UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

November 7, 2017

EA-16-247

Mr. Richard L. Anderson
Site Vice President
Entergy Operations, Inc.
Arkansas Nuclear One
1448 S.R. 333
Russellville, AR 72802-0967

SUBJECT: ARKANSAS NUCLEAR ONE – NRC SUPPLEMENTAL INSPECTION REPORT 05000368/2017016

Dear Mr. Anderson:

On September 18 through October 6, 2017, the Nuclear Regulatory Commission (NRC) performed a supplemental inspection using Inspection Procedure 95001, "Supplemental Inspection Response to Action Matrix Column 2 Inputs." Because significant weaknesses were identified during this inspection, the White finding will remain open and continue to receive consideration as an Action Matrix input until the NRC verifies that all inspection objectives have been met. On October 6, 2017, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection activity are documented in the enclosed report.

The NRC performed this inspection to review your station's actions in response to a White finding in the Mitigating Systems Cornerstone which was documented in NRC Inspection Report 05000368/2016011 on January 19, 2017, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17019A288), and finalized in NRC Inspection Report 05000368/2017014 on February 27, 2017, (ADAMS Accession No. ML17055A727). This finding involved the failure to provide adequate lubrication to the Unit 2 emergency diesel generator A inboard generator bearing.

On August 9, 2017, you informed the NRC that Arkansas Nuclear One, Unit 2, was ready for the supplemental inspection.

The NRC performed this supplemental inspection to determine if: (1) the root and contributing causes of the significant performance issues were understood; (2) the extent of condition and extent of cause for the significant performance issues were identified; (3) the corrective actions taken to address and preclude repetition of significant performance issues were prompt and effective; and (4) the corrective action plans direct prompt actions to effectively address and preclude repetition of significant performance issues.

The NRC reviewed the root and contributing causes that your staff identified for the White finding and concluded that a significant weakness existed because the evaluation was not of sufficient depth to ensure that the significant performance issues were fully understood as described in Objective 1 of Inspection Procedure 95001. Therefore, the NRC concluded that inspection Objective 1 was not met. Specifically, your staff's evaluation identified that the work planning function contributed to the failure, that the potential risk associated with the intended work was not understood, and that appropriate vendor technical information was not included in the work instructions. However, the causes for these items were not identified. In addition, the NRC identified that your staff did not evaluate the adequacy of the process for review, approval, and supervision of maintenance work. The process for ensuring that work instruction details are appropriate for the skill of the craft who would perform the work was also not evaluated.

The NRC also identified significant weaknesses associated with the extent of condition and extent of cause reviews because they did not adequately determine whether vulnerabilities exist in other plant components and other work instructions similar to the deficiency found with the Unit 2 emergency diesel generator A. For example, the extent of condition evaluation focused on large pumps and motors with oil sight glasses and did not include a review of the adequacy of lubrication practices for equipment lubricated by means other than lube oil to function properly. The NRC also determined that the extent of cause evaluation did not consider whether a lack of technical detail and vendor information existed for procedures and work orders for components without sight glasses. Therefore, the NRC concluded that inspection Objective 2, which requires proper identification of the extent of condition and extent of cause, was not met.

The NRC concluded that your staff implemented appropriate corrective actions to address the root and contributing causes that were identified. However, additional corrective actions may need to be developed once the cause evaluation, the extent of condition review, and the extent of cause review are completed. As a result, an assessment of inspection Objectives 3 and 4 will also be performed for any new aspects developed by your staff in a future NRC supplemental inspection.

Based on the significant weaknesses identified in this inspection, the White finding will remain open and continue to receive consideration as an Action Matrix input until the NRC verifies that all inspection objectives have been met. In order to meet the inspection objectives, the cause evaluation, the extent of condition and extent of cause evaluations should be revised to address the significant weaknesses described in the enclosed inspection report. We request that you notify the NRC of your readiness for a re-inspection when this and any other associated actions have been completed.

