S.R. 333
Russellville, Arkansas 72801-0967

SUBJECT: ARKANSAS NUCLEAR ONE - NRC INSPECTION REPORT 50-313/2000-15; 50-368/2000-15

Dear Mr. Anderson:

On December 30, 2000, the NRC completed an inspection at your Arkansas Nuclear One, Units 1 and 2 facility. The enclosed report documents the inspection results which were discussed on October 20, 2000 and January 9, 2001 with you and members of your staff.

The inspection examined Unit 2 steam generator replacement activities, conducted under your licenses, as they relate to safety and to compliance with the Commission's rules and regulations and with the conditions of your licenses. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

No findings of significance were identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

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

Sincerely,

/RA/

Linda Joy Smith, Chief
Project Branch D
Division of Reactor Projects

Dockets: 50-313
50-368
Licenses: DPR-51
NPF-6

Enclosure: Inspection Report 50-313/00-15, 50-368/00-15

Attachments:
(1) Supplemental Information
(2) NRC Revised Reactor Oversight Process

cc w/enclosure:
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Branch Chief, DRP/TSS **(PHH)**
RITS Coordinator **(NBH)**

<u>Only inspection reports</u> to the following:
Scott Morris **(SAM1)**
NRR Event Tracking System **(IPAS)**
ANO Site Secretary **(VLH)**
Dale Thatcher **(DFT)**

R:_ANO\2000\AN2000-15RP-KDW.wpd

RIV:RI:DRP/D	SRI:DRP/D	SPE:DRP/A	PE:DRP/E	SPE:DRP/E
KDWeaver	RLBywater	DBAllen	JFMelfi	GAPick
T-LJSmith	***E-LJSmith***	***T-LJSmith***	***/RA/***	***/RA/***
02/12/01	02/12/01	02/12/01	02/12/01	02/12/01
EMB	C:DRS/EMB	PSB	C:DRS/PSB	PE:DRP/D
JEWhittemore	CEJohnson	LTRicketson	GMGood	LMWilloughby
E-LJSmith	***/RA/***	***Unavailable***	***E-LJSmith***	***E-LJSmith***
02/08/01	02/12/01	02/ /01	02/08/01	02/09/01
C:DRP/D				
LJSmith				
/RA/				
02/12/01				

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Dockets:	50-313, 50-368
Licenses:	DPR-51, NPF-6
Report No.:	50-313/00-15, 50-368/00-15
Licensee:	Entergy Operations, Inc.
Facility:	Arkansas Nuclear One, Units 1 and 2
Location:	1448 S. R. 333 Russellville, Arkansas 72801
Dates:	October 1 through December 30, 2000
Inspectors:	R. Bywater, Senior Resident Inspector K. Weaver, Resident Inspector D. Allen, Project Engineer J. Melfi, Project Engineer G. Pick, Senior Project Engineer L. Ricketson, Senior Health Physicist J. Whittemore, Senior Reactor Inspector L. Willoughby, Project Engineer
Approved By:	Linda Joy Smith, Chief, Project Branch D Division of Reactor Projects

SUMMARY OF FINDINGS

Arkansas Nuclear One, Units 1 and 2
NRC Inspection Report No. 50-313/00-15; 50-368/00-15

IR 05000313-00-15, IR 05000368-00-15; on 10/01-12/30/00; Entergy Operations, Inc., Arkansas Nuclear One, Units 1 and 2. Integrated Resident and Regional Report; Unit 2 Steam Generator Replacement Activities.

This inspection was conducted by resident inspectors and regional-based inspectors and project engineers. The body of the report is organized under the broad categories of reactor safety, radiation safety, and other activities. The inspection activities were related to the replacement of the Unit 2 steam generators. The areas included in the inspections were as low as reasonably achievable (ALARA) planning, temporary plant modifications, postmaintenance and startup testing, lifting and rigging of heavy loads, welding, in-process nondestructive examination, and preservice inspection of components and piping related to the replacement of Unit 2 steam generators. No findings of significance were identified.

Report Details

Summary of Plant Status

Unit 1 operated at or near 100 percent power throughout the inspection period.

At the beginning of this inspection period, Unit 2 was shutdown in Refueling Outage 2R14. On December 7, 2000, Unit 2 operators made the reactor critical. On December 8, Unit 2 entered Mode 1. On December 19, following completion of startup testing, low power physics testing and steam generator replacement project postmodification testing, Unit 2 achieved 100 percent power. Unit 2 remained at 100 percent power at the end of the inspection period.

