



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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November 8, 2000

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

SUBJECT: NRC INSPECTION REPORT NO. 50-313/00-06; 50-368/00-06

Dear Mr. Anderson:

This refers to the integrated inspection conducted on April 2 through September 30, 2000, at the Arkansas Nuclear One, Units 1 and 2, facility. The enclosed report presents the results of this inspection. The results of this inspection were discussed with you and members of your staff in exit meetings on July 21, September 15, September 22, and October 4, 2000.

The inspection was an examination of 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. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations of activities, and interviews with personnel. Specifically, this inspection focused on the Unit 2 steam generator replacement activities.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be 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/

Phil H. Harrell, Chief
Project Branch D
Division of Reactor Projects

Entergy Operations, Inc.

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Docket Nos.: 50-313
50-368

License Nos.: DPR-51
NPF-6

Enclosure:

NRC Inspection Report No.
50-313/00-06; 50-368/00-06

cc w/enclosure:

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RITS Coordinator (**NBH**)

Only inspection reports to the following:

Tony McMurtray (**ACM2**)

NRR Event Tracking System (**IPAS**)

ANO Site Secretary (**VLH**)

Dale Thatcher (**DFT**)

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RIV:R:DRP/D	SRI:DRP/D	C:DRS/EMB	C:DRP/D	
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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.: 50-313/00-06; 50-368/00-06

Licensee: Entergy Operations, Inc.

Facility: Arkansas Nuclear One, Units 1 and 2

Location: 1448 S. R. 333
Russellville, Arkansas 72801

Dates: April 2 through September 30, 2000

Inspectors: R. Bywater, Senior Resident Inspector
K. Weaver, Resident Inspector
C. Johnson, Senior Reactor Inspector
P. Goldberg, Reactor Inspector
J. Whittemore, Senior Reactor Inspector
L. Willoughby, Project Engineer

Accompanying Personnel: R. Deese, Reactor Inspector

Approved by: Phil H. Harrell, Chief, Project Branch D
Division of Reactor Projects

ATTACHMENTS:

Attachment 1: Supplemental Information
Attachment 2: NRC's Revised Reactor Oversight Process

SUMMARY OF FINDINGS

Arkansas Nuclear One, Units 1 and 2
NRC Inspection Report 50-313/2000-06; 50-368/2000-06

50-313/00-06, 50-368/00-06; on 04/02-09/30/00; Entergy Operations, Inc., Arkansas Nuclear One, Units 1 & 2. Integrated Resident & Regional Report; Unit 2 Steam Generator Replacement Activities

The inspection report covers the integrated inspection activities related to the replacement of the Unit 2 steam generators for the period of April 2 through September 30, 2000. The report includes input from the resident inspectors and region-based inspectors who performed onsite baseline and supplemental inspections in areas that included steam generator replacement work activities. The areas included in the inspections were permanent and temporary plant modifications, lifting and rigging of heavy loads, and cutting, welding, and nondestructive testing. The significance of issues is indicated by their color (green, white, yellow, red) and was determined by the significance determination process in Inspection Manual Chapter 0609. However, there were no issues identified during the inspection.

Report Details

Summary of Plant Status

At the end of this inspection period, Unit 1 was at 100 percent power.

At the beginning of this inspection period, Unit 2 was at approximately 100 percent power. On September 15, 2000, Unit 2 operators commenced a plant shutdown for Refueling Outage 2R14, which includes replacement of both steam generators. Unit 2 remained shut down in Refueling Outage 2R14 at the end of this inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R02 Evaluation of Changes, Tests or Experiments (71111.02)

a. Inspection Scope

The inspectors reviewed nine 10 CFR 50.59 safety evaluations for the Unit 2 steam generator replacement project to verify that design changes and modifications made to systems, structures, and components described in the Final Safety Analysis Report were reviewed in accordance with 10 CFR 50.59 requirements. The licensee performed the safety analyses in support of modifications and engineering evaluations for replacement of the steam generators. In addition, the inspectors reviewed calculations and supporting analyses, procedures, and license amendment requests, which were generated to support the 10 CFR 50.59 safety evaluations. At the time of the inspection, the license amendment requests were not approved. The safety evaluations reviewed are listed in Attachment 1 under modifications and engineering requests. In addition, the calculations, supporting analyses, procedures, and license amendment requests are listed in Attachment 1.