The NRC inspectors did not identify any finding or violation of more than minor significance.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Troy W. Pruett, Director
Division of Reactor Projects

Docket No. 50-368
License No. NPF-6

Enclosure:
Inspection Report 05000368/2017016
w/ Attachment: Supplemental Information

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	05000368
License:	NPF-6
Report:	05000368/2017016
Licensee:	Entergy Operations, Inc.
Facility:	Arkansas Nuclear One, Unit 2
Location:	Junction of Highway 64 West and Highway 333 South Russellville, Arkansas
Dates:	September 18 through October 6, 2017
Inspectors:	Frances Ramirez, Senior Resident Inspector, Lead Inspector Margaret Tobin, Resident Inspector
Approved By:	Troy W. Pruett, Director Division of Reactor Projects

Enclosure

SUMMARY

Inspection Report 05000368/2017016; 09/18/2017 - 10/06/2017; Arkansas Nuclear One, Unit 2; Supplemental Inspection - Inspection Procedure 95001

This supplemental inspection was conducted by a senior resident inspector from the Waterford Steam Electric Station and a resident inspector from Arkansas Nuclear One. The significance of most findings is indicated by their color (i.e., Green, White, Yellow, or Red), which is determined using the Nuclear Regulatory Commission Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Their cross-cutting aspects are determined using IMC 0310, “Aspects Within the Cross-Cutting Areas,” dated December 4, 2014. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," dated July 2016.

Cornerstone: Mitigating Systems

The NRC staff performed this supplemental inspection in accordance with Inspection Procedure 95001, “Supplemental Inspection Response to Action Matrix Column 2 Inputs,” to assess the licensee’s evaluation of a White finding associated with the failure to provide adequate lubrication for the inboard bearing of the Unit 2 emergency diesel generator A. As a result, the bearing overheated and caused the emergency diesel generator to fail on September 16, 2016, during a 24-hour endurance test. The licensee identified that the root cause was that work orders for the Unit 2 emergency diesel generator A did not include vendor guidance and detailed instructions commensurate with the level of risk associated with working on equipment important to safety. The licensee also identified that a contributing cause was that maintenance technicians and supervision demonstrated inadequate maintenance fundamentals. The licensee’s evaluation identified that the work planning function contributed to the failure, that the potential risk associated with the intended work was not understood, and that appropriate vendor technical information was not included in the work instructions. However, the inspectors noted that the causes for these items were not identified. The inspectors also identified that the licensee did not evaluate the adequacy of the process for review, approval, and supervision of maintenance work. The process for ensuring that work instruction details are appropriate for the skill of the craft who would perform the work was also not evaluated. Therefore, the NRC concluded that inspection Objective 1 was not met because the licensee did not assure that the root and contributing causes for the significant performance issues were fully understood.

The NRC determined that the licensee’s extent of condition and extent of cause reviews did not adequately determine whether vulnerabilities exist in other plant components and other work instructions similar to the significant performance issues identified with the Unit 2 emergency diesel generator A. For example, the extent of condition evaluation focused on large pumps and motors with oil sight glasses and did not include a review of the adequacy of lubrication practices for equipment lubricated by other means or in other types of components (e.g., Unit 1 emergency diesel generators, fans, motor-operated valves, and motors). The NRC also determined that the extent of cause evaluation did not consider whether a lack of technical detail and vendor information existed for procedures and work orders for components without sight glasses. Therefore, the NRC concluded that inspection Objective 2 was not met because the licensee did not assure that the extent of condition and extent of cause of the significant performance issues were fully identified.

The inspectors noted that the licensee completed corrective actions to revise the Unit 2 emergency diesel generators' operating and surveillance testing procedures to include steps to check the inboard and outboard sight glass scribe mark locations against specific measurements with respect to the distance between the sight glass marks and the bearing housing or the floor. In addition, the licensee placed information labels at the end-bells of both Unit 2 emergency diesel generators to state that if the sight glass or associated piping is disturbed, the mark must be verified per the revised surveillance procedure. Additional corrective actions may need to be developed during further reviews needed to address the significant weaknesses associated with the cause evaluation and the extent of condition and extent of cause reviews.

As a result of the significant weaknesses associated with the root cause determination and the extent of cause and extent of condition reviews, the White finding associated with the failure to ensure adequate lubrication for the Unit 2 emergency diesel generator A inboard bearing is being held open and will continue to receive consideration as an Action Matrix input.

