



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION IV  
612 EAST LAMAR BLVD, SUITE 400  
ARLINGTON, TEXAS 76011-4125

August 5, 2009

Kevin Walsh, Vice President, Operations  
Entergy Operations, Inc.  
Arkansas Nuclear One  
1448 S.R. 333  
Russellville, AR 72802

Subject: ARKANSAS NUCLEAR ONE - NRC INTEGRATED INSPECTION  
REPORT 05000313/2009003; 05000368/2009003 AND 07200013/2006001

Dear Mr. Walsh:

On June 23, 2009, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Arkansas Nuclear One facility. The enclosed integrated inspection report documents the inspection findings, which were discussed on July 9, 2009, with you and other members of your staff.

The inspections examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

The International Atomic Energy Agency conducted an Operation Safety Review Team Evaluation at Arkansas Nuclear One from June 15 through July 2, 2008. The Operation Safety Review Team's review and evaluation of the facility is documented in the Operation Safety Review Team Report (ML083440148), which is accessible from the NRC Web-site at [www.nrc.gov/reading-rm/adams.html](http://www.nrc.gov/reading-rm/adams.html). During the Operation Safety Review Team evaluation, NRC personnel closely monitored the team activities and as a result have deemed it appropriate to provide baseline inspection credit in accordance with the guidance provided in Inspection Manual Chapter 2515, "Light-Water Reactor Inspection Program-Operations Phase," dated May 1, 2008, Section 08.05. Specific details are outlined in the corresponding sections of the report where credit was given.

This report documents three NRC-identified violations and one self-revealing finding of very low safety significance (Green). Two of these findings were determined to involve violations of NRC requirements. Additionally, two licensee-identified violations, which were determined to be of very low safety significance, are listed in this report. However, because of the very low safety significance and because they are entered into your corrective action program, the NRC is treating these findings as noncited violations, consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest these violations or the significance of the noncited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 612 E. Lamar Blvd, Suite 400, Arlington, Texas,

76011-4125; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Arkansas Nuclear One facility. In addition, if you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region IV, and the NRC Resident Inspector at Arkansas Nuclear One. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

In accordance with 10 CFR 2.390 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 component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

Jeff Clark, P.E., Chief  
Project Branch E  
Division of Reactor Projects

Dockets: 50-313; 50-368; 72-013  
Licenses: DPR-51; NPF-6

Enclosure:  
NRC Inspection Report 05000313/2009003; 05000313/2009003;  
and 07200013/2006001 w/Attachment: Supplemental Information

cc w/Enclosure:  
Senior Vice President  
& Chief Operating Officer  
Entergy Operations, Inc.  
P.O. Box 31995  
Jackson, MS 39286-1995

Vice President, Oversight  
Entergy Operations, Inc.  
P.O. Box 31995  
Jackson, MS 39286-1995

Manager, Licensing  
Entergy Operations, Inc.  
Arkansas Nuclear One  
1448 SR 333  
Russellville, AR 72802

Associate General Counsel  
Entergy Nuclear Operations  
P.O. Box 31995  
Jackson, MS 39286-1995

Senior Manager, Nuclear Safety &  
Licensing  
Entergy Operations, Inc.  
P.O. Box 31995  
Jackson, MS 39286-1995

Chief, Radiation Control Section  
Arkansas Department of Health  
4815 West Markham Street, Slot 30  
Little Rock, AR 72205-3867

Entergy Operations, Inc.

- 3 -

Pope County Judge  
Pope County Courthouse  
100 West Main Street  
Russellville, AR 72801

Section Chief, Division of Health  
Emergency Management Section  
Arkansas Department of Health  
4815 West Markham Street, Slot 30  
Little Rock, AR 72205-3867

David E. Maxwell, Director  
Arkansas Department of Emergency  
Management, Bldg. 9501

Camp Joseph T. Robinson  
North Little Rock, AR 72199

Chief, Technological Hazards  
Branch  
FEMA Region VI  
800 North Loop 288  
Federal Regional Center  
Denton, TX 76209

Electronic distribution by RIV:

- Regional Administrator (Elmo.Collins@nrc.gov)
- Deputy Regional Administrator (Chuck.Casto@nrc.gov)
- DRP Director (Dwight.Chamberlain@nrc.gov)
- DRP Deputy Director (Anton.Vegel@nrc.gov)
- DRS Director (Roy.Caniano@nrc.gov)
- DRS Deputy Director (Troy.Pruett@nrc.gov)
- Senior Resident Inspector (Alfred.Sanchez@nrc.gov)
- Resident Inspector (Jeffrey.Josey@nrc.gov)
- Resident Inspector (Jeff.Rotton@nrc.gov)
- Branch Chief, DRP/E (Jeff.Clark@nrc.gov)
- Senior Project Engineer, DRP/E (George.Replogle@nrc.gov)
- ANO Site Secretary (Vicki.High@nrc.gov)
- Public Affairs Officer (Victor.Dricks@nrc.gov)
- Team Leader, DRP/TSS (Chuck.Paulk@nrc.gov)
- RITS Coordinator (Marisa.Herrera@nrc.gov)
- Regional Counsel (Karla.Fuller@nrc.gov)
- Congressional Affairs Officer (Jenny.Weil@nrc.gov)
- OEMail Resource

Only inspection reports to the following:

- DRS STA (Dale.Powers@nrc.gov)
- OEDO RIV Coordinator (Leigh.Trocine@nrc.gov)
- ROPreports

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Dockets: 05000313, 50000368, 07200013

Licenses: DPR-51, DPR-6

Report: 05000313/2009003; 0500368/2009003 and 07200013/2006001

Licensee: Entergy Operations, Inc.