The inspectors requested a list of changes, tests, or experiments for which the licensee had determined that evaluations were not required, to verify that the licensee's conclusions were valid. The licensee searched their data base and determined that there were none. In addition, the inspectors requested a list of condition reports which identified problems related to 10 CFR 50.59 safety evaluations to verify that the licensee was identifying problems related to these evaluations. Again, the licensee searched their data base and determined that there were none.

b. Issues and Findings

No significant findings were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors performed walkdowns of portions of the area surrounding the outside of the Unit 2 containment building and portions of the Unit 2 auxiliary building, where

safety-related equipment was located and steam generator work activities were ongoing. The inspectors assessed and verified proper fire protection controls of transient combustibles and operational status of fire barriers used to prevent fire propagation.

b. Issues and Findings

No significant findings were identified.

1R08 Inservice Inspection Activities (71111.08)

a. Inspection Scope

The inspectors reviewed the following areas associated with the Unit 2 steam generator replacement activities: (1) nondestructive examination procedures, (2) training and qualification/certifications records for contract welders and quality control inspectors, (3) contractor L-II and L-III nondestructive examiners certifications, (4) special procedures for welding and cutting, and (5) changes/revisions to the special process manual and, (6) ANO Unit 2 replacement steam generator eddy current baseline inspection results.

The inspectors performed field examinations of welding activities associated with Feedwater Elbow Welds FW-13C1 and FW-14C1 to verify proper alignment and welding preparations. The inspectors also reviewed radiographic film for Feedwater Elbow Welds FW-13C1, F14C1, and FW 13.05 and observed ultrasonic examinations performed for Welds FW-13C1 and FW-14C1.

The inspectors also evaluated the effectiveness of the licensee's corrective action process to identify and correct problems concerning the performance of inservice inspection activities related to Unit 2 steam generator replacement activities. In this effort, the inspectors reviewed condition reports and the subsequent corrective actions pertaining to licensee-identified problems and performance. The condition reports reviewed are listed in Attachment 1.

b. Issues and Findings

No significant findings were identified.

1R11 Licensed Operator Requalification - Quarterly (71111.11Q)

a. Inspection Scope

The inspectors reviewed and attended the Unit 2 Steam Generator Load Drop Contingency Plan classroom training activities that were conducted for the Unit 1 operators training.

b. Issues and Findings

No findings were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed the technical adequacy of the operability evaluation that was performed for Condition Report ANO-2-2000-0227, which documented that, during the Unit 2 containment building drilling operations for the tower crane anchor bolts, the drill core barrel struck a vertical rebar. This condition was identified when the Unit 2 containment building was required to be operable.

b. Issues and Findings

No significant findings were identified.

1R17 Permanent Plant Modifications (71111.17)

.1 Design Review

a. Inspection Scope

The inspection of permanent plant modifications for Unit 2 was conducted to review key design aspects and modifications related to the planned replacement of the Unit 2 steam generators. The inspection was done prior to the implementation of the modifications to verify that design changes associated with steam generator replacement would be completed in conformance with facility license requirements, licensing commitments and applicable codes, standards, and regulations.

The inspectors reviewed licensee procedures and policies governing plant modifications to evaluate the effectiveness of the licensee's programs for developing the modifications to replace the Unit 2 steam generators. The inspectors also reviewed specific change elements within the licensee's design change packages, which contained a number of smaller specific permanent plant modifications. In other words, one design change package may contain several setpoint changes or numerous miscellaneous piping changes. This provided a sample to verify that design changes were performed in accordance with plant procedures. Finally, the inspectors reviewed facility license amendment requests against the planned modifications to ensure the licensing bases would remain valid. Those procedures, permanent plant modifications, and amendment requests reviewed are listed in Attachment 1.

The inspectors conducted field walkdowns of temporary and permanent plant modifications that were either installed or in the process of installation outside of the containment building, but inside the protected area.

b. Issues and Findings

No significant findings were identified.

.2 Design Update Review

a. Inspection Scope

The inspectors reviewed the updating process for the licensee's design change process to verify that the planned modifications would be appropriately updated and revised. The inspectors verified that the licensee modification process would ensure modification package updating in response to changes in the regulations, codes, and standards and the facility license. In addition, it was verified that the design change process would cause the updating of design documents, drawings, procedures, and any monitoring programs, i.e., inservice testing, inservice inspection, leakage testing, and Appendix J to 10 CFR Part 50.

b. Issues and Findings

No significant findings were identified.