Findings

No findings of significance were identified.

REPORT DETAILS

4. OTHER ACTIVITIES

4OA4 Supplemental Inspection (95001)

.01 Inspection Scope

The NRC performed this supplemental inspection in accordance with Inspection Procedure 95001, "Supplemental Inspection Response to Action Matrix Column 2 Inputs," to assess the licensee's evaluation of a White finding, which affected the Mitigating Systems Cornerstone in the reactor safety strategic performance area. The inspection objectives were to:

- Objective 1: To assure that the root and contributing causes of significant performance issues were understood;
- Objective 2: To independently assess and assure that the extent of condition and extent of cause of significant performance issues were identified;
- Objective 3: To assure that corrective actions taken to address and preclude repetition of significant performance issues were prompt and effective;
- Objective 4: To assure that corrective action plans directed prompt actions to effectively address and preclude repetition of significant performance issues.

On February 27, 2017, the NRC issued Inspection Report 05000368/2017014 (ADAMS Accession No. ML17055A727), to document the final significance determination for the failure to provide adequate lubrication for emergency diesel generator A in Unit 2. On November 11, 2014, and June 22, 2016, while performing work on the emergency diesel generator A in Unit 2, the licensee failed to provide adequate work instructions for maintenance on the inboard generator bearing such that the minimum bearing oil level was correctly marked and maintained. As a result, the bearing overheated and caused the emergency diesel generator to fail on September 16, 2016, during a 24-hour endurance test. The extent of the damage from the failure led to shutting down Unit 2 to comply with technical specifications. The NRC characterized the finding as having low to moderate (White) safety significance.

On August 9, 2017, the licensee informed the NRC that they were ready for the supplemental inspection. In preparation for this inspection, the licensee performed a root cause evaluation under Condition Report CR-ANO-2-2016-03307. The licensee provided Revision 1 of the Root Cause Evaluation Report, "2K-4A EDG Inboard Bearing Failure," dated August 22, 2017, to the inspectors for review.

The inspectors reviewed the licensee's root cause evaluation and supplemental information that the licensee provided during the inspection period. The inspectors held discussions with licensee personnel to determine if the root cause, contributing cause and the contribution of safety culture components of the issue were understood, and that corrective actions taken or planned were appropriate to address the causes and preclude repetition. The inspectors also performed plant walkdown activities, which included a field demonstration of measuring the correct oil sight glass scribe mark level

in the Unit 2 emergency diesel generator inboard bearing sight glass, and an inspection of other safety-related components with a similar sight glass configuration.

.02 Evaluation of the Inspection Requirements

.02.01 Root and Contributing Cause Evaluation (Objective 1)

a. Scope

The inspectors verified that the evaluation documented who identified the issue, which was self-revealed, and under what conditions the issue was identified. The inspectors determined that the evaluation documented how long the issue existed and prior opportunities for identification. The inspectors also determined that the evaluation documented significant plant-specific consequences and compliance concerns associated with the issue.

b. Assessment

The licensee evaluated the Unit 2 emergency diesel generator A (2K-4A) inboard bearing failure and identified one root and one contributing cause for this event. Specifically, the licensee's evaluation determined that the root cause of this event was that Unit 2 emergency diesel generator A work orders did not include vendor guidance and detailed instructions (e.g. critical measurements and critical steps) commensurate with the level of risk associated with working on equipment important to safety. The licensee determined that the contributing cause was that relay craft and supervision demonstrated inadequate maintenance fundamentals in the areas of control and knowledge as defined by Procedure EN-MA-100, "Maintenance Fundamentals Procedure," Revision 2.