Facility: Arkansas Nuclear One, Units 1 and 2

Location: Junction of Hwy. 64 W and Hwy. 333 South  
Russellville, Arkansas

Dates: March 25 through June 23, 2009

Inspectors: A. Sanchez, Senior Resident Inspector  
J. Josey, Resident Inspector  
J. Rotten, Resident Inspector  
C. Graves, Health Physicist  
R. Kellar, Health Physicist  
P. Elkmann, Senior Emergency Preparedness Inspector  
G. Guerra, CHP, Emergency Preparedness Inspector  
J. Mateychick, Senior Reactor Inspector

Approved By: Jeff Clark, P.E., Chief, Project Branch E  
Division of Reactor Projects

## SUMMARY OF FINDINGS

IR 05000313/2009003; 05000368/2009003; 07200013/2006001; 03/25/09 – 06/23/09; Arkansas Nuclear One, Units 1 and 2, Integrated Resident and Regional Report; Maintenance Risk Assessments and Emergent Work Control, Identification and Resolution of Problems, Event Follow-Up

The report covered a 3-month period of inspection by resident inspectors and announced baseline inspections by regional based inspectors. Four Green findings, two of which were noncited violations, were identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter 0609, "Significance Determination Process." Findings for which the significance determination process does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

### A. NRC-Identified Findings and Self-Revealing Findings

Cornerstone: Initiating Events

- Green. The inspectors identified a finding associated with a station planner's failure to follow procedure which resulted in inadequate work instructions. This is not a violation because the isophase blower is not safety-related equipment. Specifically, contrary to Station Procedure EN-WM-105, Revision 5, "Planning" the work instructions generated to replace worn parts for isophase blower C-8A, did not provide sufficient details, nor provide references to appropriate instructions which provided sufficient detail, concerning reassembly of the damper positioner. This resulted in the positioner being incorrectly reassembled during the maintenance which caused the damper to not open or shut reliably. The licensee entered this issue into their corrective action program as Condition Report CR-ANO-1-2009-865.

The performance deficiency was more than minor because it affected the procedure quality attribute of the Initiating Events Cornerstone, and it directly affected the cornerstone objective to limit the likelihood of those events that upset plant stability during power operations. Using Inspection Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, this finding was determined to have very low safety significance because it did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions would not be available. The finding was determined to have a crosscutting aspect in the area of human performance associated with work practices [H.4(b)], in that the licensee failed to define and effectively communicate expectations regarding procedural compliance and personnel followed procedures. Specifically, station planners failed to follow Procedure EN-WM-105 when developing work instructions for a reference level work package which resulted in an inadequate work package for the planned activities for the isophase blower (Section 4OA2.3).

- Green. The inspectors documented a self-revealing finding associated with the trip of main feed pump P-1B on April 9, 2009. Specifically, the main feed pump tripped due to an intermittent electromagnetic interference signal. This interference caused the digital speed monitor to sense an over speed condition and generate a trip signal for the main feed pump turbine, when no such condition actually existed. This issue was the result of the licensee not properly implementing a modification whose purpose it was to noise harden the main feed pumps control cabinets. The licensee entered this issue into their corrective action program as Condition Report CR-ANO-1-2009-0760.

The performance deficiency was more than minor because it affected the design control attribute of the Initiating Events Cornerstone, and it directly affected the cornerstone objective to limit the likelihood of those events that upset plant stability during power operations. Using Inspection Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, this finding was determined to have very low safety significance because it did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions would not be available. The finding was determined to have a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program [P.1(c)], in that the licensee failed to thoroughly evaluate problems such that the resolutions address causes and extent of conditions, as necessary. This is indicative of current plant performance because the licensee continues to inadequately evaluate issues and develop appropriate resolutions (Section 4OA3).

#### Cornerstone: Mitigating Systems

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," associated with licensee personnel's failure to follow station procedures. Specifically, following work completed on high pressure safety injection pump P-36C, on April 24, 2009, the specified postmaintenance testing was not performed until April 27, 2009, but the pump was declared operable by the operations department following performance of a quarterly surveillance run. Subsequently, when the postmaintenance testing inspection was performed, maintenance personnel identified a damaged tee fitting which resulted in the pump being declared inoperable. The licensee entered this issue into their corrective action program as Condition Report CR ANO-1-2009-0872.

The performance deficiency was more than minor because, if left uncorrected, it could result in more significant concerns. Specifically, during future corrective maintenance work on safety-related equipment, the failure to perform the specified postmaintenance testing, or have operations perform a proper evaluation of the equipment prior to declaring the equipment operable, could result in other more risk significant equipment being inoperable with the licensee unaware of the issue. Using Inspection Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, this finding was determined to have a very low safety significance because the finding: (1) is not a design or qualification issue confirmed not to result in a loss of operability of the pump;

(2) did not lead to an actual loss of safety function of the system or train; (3) did not result in the loss of one or more trains of nontechnical specification equipment; and (4) did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The finding was determined to have a crosscutting aspect in the area of human performance associated with work practices [H.3(b)], in that the licensee failed to appropriately coordinate work activities by incorporating actions to address the need to keep personnel apprised of work status and the operational impact of work activities (Section 1R13).