.3 Identification and Resolution of Problems

a. Inspection Scope

The inspectors verified that the licensee was identifying permanent plant modification issues related to the modifications for Unit 2 steam generator replacement at the appropriate threshold. Additional review was performed to evaluate the effectiveness of the licensee's corrective action process to correct the identified issues. To accomplish this task, the inspectors reviewed the condition reports and the related corrective actions for those reports listed in Attachment 1, pertaining to Unit 2 steam generator replacement.

b. Issues and Findings

No significant findings were identified.

1R22 Surveillance Testing and Inservice Testing (71111.22, 50001)

a. Inspection Scope

The inspectors reviewed work plans, interviewed personnel, and observed portions of the crane and rigging testing activities associated with the static load testing for the inside containment steam generator temporary lifting device to verify the equipment's operational capability.

b. Issues and Findings

No significant findings were identified.

1R23 Temporary Plant Modifications (71111.23, 50001)

a. Inspection Scope

The inspectors reviewed the applicable engineering design, modification, and analysis that was performed for the lifting and rigging activities associated with the Unit 2 steam generator replacement. This review included: (1) crane and rigging equipment, (2) the steam generator load drop analysis, and (3) safe load paths. The inspectors verified that any impact from load handling activities that could effect Unit 1 was evaluated and included in the engineering analysis.

The inspectors also observed portions of the load handling activities associated with the movement of the replacement steam generators from the barge to the storage facility.

b. Issues and Findings

No significant findings 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 defueling, reactor coolant system draindown, and applicable system isolation.

In addition, the inspectors routinely 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. Issues and Findings

No significant findings were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

The inspectors presented the preliminary inspection results of the permanent plant modifications inspection to Mr. B. Bement and other members of licensee management on July 21, 2000.

The inspectors presented the preliminary inspection results of the 10 CFR 50.59 safety evaluation inspection to Mr. C. Anderson, Vice President, and other members of the licensee staff on September 15, 2000.

The inspectors presented the results of the inservice inspection activities to Mr. C. Anderson, Vice President, and other members of the licensee staff on September 22, 2000.

The inspectors presented the results of the resident inspections to Mr. B. Bement and other members of the licensee staff on October 4, 2000.

The inspectors asked the licensee's management whether any materials examined during the inspection should be considered proprietary. It was determined that the inspectors had reviewed proprietary information associated with licensee contractor safety analysis in support of the steam generator replacement. However, this report contains no proprietary information reviewed and all of the proprietary information reviewed was returned to a licensee representative.

ATTACHMENT 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Anderson, Vice President, Operations
G. Ashley, Technical Assistant, Vice President
D. Barborek, Installation Lead, Steam Generator Replacement
B. Bement, General Manager, Plant Operations
M. Chisum, Manager, Unit 2 System Engineering
M. Cooper, Licensing Specialist
J. Crabill, System Engineer
A. Cox, Supervisor, Design Engineering
D. Edgell, Engineering Lead, Secondary Plant Uprate
N. Eggemeyer, Manager, Technical Support
C. Eubanks, Manager, Planning and Scheduling/Outage
J. Hathcote, Engineer, Steam Generator Replacement Project
D. Hawkins, Specialist, Licensing
J. Hoffpauir, Unit 2 Plant Manager
L. Humphrey, Project Manager, Steam Generator Replacement and Power Uprate
D. James, Manager, Licensing
J. Kowalewski, Manager, Unit 1 System Engineering
R. Lane, Director, Engineering
J. McWilliams, Manager, Steam Generator Replacement and Power Uprate
D. Nilius, Lead Engineer, Steam Generator Replacement
K. Panther, Nondestructive Examination Specialist
S. Pyle, Specialist, Licensing
J. Ray, Supervisor, Nondestructive Examination
R. Rispoli, Manager, Engineering Programs
M. Smith, Manager, Engineering Programs and Components
J. Taylor-Brown, Engineer, Steam Generator Replacement Project Fabrication
C. Tyrone, Manager, Quality Assurance
J. Vandergrift, Director, Nuclear Safety
D. Wagner, Supervisor, Quality Assurance
G. Woerner, Jr., Supervisor, Design Engineering