Significant Weakness Number 1

The inspectors noted that the significant performance issues were not fully understood by the licensee. The inspectors noted that the organizational and programmatic evaluation, which the licensee performed as part of the root cause evaluation, identified that personnel involved in work planning lacked an understanding of the risk significance associated with changing the oil in an emergency diesel generator bearing sight glass. Specifically, they did not consider the potential consequences of failing to successfully complete the work as intended. After assessing the planning function, the inspectors noted that when writing the work order to replace the oil sight glass, the planner had assumed a level of skill of the craft of the maintenance workers that wasn't validated prior to finalizing the work instructions. As a result, work orders associated with Unit 2 emergency diesel generator A did not include sufficient vendor guidance and detailed instructions to ensure the task was completed as intended. During interviews with work planners, the inspectors noted that the planning group still assumed a high level of skill in the maintenance workers when planning tasks that were perceived as simple. Further, the licensee did not consider potential corrective actions to ensure that the work instructions are appropriate to the circumstances by accounting for the skill of the workers and the potential risk and consequences of not being successful when accomplishing a task.

The inspectors noted that the licensee did not evaluate the adequacy of the process for review, approval, and supervision of maintenance work. The process for ensuring that work instruction details are appropriate for the skill of the craft who would perform the work was also not evaluated. Therefore, the inspectors concluded that some relevant factors that contributed to the performance issue, such as the impact of other programs and organizations, were not explored.

As a result of significant weakness number 1, the inspectors concluded that the licensee did not achieve an adequate understanding of the causes for the significant performance issues, and therefore Objective 1 was not met.

c. Findings

No findings of significance were identified.

.02.02 Extent of Condition and Extent of Cause Evaluation (Objective 2)

a. Scope

The inspectors verified that the significant performance issues were evaluated using a systematic methodology. The inspectors evaluated whether the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem, and that it included a consideration of prior occurrences of the problem and knowledge of prior operating experience. Additionally, the inspectors assessed whether the root cause evaluation addressed the extent of condition and the extent of cause associated with the significant performance issues, and assessed whether the licensee appropriately considered safety culture traits in NUREG-2165, “Safety Culture Common Language,” referenced in Inspection Manual Chapter 0310, “Aspects within Cross-Cutting Areas,” dated December 4, 2014. The licensee did not perform a common cause analyses for potential programmatic weaknesses in performance since only one White finding currently exists in the affected cornerstone.

b. Assessment

The inspectors determined that the licensee conducted a root cause evaluation using systematic methodologies. In addition, the inspectors determined that the root cause evaluation included a consideration of prior occurrences of the problem and knowledge of prior operating experience. The operating experience search included oil and other types of component lubrication and other types of failure mechanisms, such as pump oil bubbler failures.

The licensee’s root cause evaluation included a review of whether weaknesses in any safety culture aspect contributed to the significant performance issue. The root cause evaluation identified weaknesses in five safety culture aspects that were related to the identified causes. Within the area of human performance, weaknesses in the aspects of work management were identified due to the planning function not identifying and managing the risk associated with the task, as well as documentation for not creating and maintaining documentation commensurate with safety components. The resources aspect was also impacted due to the planning supervisor not ensuring the work instructions were adequate for the work being performed. Within the area of supplemental cross-cutting aspects, two weaknesses were identified. The licensee

identified a weakness in standards because individuals did not exercise personal accountability for shortfalls in meeting standards, and in job ownership because individuals did not understand and demonstrate personal responsibility for the behaviors and work practices that support nuclear safety. The inspectors concluded that there were significant weaknesses in the extent of condition and extent of cause reviews.

Significant Weakness Number 2

The licensee's extent of condition review did not fully assess the adequacy of lubrication in other plant equipment. The inspectors noted that the scope of the licensee's review was limited to major oil-lubricated pumps and motors with sight glasses, and did not address safety-significant equipment lubricated by other means or other important equipment that relies on proper lubrication to function properly, such as the Unit 1 emergency diesel generators, the security diesel generator, fans, motor-operated valves, and motors. During the inspection, the licensee extended the review to include several of these categories, but did not adequately extend it to all categories.

The inspectors concluded that a significant weakness in the licensee's extent of condition evaluation existed because the review did not cover an adequate population of risk-significant equipment where adequate lubrication is necessary to support the function and mission time of safety-significant equipment. In addition, the licensee's review did not include a sample of different types of components to determine whether there are adequate program controls and detailed work instructions to ensure adequate lubrication. As a result of significant weakness number 2, the inspectors concluded that Objective 2 was not met.