Cornerstone: Barrier Integrity

Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XV, "Nonconforming Materials, Parts, or Components," associated with the licensee's failure to properly control nonconforming components. Specifically, in 1997 the licensee identified that two check valves, which had been installed in the postaccident monitoring system, had a defective design that prevented them from seating all of the way. However, the stations material control system was not updated with this information and this model valve was subsequently issued for use in the high pressure safety injection pressurization system which resulted in leakage due to the valves failure to completely seat. The licensee entered this issue into their corrective action program as Condition Report CR-ANO-2-2009-1012.

The performance deficiency was more than minor because it affected the design control attribute of the Barrier Integrity Cornerstone and it directly affected the cornerstone objective to provide reasonable assurance that the physical design barriers protect the public from radionuclide releases caused by accidents or events. Using Inspection Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, this finding was determined to have very low safety significance because the finding did not represent a degradation of the barrier functions of the control room or auxiliary building, did not represent an actual open pathway in the physical integrity of reactor containment, and did not involve an action reduction in the function of hydrogen ignitors in the reactor containment. The finding was determined to have a crosscutting aspect in the area of Problem Identification and Resolution associated with the Corrective Action Program [P.1(c)], in that the licensee failed to thoroughly evaluate problems such that the resolutions address causes and extent of conditions as necessary. This is indicative of current plant performance because the licensee continues to inadequately evaluate issues and develop appropriate resolutions (Section 4OA2.4).

**B. Licensee-Identified Violations**

Violations of very low safety significance, which were identified by the licensee, have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. These violations and corrective action tracking numbers (condition report numbers) are listed in Section 4OA7.

## REPORT DETAILS

### Summary of Plant Status

Unit 1 began this inspection period operating at 100 percent power and remained there until April 4, 2009, when a trip of the main feedwater pump A occurred due to a malfunction associated with the digital overspeed trip device. This trip resulted in an automatic runback of the unit to 40 percent power. Unit 1 returned to 100 percent power on April 10, 2009. Unit 1 continued to operate at 100 percent power for the remainder of this inspection period.

Unit 2 operated at 100 percent power for the entire inspection period.

### 1. REACTOR SAFETY

#### Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness

#### 1R01 Adverse Weather Protection (71111.01)

##### .1 Summer Readiness for Offsite and Alternate-AC Power

##### a. Inspection Scope

On June 14, 2009, the inspectors performed a review of the licensee's preparations for summer weather for selected systems, including conditions that could lead to loss-of-offsite power and conditions that could result from high temperatures. The inspectors reviewed the licensee's procedures affecting these areas and the communications protocols between the transmission system operator and the plant to verify that the appropriate information was being exchanged when issues arose that could affect the offsite power system. Examples of aspects considered in the inspectors' review included:

- The coordination between the transmission system operator and the plant during off-normal or emergency events
- The explanations for the events
- The estimates of when the offsite power system would be returned to a normal state
- The notifications from the transmission system operator to the plant when the offsite power system was returned to normal

These activities constitute completion of one readiness for summer weather affect on offsite and alternate ac power sample as defined in Inspection Procedure 71111.01-05.

b. Findings

No findings of significance were identified.

.2 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors performed a review of the licensee's adverse weather procedures for seasonal extremes involving extreme high temperatures. The inspectors: verified that weather-related equipment deficiencies identified during the previous year were corrected prior to the onset of seasonal extremes; and evaluated the implementation of the adverse weather preparation procedures and compensatory measures for the affected conditions before the onset of, and during, the adverse weather conditions.

During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to mitigate or respond to adverse weather conditions. Additionally, the inspectors reviewed the Updated Final Safety Analysis Report and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant-specific procedures. Specific documents reviewed during this inspection are listed in the attachment. The inspectors also reviewed corrective action program items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their corrective action program in accordance with station corrective action procedures. The inspectors' reviews focused specifically on the following plant systems:

- May 29-30, 2009, Units 1 and 2, service water intake structures
- June 4, 2009, Units 1 and 2, transformer yards

These activities constitute completion of one readiness for seasonal adverse weather sample as defined in Inspection Procedure 71111.01-05.

b. Findings

No findings of significance were identified.

**1R04 Equipment Alignments (71111.04)**

.1 Partial Walkdown

a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- April 9, 2009, Unit 1, instrument air compressor C-28B due to instrument air compressor C-28A being declared for emergency use only

- April 10, 2009, Unit 2, train B low pressure safety injection system while the train A low pressure safety injection system was out of service for preventative maintenance
- April 16, 2009, Unit 1, trains B and C high pressure injection system while train A high pressure injection valves were inoperable due to preventative maintenance
- April 21, 2009, Unit 2, alternate ac diesel generator while emergency diesel generator 2 was out of service for planned maintenance
- May 07, 2009, Unit 2, emergency diesel generator 2K-4B while emergency diesel generator 2K-4A was unavailable for preventative and corrective maintenance
- June 3, 2009, Unit 1, emergency diesel generator 1K-4B while emergency diesel generator 1K-4A unavailable due to scheduled overhaul

The inspectors selected these systems based on their risk significance relative to the Reactor Safety Cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could affect the function of the system, and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, Updated Final Safety Analysis Report, technical specification requirements, administrative technical specifications, outstanding work orders, condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the corrective action program with the appropriate significance characterization. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of six partial system walkdown samples as defined in Inspection Procedure 71111.04-05.

b. Findings

No findings of significance were identified.