PARTIAL LIST OF DOCUMENTS REVIEWED

Condition Reports

CR-ANO-2-1998-0111	CR-ANO-2-2000-0121	CR-ANO-2-2000-0244
CR-ANO-2-1999-0215	CR-ANO-2-2000-0136	CR-ANO-2-2000-0245
CR-ANO-2-1999-0380	CR-ANO-2-2000-0142	CR-ANO-2-2000-0249
CR-ANO-2-1999-0470	CR-ANO-2-2000-0143	CR-ANO-2-2000-0330
CR-ANO-2-1999-0651	CR-ANO-2-2000-0170	CR-ANO-2-2000-0358
CR-ANO-2-1999-0779	CR-ANO-2-2000-0187	CR-ANO-2-2000-0360
CR-ANO-2-2000-0083	CR-ANO-2-2000-0195	CR-ANO-2-2000-0370
CR-ANO-2-2000-0095	CR-ANO-2-2000-0223	CR-ANO-2-2000-0382
CR-ANO-2-2000-0114	CR-ANO-2-2000-0227	CR-ANO-2-2000-0384
CR-ANO-2-2000-0118	CR-ANO-2-2000-0233	CR-ANO-2-2000-0399

Procedures

NUMBER	TITLE	REVISION
2104.033	Containment Atmosphere Control	39
5010.008	Review of Potentially Hazardous Seismic Category III/I Situations	0
6030.001F	Installation Plan	12
2311.002	Service Water System Flow Test	11
6060.001	Modification Package Closeout	9
PT(SR)ASME/XI	NDE Standard Liquid Penetration Exam	1
HES-28	ANO-2 Steam Generator Eddy Current Examination Guidelines	13
OEB2CS301	Radiographic Examinations	13
PI-AT-Lh (CVN+40F)	Welding Procedure	3
NDE 9.04	Ultrasonic Examination of Ferritic Piping Welds (ASME Section XI)	2

CP-02	ANO Unit 2 Steam Generator Replacement Project Construction Procedure, "Work Plan and Inspection Record"	1
CP-10	ANO Unit 2 Steam Generator Replacement Project Construction Procedure "Foreign Material Exclusion and Housekeeping"	1

Calculations

NUMBER	DESCRIPTION	REVISION
980642D202-03	Evaluation of Containment Opening for SGRP- Load Conditions and Allowable Stresses	0
91-E-0016-205	Pipe Stress Analysis of RSG Narrow Range-Upper and Lower Level Instrumentation Lines Inside the RB	1
980642D205-01	Detailed Heat Loss Calculation for the Thermal Insulation System for Replacement Steam Generators	0
89D-2053-05	DEFAS SG Narrow Range Level Response Times	2
93-EQ-2001-01	Loop Error Setpoint and Response Time Analysis for PPS Trip Functions and Loop Error Analysis for CPC Functions	4
89-E-0137-01	Service Water Flow to the Emergency Feedwater System	2
91-R-2013-01	Service Water Performance Test Methodology	6
92-E-0079-01	Determination of SW-Cooled Room Heat Loads Under Various Operating Conditions	1
95-E-0079-05	ANO-2 Feedwater Line Break with 2815 MWt Core, Replacement Steam Generators and Increased Pressurizer Volume	001-02-1
95-E-0080-05	Loss of Condenser Vacuum Analysis for RSG and Power Uprate	001-02-1
92-E-0078-02	Unit 2 HPSI System Pump Performance Requirements	02