Significant Weakness Number 3

The licensee's extent of cause review focused on whether adequate technical and vendor manual instructions were provided for the same limited list of equipment considered in the original extent of condition review. The licensee did not consider whether a lack of technical detail and vendor information existed for procedures and work orders for components without oil sight glasses.

The inspectors noted that consideration of risk insights was not readily apparent in the selection of the licensee's scope of review for the extent of cause activities. For example, electrical systems are top risk contributors, yet consideration of electrical systems was not documented in the extent of condition and extent of cause evaluations. As a result, the list of equipment that the licensee evaluated and work instructions that the licensee sampled were not sufficiently risk-informed to ensure that the results represented a reasonable breadth of review.

The inspectors concluded that a significant weakness in the licensee's extent of cause review existed because this review did not include a sufficiently broad sample of procedures for components in risk-significant systems to determine if the procedures and work instructions for risk-significant systems and components have adequate program controls and detailed work instructions. In addition, the licensee did not consider whether the lack of recognition of potential consequences, the lack of detailed work instructions, or the lack of vendor manual information was present in other activities

with the potential to create risk-significant consequences if not properly performed. As a result of significant weakness number 2, the inspectors concluded that Objective 2 was not met.

c. Findings

No findings of significance were identified.

.02.03 Corrective Actions Taken (Objective 3)

a. Scope

The inspectors reviewed the licensee's root cause evaluation to assess whether appropriate corrective actions were specified for each root and contributing cause or that the licensee had an adequate evaluation for why no corrective actions were necessary. The inspectors also assessed whether the corrective actions had been prioritized with consideration of the significance and regulatory compliance. The inspectors evaluated whether the corrective actions taken to address and preclude repetition of significant performance issues were prompt and effective, and whether the Notice of Violation related to the supplemental inspection was adequately addressed.

b. Assessment

The licensee's root cause evaluation identified a number of corrective actions. Revision 33 to Procedure OP-2403.007, "Unit 2 2K4A/2K4B Emergency Diesel Generator Surveillance," was implemented to include detailed steps to verify that the inboard and outboard sight glass scribe mark locations are in the correct locations. This check is required when any maintenance is performed that may affect the scribe mark location. Labels were also installed at the end-bells of both Unit 2 emergency diesel generators that state that if the sight glass or associated piping is disturbed, the mark must be verified per Procedure OP-2403.007.

Additional corrective actions taken included revising the model work orders for the Unit 2 emergency diesel generators to ensure as-left measurements of the sight glass are taken per Procedure OP-2403.007 following any adjustments; provide training on identifying critical measurements to in-house maintenance personnel, in-house planners, and their respective supervision; benchmarking a high performing station in the work order planning area; performing a work release challenge board of work instruction associated with critical maintenance during the Unit 1 Refueling Outage 26, the Unit 2 unplanned Outage 16-03, and the Unit 2 Refueling Outage 25; and temporarily assigning oversight personnel to the maintenance shops to strengthen maintenance fundamentals and provide feedback. The licensee also developed a "maintenance fundamentals blitz" to ensure previous corrective actions on maintenance fundamentals had been effective. The inspectors reviewed the implementation of these corrective actions which are documented in Condition Report CR-ANO-2-2016-03307, Corrective Action Nos. 22 through 39, 44, and 58 through 60.

The inspectors reviewed the existing corrective actions, and determined that they had been prioritized and completed with consideration of the significance and regulatory compliance. In addition, the inspectors concluded that by completing the corrective actions to prevent recurrence listed above, the licensee restored compliance from the

NRC Notice of Violation issued on February 27, 2017, for the failure to ensure adequate lubrication to the inboard generator bearing so that the Unit 2 emergency diesel generator A would be capable of performing its safety function for the intended mission time. The Notice of Violation was documented in NRC Inspection Report 05000368/2017014. However, the inspectors noted that additional corrective actions may be developed when the licensee performs the evaluations needed to address the significant weaknesses detailed above. As a result, any new corrective actions and the assessment of this objective will be evaluated in a future NRC supplemental inspection.

c. Findings

No findings of significance were identified.