.2 Complete Walkdown

a. Inspection Scope

On May 26, 2009, the inspectors performed a complete system alignment inspection of the main steam system to verify the functional capability of the system. The inspectors selected this system because it was considered both safety-significant and

risk-significant in the licensee's probabilistic risk assessment. The inspectors walked down the system to review mechanical and electrical equipment line ups, electrical power availability, system pressure and temperature indications, as appropriate, component labeling, component lubrication, component and equipment cooling, hangers and supports, operability of support systems, and to ensure that ancillary equipment or debris did not interfere with equipment operation. The inspectors reviewed a sample of past and outstanding work orders to determine whether any deficiencies significantly affected the system function. In addition, the inspectors reviewed the corrective action program database to ensure that system equipment-alignment problems were being identified and appropriately resolved. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one complete system walkdown sample as defined in Inspection Procedure 71111.04-05.

b. Findings

No findings of significance were identified.

**1R05 Fire Protection (71111.05)**

.1 Quarterly Fire Inspection Tours

a. Inspection Scope

The inspectors conducted fire protection walkdowns that were focused on availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- June 1, 2009, Unit 2, fire zone 2151-A, fuel handling area
- June 9, 2009, Unit 1, fire zone 105-T, lower south electrical penetration room
- June 12, 2009, Unit 1, fire zone 149-E, upper north electrical penetration, hot tool, and decontamination room
- June 15, 2009, Unit 2, fire zone 2154-E, control element drive mechanism equipment room

The inspectors reviewed areas to assess if licensee personnel had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant; effectively maintained fire detection and suppression capability; maintained passive fire protection features in good material condition; and had implemented adequate compensatory measures for out of service, degraded or inoperable fire protection equipment, systems, or features, in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to affect equipment that could initiate or mitigate a plant

transient, or their impact on the plant's ability to respond to a security event. Using the documents listed in the attachment, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed, that transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's corrective action program. Specific documents reviewed during this inspection are listed in the attachment.

The International Atomic Energy Agency conducted an Operation Safety Review Team Evaluation at Arkansas Nuclear One from June 15 through July 2, 2008. In accordance with Inspection Manual Chapter 2515, "Light-Water Reactor Inspection Program-Operations Phase," dated May 1, 2008, Section 08.05, the annual minimum inspection sample in this area has been reduced to a minimum of 3 samples per quarter and a maximum of 18 samples per year.

These activities constitute completion of four quarterly fire-protection inspection samples as defined in Inspection Procedure 71111.05-05.

b. Findings

No findings of significance were identified.

**1R06 Flood Protection Measures (71111.06)**

a. Inspection Scope

The inspectors reviewed the Updated Final Safety Analysis Report, the flooding analysis, and plant procedures to assess susceptibilities involving internal flooding; reviewed the corrective action program to determine if licensee personnel identified and corrected flooding problems; inspected underground bunkers/manholes to verify the adequacy of sump pumps, level alarm circuits, cable splices subject to submergence, and drainage for bunkers/manholes; and verified that operator actions for coping with flooding can reasonably achieve the desired outcomes. The inspectors also walked down the one area listed below to verify the adequacy of equipment seals located below the flood line, floor and wall penetration seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, and control circuits, and temporary or removable flood barriers. Specific documents reviewed during this inspection are listed in the attachment.

- April 14, 2009, Unit 1, east and west decay heat vaults

These activities constitute completion of one flood protection measures inspection sample(s) as defined in Inspection Procedure 71111.06-05.

b. Findings

No findings of significance were identified.

## 1R07 Heat Sink Performance (71111.07)

### .1 Triennial Review

#### a. Inspection Scope

The inspectors reviewed design documents (e.g., calculations and performance specifications), program documents, test and maintenance procedures, and corrective action documents for the inspection samples selected. The inspectors also interviewed chemistry and engineering personnel.

The inspectors selected heat exchangers in Unit 2 that ranked high in the plant specific risk assessment and were directly connected to the safety-related service water system. The inspector also selected the emergency cooling pond which is the ultimate heat sink for both units. The inspector selected the following inspection samples:

- High pressure safety injection pump room unit coolers 2VUC11-A, -B
- Containment cooling unit service water coils 2VCC2A, -B, -C, and -D
- Emergency cooling pond

For heat exchangers directly connected to the safety-related service water system, the inspector verified whether testing, inspection, maintenance, and the biotic fouling monitoring program provided sufficient controls to ensure proper heat transfer. Specifically, the inspectors reviewed: (1) heat exchanger test methods and test results from performance testing; (2) chemical treatments for macrofouling and controls for macrofouling; and (3) whether test results appropriately considered differences between testing conditions and design conditions.