1. REACTOR SAFETY
Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R08 Welding and Examination Activities Related to Steam Generator Replacement (71111.08, 50001)

.1 Welding and In-Process Nondestructive Examination

a. Inspection Scope

The inspectors reviewed procedures and documentation associated with the Unit 2 steam generator replacement activities including nondestructive examination procedures, welding procedure specifications, procedure qualification records, welding material control, and postweld stress relief. The inspectors then observed the setup and performance of automatic welding operations for the Class 1 welds connecting the new steam generators to the reactor coolant system. At the one-third and two-thirds weldout points, the inspectors also observed the setup and performance of in-process radiography and liquid penetrant weld examination that was not required by either Sections III or XI of the ASME Boiler and Pressure Vessel Code. Finally, the inspectors reviewed a sample of the in-process nondestructive examination reports and film. The sample of in-process reports reviewed included examinations for weld passes that were ground out, rewelded, and reexamined.

b. Findings

No findings of significance were identified.

.2 ASME Boiler and Pressure Vessel Code, Section XI, Required Preservice Inspection Examinations

a. Inspection Scope

The inspectors reviewed a sample of the reports and film for the final radiography of the B Steam Generator Class 1 piping welds. The radiography was required by ASME Boiler and Pressure Vessel Code, Section III. Following weld stress relief, the inspectors observed the performance of nondestructive examinations conducted by contractors and licensee quality control personnel to meet the applicable ASME Boiler and Pressure Vessel Code, Section XI, requirements for preservice inspection, of the

B Steam Generator Class 1 piping welds. The inspectors verified that magnetic particle and ultrasonic testing were the examination methodologies required by Section XI.

The inspector's review further assessed the licensee's review and disposition of reportable indications identified during the ultrasonic and magnetic particle examinations for preservice inspection of the Class 1 piping welds. Finally, the inspectors also reviewed the licensee's procedure used for the ultrasonic examination and the licensee-approved contractor procedure for magnetic particle examination.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalifications (71111.11, 50001)

a. Inspection Scope

Prior to movement of the Unit 2 steam generators over safety-related equipment, the inspectors observed operations personnel conduct a full exercise of the required actions and continency measures specified in Procedure 2409.655, "Contingency Measures for Steam Generator Drop," Revision 0. This procedure outlined contingency measures that were necessary during movement of the Unit 2 original and replacement steam generators in the vicinity where damage to safety-related equipment could occur. This procedure also established the compensatory actions that operations personnel needed to perform for mitigating the consequences of a steam generator load drop event in accordance with the identified unreviewed safety question submitted to the NRC by letter dated September 17, 1999 (0CAN099903).

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing (71111.19, 50001)

.1 Unit 2 Startup Testing Activities

a. Inspection Scope

The inspectors reviewed the Startup Test Group organization and administrative controls. The inspectors reviewed the Unit 2 post steam generator replacement startup test program documentation and interviewed Startup Test Group engineers and supervisors to ascertain the scope of the test program. The inspectors noted that the licensee had compared the scope of the test program to the initial startup test program described in Chapter 14 of the Final Safety Analysis Report and the extent of the modifications performed during the steam generator replacement outage.

In addition, the inspectors reviewed the following test packages for procedure performance, step signoffs and test log entries for compliance with administrative controls, acceptability of test results, and implementation of corrective actions:

- Procedure 2409.657, "2R14 Startup Requirements," Revision 0
- Procedure 2409.671, "Inside Reactor Building Thermal Expansion Measurements/Walkdowns," Revision 0
- Procedure 2409.677, "Steam Generator Blowdown Testing," Revision 0
- Procedure 2409.678, "Spray Valve Bypass Valve Setting," Revision 0
- Procedure 2409.681, "Pressurizer Spray Effectiveness Test," Revision 0
- Procedure 2409.684, "Pressurizer Heat Loss Test," Revision 0

On December 6, 2000, the inspectors observed a meeting conducted by the Startup Test Working Group to verify that the group had adequate representation for a quorum and that the group appropriately identified and addressed any test result or test procedure deficiencies. Prior to the meeting, the inspectors had reviewed draft Procedure 2409.683, "Secondary Performance Testing," for procedure content and adequacy of acceptance criteria. During this meeting, the Startup Test Working Group reviewed and approved Procedure 2409.683, and the test results for the containment building structural integrity test, the integrated leak rate test, and the inside reactor building thermal expansion measurements and walkdowns.

b. Findings

No findings of significance were identified.