.02.04 Corrective Action Plans (Objective 4)

a. Scope

The inspectors reviewed the licensee's root cause evaluation to assess whether appropriate corrective action plans were specified for each root and contributing cause or that the licensee had an adequate evaluation for why no corrective actions are necessary. The inspectors also assessed whether the corrective actions had been prioritized with consideration of the significance and regulatory compliance. The inspectors evaluated whether the corrective action plans to address and preclude repetition of significant performance issues were prompt and effective, appropriate quantitative or qualitative measures of success have been developed for determining the effectiveness of planned corrective actions.

b. Assessment

The inspectors noted that the licensee established a schedule for implementing and completing the corrective actions. The inspectors noted that all corrective actions for this issue had been completed with the exception of the corrective actions created as a result of responding to concerns raised during this supplemental inspection. The licensee created corrective actions during this inspection to perform a review of procedures and model work orders associated with systems with high safety significance. This evaluation will assess the degree that the root cause, which is associated with insufficient work instructions or missing vendor manual guidance, may exist in procedures and work orders for equipment other than ones with a sight glass and oil lubrication. The licensee will perform this evaluation using a sampling process, and expand the sample as necessary based on the results. The licensee also planned to assess the degree that the actual condition of inadequate lubrication, in addition to components containing a sight glass, may exist in other plant equipment. This will include a review of other types of lubricated components.

The licensee's revised corrective action plans also included extending training to ensure that personnel on site understand risk and skills necessary to perform a task, as well as extending training of maintenance fundamentals to craft in other departments. In addition, the licensee plans to evaluate the lack of fundamentals in other site departments. The licensee documented these planned actions into the corrective action program in as Condition Reports CR-ANO-C-2017-03620, CR-ANO-C-2017-03619,

CR-ANO-C-2017-03618, CR-ANO-C-2017-03672, CR-ANO-C-2017-03621, as well Condition Report CR-ANO-2-2016-03307, Corrective Action Nos. 67 through 73.

The inspectors reviewed the existing corrective actions plans and determined that they have been prioritized to be completed with consideration of the significance and regulatory compliance. The inspectors also determined that the licensee had developed effectiveness review plans for the corrective actions to prevent recurrence. However, the inspectors noted that additional corrective actions may be developed when the licensee performs the evaluations needed to address the significant weaknesses detailed above. As a result, any new corrective action plans and the assessment of this objective will be evaluated in a future NRC supplemental inspection.

c. Findings

No findings of significance were identified.

.02.05 Evaluation of Inspection Manual Chapter 0305 Criteria for Treatment of Old Design Issues

The licensee did not request credit for self-identification of an old design issue; therefore, the risk-significant issue was not evaluated against the Inspection Manual Chapter 0305, "Operating Reactor Assessment Program," dated November 17, 2016, criteria for treatment of an old design issue.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On October 6, 2017, the inspectors presented the inspection results to Mr. R. Anderson, Site Vice President, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

R. Anderson, Site Vice President
L. Blocker, Recovery Director
G. Brown, Security Manager
J. Bryan, MTS/Projects Acting Manager
P. Butler, Design Engineering Manager
B. Casey, Planning
D. Caudwell, Planning
B. Daiber, Engineering Manager
B. Davis, Engineering Director
D. Demoret, Planning
D. Edgell, Recovery Manager
B. Egnew, Regulatory Assurance Specialist
T. Evans, Assistant to the Site Vice President
A. Foster, Engineer
C. Garbe, PI-CAP Manager
J. Grove, Maintenance Superintendent
M. Halter, Licensing Director
E. Hudson, Engineer
K. Hutchings, Recovery Consultant
G. Kilpatrick, Training Manager
J. Kirkpatrick, General Manager, Plant Operations
L. Marvin, Employee Concerns Program Coordinator
S. Morris, Chemistry Manager
E. Nicholson, PI Manager
L. Nietert, OE Specialist
C. O'Connor, Planning
B. Pace, Production Manager
B. Patrick, Maintenance Manager
R. Penfield, Regulatory Affairs and Performance Improvement Director
M. Phalen, Radiation Protection Manager
L. Phillips, Communications Specialist
S. Pyle, Regulatory Assurance Manager
T. Sherrill, Emergency Preparedness Manager
M. Skartvedt, System Engineering Manager
M. Stang, Maintenance Supervisor
J. Toben, Nuclear Safety Culture Manager
D. Vest, EDG System Engineer
D. Vogt, Operations Manager