For the ultimate heat sink and its subcomponents, the inspector verified the licensee established appropriate controls for macrofouling and biological fouling. Since the licensee had an emergency cooling pond, a walk-down was performed to verify the physical condition of the facility. The inspector reviewed the licensee's procedures for:

- Maintaining sufficient reservoir capacity
- Performing periodic monitoring and trending of sediment build-up
- Periodic performance of fish eradication and algae control

Documents reviewed by the inspector are listed in the attachment.

These activities constitute completion of three samples as defined in Inspection Procedure 71111.07.

#### b. Findings

No findings of significance were identified.

.2 Annual Review

a. Inspection Scope

The inspectors reviewed licensee programs, verified performance against industry standards, and reviewed critical operating parameters and maintenance records for the Unit 1 emergency diesel generators jacket water heat exchangers. The inspectors verified that performance tests were satisfactorily conducted for heat exchangers/heat sinks and reviewed for problems or errors; the licensee utilized the periodic maintenance method outlined in EPRI NP-7552, "Heat Exchanger Performance Monitoring Guidelines"; the licensee properly utilized biofouling controls; the licensee's heat exchanger inspections adequately assessed the state of cleanliness of their tubes; and the heat exchangers were correctly categorized under 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one heat sink inspection sample as defined in Inspection Procedure 71111.07-05.

b. Findings

No findings of significance were identified.

**1R11 Licensed Operator Requalification Program (71111.11)**

a. Inspection Scope

On June 16, 2009, the inspectors observed a crew of licensed operators in the plant's Unit 1 simulator to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- Licensed operator performance
- Crew's clarity and formality of communications
- Crew's ability to take timely actions in the conservative direction
- Crew's prioritization, interpretation, and verification of annunciator alarms
- Crew's correct use and implementation of abnormal and emergency procedures
- Control board manipulations
- Oversight and direction from supervisors

- Crew's ability to identify and implement appropriate technical specification actions and emergency plan actions and notifications

The inspectors compared the crew's performance in these areas to pre-established operator action expectations and successful critical task completion requirements. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one quarterly licensed-operator requalification program sample as defined in Inspection Procedure 71111.11.

b. Findings

No findings of significance were identified.

**1R12 Maintenance Effectiveness (71111.12)**

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk significant systems:

- June 5, 2009, Unit 1, auxiliary building sump
- April 28, 2009, Unit 1, makeup and purification, and high pressure injection
- April 29, 2009, Unit 2, main steam

The inspectors reviewed events such as where ineffective equipment maintenance has resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- Implementing appropriate work practices
- Identifying and addressing common cause failures
- Scoping of systems in accordance with 10 CFR 50.65(b)
- Characterizing system reliability issues for performance
- Charging unavailability for performance
- Trending key parameters for condition monitoring
- Ensuring proper classification in accordance with 10 CFR 50.65(a)(1) or (a)(2)
- Verifying appropriate performance criteria for structures, systems, and components classified as having an adequate demonstration of performance

through preventive maintenance, as described in 10 CFR 50.65(a)(2), or as requiring the establishment of appropriate and adequate goals and corrective actions for systems classified as not having adequate performance, as described in 10 CFR 50.65(a)(1)

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the corrective action program with the appropriate significance characterization. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of three quarterly maintenance effectiveness samples as defined in Inspection Procedure 71111.12-05.

b. Findings

No findings of significance were identified.

**1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)**

a. Inspection Scope

The inspectors reviewed licensee personnel's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- April 16, 2009, Unit 1, maintenance work window for the train A high pressure injection block valve CV-1278
- April 27, 2009, Unit 1, emergent work activities and analysis of risk associated with the unplanned unavailability of the high pressure injection pump C
- April 29, 2009, Unit 2, maintenance window for service water supply valve 2CV-1448-2 to the containment spray pump B
- May 7-8, 2009, Unit 2, unexpected maintenance extension on emergency diesel generator 2K-4A due to a exhaust leak
- May 11-13, 2009, Units 1 and 2, 500 kV north and south bus differential primary and backup relay dc functional checks
- May 14-15, 2009, Units 1 and 2, switchyard maintenance on breakers B1218 and B1215, and 161 kV capacitor bank work
- May 29, 2009, Unit 2, engineered safeguards feedwater actuation system relay cabinet

The inspectors selected these activities based on potential risk significance relative to the Reactor Safety Cornerstones. As applicable for each activity, the inspectors verified that licensee personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When licensee personnel performed emergent work, the inspectors verified that the licensee personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed the technical specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of seven maintenance risk assessments and emergent work control inspection samples as defined in Inspection Procedure 71111.13-05.

b. Findings

Introduction. The inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," associated with licensee personnel's failure to follow station procedures. Specifically, following work completed on high pressure safety injection pump P-36C, on April 24, 2009, the specified postmaintenance testing was not performed until April 27, 2009, yet the pump was declared operable by the operations department following performance of a quarterly surveillance run. Subsequently, when the postmaintenance testing was performed, craft personnel identified a damaged tee fitting which caused the operations department to declare the pump inoperable.