.2 Unit 2 Containment Structural Integrity and Integrated Leak Rate Test

a. Inspection Scope

The inspectors evaluated the controlling procedures for conduct of the structural integrity test and for conduct of the containment integrated leak rate test. In addition, the inspectors discussed the conduct of the test with responsible licensee personnel. The inspectors evaluated the tests to determine; (1) whether they met the requirements listed in the standards and regulations, and (2) if the tests could be performed as described with all data being taken. The inspectors also reviewed the finial test results to ensure acceptance criteria were met. The inspectors used the documents listed below during their review:

- Maintenance Action Item 31490 performed in accordance with Procedure 2409.693, “Unit 2 Personnel Airlock Structural Integrity Test 2R14,” Revision 0
- Procedure 5120.401, “Unit Two Integrated Leak Rate Test,” Revision 3

- Procedure 5120.405, “Unit Two Integrated Leak Rate Test Instrumentation Setup,” Revision 1

- Procedure 2409.664, “Unit 2 Containment Structural Integrity Test (SIT) and Code Pressure Test,” Revision 0

- Design Change ER991864E239R1, “Criteria for Unit 2 Containment Uprate SIT”

- ANSI/ANS-56.8-1994, “Containment System Leakage Testing Requirements”

- Regulatory Guide 1.163, “Performance-Based Containment Leak-Test Program,” September 1995 and NEI 94-01, “Industry Guidance for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J,” Revision 0

- Procedure 2305.036, "Operations Control of the Integrated Leak Rate Test," Revision 2

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23, 50001)

.1 Unit 2 Containment Building Temporary Opening

a. Inspection Scope

The inspectors reviewed the engineering design package for the temporary reactor building opening, verifying that the package contained the criteria (e.g., concrete compressive strength) that were specified in Section 3 of the Finial Safety Analysis Report. In discussions with the licensee, the inspectors determined that the new concrete mix design and placement practices were consistent with the American Concrete Institute (ACI) practices used during initial construction. The inspectors further reviewed the procedures for the possible use of cadweld splices. Since the licensee intended to reuse the liner plate, the inspectors observed portions of the torch cutting of the liner plate.

b. Findings

No findings of significance were identified.

.2 Containment Building Structural Integrity Test Equipment and Instrumentation Installation

a. Inspection Scope

The inspectors reviewed Procedure 2409.664, to determine the necessary temporary equipment and instrumentation and the specified installation locations necessary to measure the horizontal and vertical displacement of the containment building during the pressurization period of the containment building structural integrity test. The inspectors also walked down portions of this temporary equipment and instrumentation inside the Unit 2 containment building to verify that the equipment was properly installed at the specified locations on the interior of the containment building steel liner and dome.

b. Findings

No findings of significance were identified.

.3 Lifting and Rigging of Heavy Loads

a. Inspection Scope

The inspectors monitored and observed heavy load handling activities in and around safety-related equipment throughout the inspection period to ensure that the activities were conducted in accordance with the engineering analysis and applicable regulatory requirements. These activities included lifting, rigging and moving both the original and replacement steam generators inside and outside the Unit 2 containment building and to and from the original steam generator permanent storage facility.

b. Findings

No findings of significance were identified.

.4 Stationed Temporary Equipment Required for a Steam Generator Load Drop Event

a. Inspection Scope

The inspectors reviewed Procedure 2409.655, "Contingency Measures for Steam Generator Drop," Revision 0, and the staging of a temporary diesel fuel oil system to address the unreviewed safety question associated with a steam generator load drop event. This temporary diesel fuel oil system included two fuel oil tanker trucks located in an environmental coffer dam, electrically-driven transfer pumps, portable electrical generators, and hoses, valves and fittings necessary to install the temporary system to the Unit 1 emergency diesel generator fuel oil day tanks. The inspectors walked down the system to ensure that equipment staged in the Unit 1 emergency diesel generator rooms along with the equipment staged outside was the appropriate equipment identified in the plan and was properly staged at the correct locations. During the walk down, the inspectors verified that these temporary modifications and equipment did not adversely effect any necessary safety-related equipment. The inspectors also observed dry runs that demonstrated that assigned personnel were trained to make the final connections and run the system using the developed procedure.

b. Findings

No findings of significance were identified.

.5 Containment Building Walk Down and Restoration

a. Inspection Scope

The inspectors walked down the Unit 2 Containment Building prior to finial restoration to an operable condition. During this walk down, the inspectors verified that all previously installed temporary equipment, including lifting and rigging equipment, temporary laydown areas, and welding and testing equipment which could affect the design basis or the functional capability of containment was removed, and that the material condition of the containment building was restored.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY
Cornerstone: Occupational Radiation Safety

2OS2 ALARA Planning and Controls (71121.03, 50001)

a. Inspection Scope

The inspectors interviewed radiation workers and radiation protection personnel involved in high dose rate and high exposure jobs in the containment building during the steam generator replacement outage. Independent radiation surveys of selected work areas within the controlled access area were performed. The following items were reviewed and compared with regulatory requirements:

- ALARA program procedures
- Processes used to estimate and track exposures
- Radiation work permit packages for reactor coolant system cutting (2000-2206) and foreign object search and retrieval (2000-2209)
- Use of engineering controls to achieve dose reductions
- Individual exposures of selected work groups
- Radiological work planning
- Selected corrective action documentation involving higher than planned exposures and radiation worker practice deficiencies since the last inspection in this area
- Exposure controls including temporary shielding

- Contamination controls and radioactive material management
- Radiation protection staffing and training
- Emergency contingencies
- Radiological safety plans for storage of retired steam generators and components

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA5 Steam Generator Replacement Inspection (50001)

a. Inspection Scope

Throughout this inspection period, the inspectors reviewed and monitored steam generator replacement activities to verify that steam generator removal and replacement activities were safely performed and satisfied regulatory and license requirements. As part of this effort, the inspectors routinely monitored operating conditions, including refueling, reactor coolant system heatup and reactor startup, which encompassed reactor criticality and low power physics testing. The inspectors also routinely monitored safety-related system restorations and restoration of the temporary containment opening.

In addition, the inspectors monitored radiation protection controls, foreign material exclusion controls, fire protection controls, security considerations associated with vital and protected area barriers, and efforts to minimize any adverse impact on Unit 1.

b. Findings

No findings of significance were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

The inspectors presented the preliminary inspection results of the ALARA planning and controls inspection to Mr. R. Bement, General Manager, and other members of licensee management on October 20, 2000.

The inspectors presented the preliminary inspection results of resident inspections to Mr. C. Anderson, Vice President, and other members of licensee management, on January 9, 2001.

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

ATTACHMENT 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Anderson, General Manager, Plant Operations
G. Ashley, Technical Assistant to Vice President
B. Bement, General Manager
V. Bond, Unit 2 System Supervisor
R. Carter, Unit 2 Operations Assistant Manager
M. Cooper, Licensing Specialist
S. Cotton, Training/EP, Manager
R. Crowe, Unit 2 Mechanical Maintenance
N. Eggemeyer, Technical Support Manager
J. Eichenberger, Unit 1 Operations
J. Hoffpauir, Unit 2 Plant Manager
L. Humphrey, Unit 2 Steam Generator Radiation Protection
D. James, Licensing Manager
D. Lach, Design Engineering Supervisor
D. McKenney, Unit 1 System Engineering Supervisor
J. McWilliams, Steam Generator Replacement Project
D. Moore, ALARA Steam Generator Project Supervisor
T. Nickels, Radiation Protection Superintendent
R. Nielsen, Planning and Scheduling Outage Manager
K. Panther, Nondestructive Examination Specialist
D. Rassmusson, Radiation Protection Operations Supervisor
J. Smith, Radiation Protection Manager
D. Stoltz, Radiation Protection Supervisor
C. Tyrone, Manager, Quality Assurance Manager
J. Vandergrift, Director, Nuclear Safety
C. Zimmerman, Unit 1 Plant Manager

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

LIST OF DOCUMENTS REVIEWED

Procedures

NUMBER	DESCRIPTION	REVISION
NMM NDE9.04	Ultrasonic Examination of Ferritic Piping Welds (ASME Boiler and Pressure Vessel Code, Section XI)	2
SMP Section 1	Introduction and Instructions	5
SPM Section 2	Welding and NDE Matrices	5
SPM Section 3	Procurement and Control of Welding Filler Materials	4
SPM Section 4	Welder Performance Qualification Standards	15
SPM Section 5	General Welding Standards	9
SPM Section 6	Nondestructive Examination Standards	6
SPM Section 7	Post-Weld Heat Treatment Standards	2
SPM Section 8	Weld Documentation Requirements	3
SPM Section 9	Welding Procedure Specifications	6
SPM Section 10	Chemical Etching Procedure	1
1000.143	Control of Infrequently Performed Test or Evolutions	4
2103.018	RCS Flow Rate Calculation	7

Calculation

Calculation Number 94-E-0086-16, ANO-2 Replacement Steam Generator COLSS and CPC Flow Uncertainty Analysis, Revision 1

Nondestructive Examination Reports

200ISIUT057	200ISIUT062	RT-00-125	RT-00-130
200ISIUT058	200ISIUT081	RT-00-127	RT-00-132
200ISIUT059	MT-00-101	RT-00-128	RT-00-133
200ISIUT060	PT-00-037	RT-00-129	
200ISIUT061			

ATTACHMENT 2

NRC'S REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety	**Radiation Safety**	**Safeguards**
•Initiating Events	•Occupational	•Physical Protection
•Mitigating Systems	•Public	
•Barrier Integrity		
•Emergency Preparedness		

To monitor these seven cornerstones of safety, the NRC used two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: http://www.nrc.gov/NRR/OVERSIGHT/index.html.