Design Change
Packages

NUMBER	TITLE	REVISION
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974814D201	Install Containment Penetration Pressure Relief Devices	00
975122N201	High High Containment Pressure Isolation of Main Feedwater	00
980547N202	Steam Generator Replacement/Power Uprate Related Setpoint Changes for DEFAS	01
980547N203	Steam Generator Replacement/Power Uprate Instrument Range/Setpoint Changes for FWCS	00
980547N203	Steam Generator Replacement /Power Uprate Instrument Range/Setpoint Changes for RRS	00
980642D202	Containment Construction Opening	00
980642D203	Steam Generator Replacement Project Rigging and Handling - Identification of Safe Load Path for Original and Replacement Steam Generators	09
980642D203	Steam Generator Replacement Project Rigging and Handling - Installation and Testing of Special Lifting Equipment	09
980642D203	Steam Generator Replacement Project Rigging and Handling - Postulated Dropped Load	09
980642D205	ANO-2 SGR Project - Thermal Insulation Changes	00
980642D207	ANO-2-SGR Project - Steam Generator Replacement	00
980642D209	ANO Steam Generator Replacement - Support Modification	00
980642D209	ANO Steam Generator Replacement - Level Instrument Piping Modification	00
980642D209	ANO Steam Generator Replacement - Steam Generator Sample Piping Modification	00
980642D209	ANO Steam Generator Replacement - Steam Generator Blowdown Piping Modification	00
980642D210	ANO-2 SGRP - Replacement Steam Generator Design/Qualification	00
981243N201	Steam Generator Blowdown System Heat Exchanger Replacement	00

991322N201	Containment Cooler Chill Water Coil Replacement	00
991322N201	Containment Cooler Fan Blade Pitch Modification	00
981243N201	Steam Generator Blowdown System Heat Exchanger Replacement	00
991322N201	Containment Cooler Chill Water Coil Replacement	00

Engineering Requests/Modifications

NUMBER	TITLE	REVISION
ER962006N205	Nuclear Change Package to Replace Seals on the Remaining 2WR20 Series Amphenol Sams Modules that Still Have Seals	00
ER002328E201	Containment Spray and ECCS System Review for Steam Generator Replacement	01
ER991864E221	Equipment Qualification Inside Containment	01
ER991864E217	HPSI Effects Due to Containment Pressure Increase to 59 psig	00
ER991864E213	Motor Operated Valves Effects Due to Containment Pressure Increase to 59 psig	00
ER991864E233	Auxiliary Building HVAC Effects Due to Containment Pressure Increase to 59 psig	00
ER991864N201	Containment Uprate from 54 to 59 psig	00
ER991864E220	Evaluation of ANO-2 Electrical Penetrations due to Containment Pressure Increase to 59 psig	00
ER002393E201	Evaluation of Emergency Feedwater and Condensate Storage Systems for Steam Generator Replacement	01
ER991864E227	Evaluation of ECP Peak Temperature and 30-Day Inventory Analysis to Incorporate Effects of Containment Uprate, Replacement Steam Generators, and Power Uprate	00

Work Plan and Inspection Records (WP&IR)

NUMBER	TITLE
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WP&IR P-PSA-113 Primary Side RSG Preps
Steam Generator A

WP&IR P-PSA-114 Primary Side RSG Preps Steam Generator A

WP&IR P-PSA-115 Primary Side RSG Preps Steam Generator B

WP&IR P-PSA-116 Primary Side RSG Preps Steam Generator B

Miscellaneous
Documents

NUMBER	DESCRIPTION	REVISION/ DATE
A-AN-ST-0030	ANO-2 NSSS Control System Contractor Setpoint Evaluation for Cycle 15	00
OCAN099903	Request for NRC Review of Steam Generator Load Handling Under 10CFR50.59	09/17/1999
2CAN060003	Technical Specification Request for ANO-2 Containment Cooling System	06/29/2000
2CAN060010	Response to Request for Additional Information Regarding ANO-2's Steam Generator Load Handling License Amendment Request	06/29/2000
OCAN010004	Proposed Amendment Condensate Storage Tank Volume Technical Specifications	01/27/2000
2CAN119903	Proposed Amendment for Technical Specification Change Request Supporting containment Building Design Pressure Increase to 59 psig	11/03/1999
2CAN119901	Proposed Technical Specification Changes and Resolution of Unreviewed Safety Question Associated with Applicable Limits and Setpoints Supporting Steam Generator Replacement	11/29/1999
SPS-1	Bechtel Special Process Standard, "Steam Generator Replacement Project"	Revision 1
WM-ER70S-6 (CVN)	Bechtel Special Process Manual Section 3	
WM-ER7018 (CVN)	Bechtel Special Process Manual Section 3	
RT-00-073	Bechtel Radiographic Quality Report ANO2 Replacement Steam Generator Eddy Current Baseline Inspection Results	

CONAM Employee Certification Records

Bechtel Employee L-II and L-III Certification
Records

Raytheon Employee Certification Records