Description. On April 22, 2009, high pressure safety injection pump P-36C was tagged out for planned mechanical maintenance. This was to include strainer cleaning, pump/gearbox oil change, coupling greasing, pump case vent water repairs, seal venting, and lube oil cooler visual and NDE/UT inspections. On April 24, 2009, following completion of this maintenance, the operations department ran the pump for a quarterly surveillance test and subsequently declared the pump to be operable.

On April 27, 2009, mechanical maintenance determined that the postmaintenance testing for the lube oil system work had not been performed on the oil joints that had been disassembled as required by the work order. Operations started the auxiliary lube oil pump to pressurize the oil system to facilitate mechanical maintenance's performance of the required postmaintenance test inspections. During these inspections, mechanical maintenance identified a leaking joint in the oil system. Based on this, the operations department declared the pump to be inoperable and took actions to isolate the pump. This issue was entered into the corrective action program as Condition Report CR ANO-1-2009-0872.

During the performance of an apparent cause evaluation to determine the cause of the oil leak, the evaluator identified that the postmaintenance testing had not been performed until April 27, 2009, 3 days after the pump had been declared operable. Condition Report CR ANO-1-2009--0984 was initiated on May 15, 2009, to document this concern.

Through this condition report, the licensee performed a human performance error review and determined that inadequate communications between the work week manager and the maintenance supervisor was the cause of this issue. Specifically, the maintenance supervisor thought that it had been communicated to the work week manager that the fix-it-now team was going to perform the postmaintenance testing on the pump. However, the work week manager had not received this communication. As such, the licensee performed coaching and counseling as the corrective action.

During review of this issue, the inspectors questioned the communication breakdown as the cause of this issue. Specifically, station procedures provide requirements that are to be met prior to returning a piece of safety-related equipment to an operable condition following a maintenance activity and it was not clear to the inspectors that these procedural requirements were met. Specifically, Station Procedure OP-1015.001, "Conduct of Operations," Revision 72, Section 8.4, "Returning Equipment To Service," step 8.4.3 requires:

When maintenance is complete and it is desired to place the equipment back into service, then review the applicable work order package for postmaintenance test requirements.

Step 8.4.5 requires:

When the component has been returned to service, and applicable postmaintenance testing is complete, then the control room supervisor is to obtain shift manager concurrence and declare the component operable.

The inspectors reviewed Work Order 143309 which had been used to perform the maintenance on the lube oil cooler. During this review, the inspectors noted that step 1.9.1 of the work order directed maintenance to have operations start the pump and for the maintenance to inspect for leakage on any water lines and verify no oil leakage from the piping associated with the lube oil cooler. Furthermore, step 1.9.3 required that the craft verify that with the system at normal operating temperature and pressure, operations was satisfied with the operation of the equipment after maintenance. This step also required operations to verify, with a signature, that there were no tube leaks or the leakage had been controlled to satisfactory conditions.

The inspectors determined that the cause of this issue was failure to follow Procedure OP-1015.001. Specifically, during the required review of the postmaintenance testing requirements, there was no apparent emphasis placed on step 1.9.3, which required an operations signature as part of the testing requirements, and the control room supervisor failed to verify that the postmaintenance testing had been completed prior to declaring the pump operable.

Analysis. The failure of station personnel to follow Station Procedure OP-1015.001 and verify that postmaintenance testing was completed prior to declaring pump P-36C operable was a performance deficiency. The performance deficiency was more than minor because, if left uncorrected, it could result in more significant concerns. Specifically, during future corrective maintenance work on safety-related equipment, the failure to perform the specified postmaintenance testing or have operations perform a proper evaluation of the equipment prior to declaring the equipment operable, could result in other more risk significant equipment being inoperable with the licensee unaware of issue. Using the Inspection Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, this finding was determined to have a very low safety significance because the finding: (1) is not a design or qualification issue confirmed not to result in a loss of operability of the pump; (2) did not lead to an actual loss of safety function of the system or train; (3) did not result in the loss of one or more trains of nontechnical specification equipment; and (4) did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The finding was determined to have a crosscutting aspect in the area of human performance associated with work practices [H.3(b)] in that the licensee failed to appropriately coordinate work activities by incorporating actions to address the need to keep personnel apprised of work status and the operational impact of work activities.

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures or drawings of a type appropriate to the circumstances, and shall be accomplished in accordance with these instructions, procedures, or drawings. Contrary to the above, on April 24, 2009, station operations department declared high pressure safety injection pump P-36C to be operable without verifying that the required postmaintenance testing had been performed. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program as Condition Report CR ANO-1-2009-0984, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000313/2009003-01, "Failure to Follow Procedure and Perform Postmaintenance Testing Prior to Declaring Equipment Operable."

## **1R15 Operability Evaluations (71111.15)**

### a. Inspection Scope

The inspectors reviewed the following issues:

- April 9, 2009, Unit 2, containment coolers 2VCC-2A/B
- April 7, 2009, Unit 2, core operating limit supervisory system
- April, 28, 2009, Unit 1, emergency feedwater pump P-7A following identification of an oil leak
- May 6, 2009, Unit 2, reactor trip breaker TCB-5 slow response time
- May 7, 2009, Unit 2, inverter 2Y-1113

- May 11, 2009, Unit 1, emergency diesel generator K-4A
- May 13, 2009, Unit 2, emergency feedwater pump 2P-7B for vibrations
- May 26, 2009, Unit 1, pin hole leak in service water valve CV-3850
- June 3, 2009, Unit 2, safety injection tank drain valves
- June 18, 2009, Unit 1, emergency diesel generator K-4B

The inspectors selected these potential operability issues based on the risk-significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and Updated Safety Analysis Report to the licensee's evaluations, to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors also reviewed a sampling of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of ten operability evaluations inspection sample(s) as defined in Inspection Procedure 71111.15-04.

b. Findings

No findings of significance were identified.