NRC Personnel

C. Henderson, Senior Resident Inspector
T. Sullivan, Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Discussed

05000368/2016011-01	VIO	Failure to Ensure Adequate Lubrication for Emergency Diesel Generator Bearing (Section 4OA4)

LIST OF DOCUMENTS REVIEWED

Section 4OA4: Supplemental Inspection (95001)

Miscellaneous Documents

Number	Title	Revision/Date
	Fairbanks Morse Owners' Group Generator Maintenance Recommendations	April 20, 2015
	Operations Logs	September 18, 2016
EC-73850	Oil Level Verification Information for ANO Safety Related Pumps Extent of Condition	1
EC-74158	Expanded Extent of Condition for CR-ANO-2-2016-03307	0
Mock 95001 Report	Arkansas Nuclear One, Unit 2 Emergency Diesel Generator 2K-4A Inboard Bearing Failure During 24-Hour Surveillance Run	June 30, 2017
PSA-ANO2-06-04	PSA Maintenance Rule Input for Arkansas Nuclear One, Unit 2	0
TD C470.0090	Instructions for Two Bearing Spherical Roller Oil Lubricated Alternators	0
TD P292.0010	Instruction Manual for Installation, Operation, Maintenance of Horizontal A.C. Synchronous Generators Manufactured by Portec, Inc.	0

Procedures

Number	Title	Revision
EN-FAP-WM-002	Critical Evolutions	4
EN-LI-118	Cause Evaluation Process	24
EN-LI-118-ANO-RC	Cause Evaluation Process	3

Procedures

Number	Title	Revision
EN-MA-100	Maintenance Fundamentals Program	2
EN-MA-101	Conduct of Maintenance	20
EN-MA-101	Conduct of Maintenance	21
EN-MA-123	Identification and Trending of Rework	8
EN-TQ-201-03	SAT – Development Phase	12
EN-WM-104	On Line Risk Assessment	15
EN-WM-105-ANO-RC	Planning	3
OP-1307.026	Unit 1 K4A and K4B EDG 24 Month Surveillance	19
OP-1402.004	Decay Heat Removal Pump P-34A/B Maintenance	22
OP-1402.008	Unit 1 Auxiliary Feedwater Pump P-75 Disassembly, Inspection, and Reassembly	11
OP-1402.009	P-7A&B Emergency Feedwater Pump Maintenance	13
OP-1402.059	Unit 1 Emergency Feedwater (EFW) K-003 Turbine Disassemble, Inspect, Reassemble	15
OP-2104.036	Emergency Diesel Generator Operations	89
OP-2104.036	Emergency Diesel Generator Operations	93
OP-2403.007	Unit 2 2K4A/2K4B EDG Surveillance	33
OP-2403.080	Unit 2 Inspection and Repair of 2K-4A and 2K-4B Diesel Generator	13

Condition Reports (CRs)

CR-HQN-2016-01362	CR-ANO-2-2016-03307	CR-ANO-2-2017-05087
CR-ANO-C-2017-03618	CR-ANO-C-2017-03619	CR-ANO-C-2017-03620
LO-ALO-2017-00070	CR-ANO-C-2017-03572	CR-ANO-C-2017-03621

Work Orders (WOs)

00095948-01	00309267	00347122	52664433	52667001

ARKANSAS NUCLEAR ONE – NRC SUPPLEMENTAL INSPECTION
REPORT 05000368/2017016 – NOVEMBER 7, 2017

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ADAMS ACCESSION NUMBER: ML17311A115

☒ SUNSI Review: By: NFO	ADAMS: ☒ Yes ☐ No	☐ Non-Publicly Available ☒ Publicly Available	☒ Non-Sensitive ☐ Sensitive	Keyword: NRC-002

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