**1R18 Plant Modifications (71111.18)**

.1 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following temporary modifications to verify that the safety functions of important safety systems were not degraded:

- April 7, 2009, Unit 2, emergency temporary modification performed due to failure of computer room air conditioning unit 2VUC-43
- April 18, 2009, Unit 2, temporary modification to service water motor-operated valve spline adapters

The inspectors reviewed the temporary modification and the associated safety evaluation screening against the system design bases documentation, including the Updated Final Safety Analysis Report and the technical specifications, and verified that the modification did not adversely affect the system operability/availability. The inspectors also verified that the installation and restoration were consistent with the modification documents and that configuration control was adequate. Additionally, the inspectors verified that the temporary modification was identified on control room drawings, appropriate tags were placed on the affected equipment, and licensee personnel evaluated the combined effects on mitigating systems and the integrity of radiological barriers.

These activities constitute completion of two samples for temporary plant modifications as defined in Inspection Procedure 71111.18-05

b. Findings

No findings of significance were identified.

.2 Permanent Plant Modifications

a. Inspection Scope

The inspectors reviewed key affected parameters associated with energy needs, materials/replacement components, timing, heat removal, control signals, equipment protection from hazards, operations, flow paths, pressure boundary, ventilation boundary, structural, process medium properties, licensing basis, and failure modes for the modification listed below. The inspectors verified that modification preparation, staging, and implementation did not impair emergency/abnormal operating procedure actions, key safety functions, or operator response to loss of key safety functions; postmodification testing will maintain the plant in a safe configuration during testing by verifying that unintended system interactions will not occur, systems, structures and components' performance characteristics still meet the design basis, the appropriateness of modification design assumptions, and the modification test acceptance criteria will be met; and licensee personnel identified and implemented appropriate corrective actions associated with permanent plant modifications. Specific documents reviewed during this inspection are listed in the attachment.

- Units 1 and 2, modifications performed to the emergency cooling pond

These activities constitute completion of one sample for permanent plant modifications as defined in Inspection Procedure 71111.18-05

b. Findings

No findings of significance were identified.

## 1R19 Postmaintenance Testing (71111.19)

### a. Inspection Scope

The inspectors reviewed the following postmaintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- April 16, 2009, Unit 1, train A high pressure injection valves CV-1278, CV-1279, CV-1219, and CV-1220 following preventative maintenance
- May 7, 2009, Unit 2, emergency diesel generator 2K-4A following replacement of exhaust gaskets
- May 11, 2009, Unit 2, emergency feedwater pump suction from the condensate storage tank valve 2CV-2800 following maintenance
- June 1, 2009, Unit 2, emergency feedwater actuation system following component replacement due to failure
- June 9, 2009, Unit 1, emergency diesel generator 1K-4A following overhaul
- June 16, 2009, Unit 2, control element assembly 31 following troubleshooting

The inspectors selected these activities based upon the structure, system, or component's ability to affect risk. The inspectors evaluated these activities for the following:

- The effect of testing on the plant had been adequately addressed and testing was adequate for the maintenance performed
- Acceptance criteria were clear and demonstrated operational readiness and test instrumentation was appropriate

The inspectors evaluated the activities against the technical specifications, the Updated Final Safety Analysis Report, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with postmaintenance tests to determine whether the licensee was identifying problems and entering them in the corrective action program and that the problems were being corrected commensurate with their importance to safety. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of six postmaintenance testing inspection samples as defined in Inspection Procedure 71111.19-05.

b. Findings

No findings of significance were identified.

**1R22 Surveillance Testing (71111.22)**

a. Inspection Scope

The inspectors reviewed the Updated Final Safety Analysis Report, procedure requirements, and technical specifications to ensure that the surveillance activities listed below demonstrated that the systems, structures, and/or components tested were capable of performing their intended safety functions. The inspectors either witnessed or reviewed test data to verify that the significant surveillance test attributes were adequate to address the following:

- Preconditioning
- Evaluation of testing impact on the plant
- Acceptance criteria
- Test equipment
- Procedures
- Jumper/lifted lead controls
- Test data
- Testing frequency and method demonstrated technical specification operability
- Test equipment removal
- Restoration of plant systems
- Fulfillment of ASME Code requirements
- Updating of performance indicator data
- Engineering evaluations, root causes, and bases for returning tested systems, structures, and components not meeting the test acceptance criteria were correct
- Reference setting data
- Annunciators and alarms setpoints

The inspectors also verified that licensee personnel identified and implemented any needed corrective actions associated with the surveillance testing.

- May 8, 2009, Unit 2, train A control room emergency air conditioning and ventilation
- May 12, 2009, Unit 1, reactor coolant system leak detection quarterly test
- May 17, 2009, Unit 2, high pressure safety injection pump 2P-89A
- June 1, 2009, Unit 2, inservice test containment spray pump 2P-35B.

Specific documents reviewed during this inspection are listed in the attachment.

The International Atomic Energy Agency conducted an Operation Safety Review Team Evaluation at Arkansas Nuclear One from June 15 through July 2, 2008. In accordance with Inspection Manual Chapter 2515, Section 08.05, "Light-Water Reactor Inspection Program-Operations Phase," dated May 1, 2008, the annual minimum inspection samples in this area was reduced to 14 samples and the annual maximum was reduced to 19 samples.

These activities constitute completion of four surveillance testing inspection samples as defined in Inspection Procedure 71111.22-05.

b. Findings

No findings of significance were identified.

**Cornerstone: Emergency Preparedness**

**1EP2 Alert Notification System Testing (71114.02)**

a. Inspection Scope

The inspectors discussed with licensee staff the operability of offsite siren emergency warning systems to determine the adequacy of licensee methods for testing the alert and notification system in accordance with 10 CFR Part 50, Appendix E. The licensee's alert and notification system testing program was compared with criteria in NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1; FEMA Report REP-10, "Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants"; and the licensee's current FEMA-approved alert and notification system design report, "Alert and Notification System Report for Arkansas Nuclear One," February 13, 1996. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one sample as defined in Inspection Procedure 71114.02-05.

b. Findings

No findings of significance were identified.

### **1EP3 Emergency Response Organization Augmentation Testing (71114.03)**

#### a. Inspection Scope

The inspectors discussed with licensee staff the operability of primary and backup systems for augmenting the on-shift emergency response staff to determine the adequacy of licensee methods for staffing emergency response facilities in accordance with their emergency plan. The inspectors reviewed the documents and references listed in the attachment to this report, to evaluate the licensee's ability to staff the emergency response facilities in accordance with the licensee's emergency plan and the requirements of 10 CFR Part 50, Appendix E. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one sample as defined in Inspection Procedure 71114.03-05.

#### b. Findings

No findings of significance were identified.

### **1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)**

#### a. Inspection Scope

The inspectors performed an in-office review of the Arkansas Nuclear One Emergency Plan, Revision 35. This revision updated the plan with several organizational title changes and contractor name changes including updating the emergency planning zone maps and making the emergency radiation team responsible for emergency operations facility and alternate emergency plan implementing facility monitoring. The inspectors also reviewed Emergency Plan Implementing Procedure 1903.010, "Emergency Action Level Classification," Revision 42. This revision added seismic monitoring instruments XR-8012 and XR-8013 to the listing of seismic monitoring instrumentation to Emergency Action Levels 8.1, 8.2, and 8.3.

These revisions were compared to its previous revision, to the criteria of NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans" and to the standards in 10 CFR 50.47(b) to determine if the revision adequately implemented the requirements of 10 CFR 50.54(q). This review was not documented in a safety evaluation report and did not constitute approval of licensee-generated changes; therefore, this revision is subject to future inspection. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of two samples as defined in Inspection Procedure 71114.04-05.

#### b. Findings

No findings of significance were identified.

## **1EP5 Correction of Emergency Preparedness Weaknesses and Deficiencies (71114.05)**

### a. Inspection Scope

The inspectors reviewed summaries of 51 corrective action program documents assigned to the emergency preparedness department and emergency response organization between May 2008 and April 2009, and selected 11 for detailed review against the program requirements. During the inspection the inspectors requested other corrective action documents as necessary. The inspectors evaluated the response to the corrective action requests to determine the licensee's ability to identify, evaluate, and correct problems in accordance with the licensee program requirements, planning standard 10 CFR 50.47(b)(14), and 10 CFR Part 50, Appendix E. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one sample as defined in Inspection Procedure 71114.05-05.

### b. Findings

No findings of significance were identified.

## **1EP6 Drill Evaluation (71114.06)**

### .1 Emergency Preparedness Drill Observation

#### a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on April 8, 2009, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the Technical Support Center and the Emergency Operations Facility to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the corrective action program. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the attachment.

These activities constitute completion of one sample as defined in Inspection Procedure 71114.06-05.

#### b. Findings

No findings of significance were identified.

## .2 Training Observations

### a. Inspection Scope

The inspectors observed a simulator training evolution for Unit 2 licensed operators on April 8, 2009, which required emergency plan implementation by a licensee operations crew. This evolution was planned to be evaluated and included in performance indicator data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. The inspectors also attended the postevolution critique for the scenario. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the crew's performance and ensure that the licensee evaluators noted the same issues and entered them into the corrective action program. As part of the inspection, the inspectors reviewed the scenario package and other documents listed in the attachment.

These activities constitute completion of one sample as defined in Inspection Procedure 71114.06-05.

### b. Findings

No findings of significance were identified.

## 2. **RADIATION SAFETY**

### **Cornerstone: Occupational and Public Radiation Safety**

#### **2OS1 Access Control to Radiologically Significant Areas (71121.01)**

### a. Inspection Scope

This area was inspected to assess licensee personnel's performance in implementing physical and administrative controls for airborne radioactivity areas, radiation areas, high radiation areas, and worker adherence to these controls. The inspectors used the requirements in 10 CFR Part 20, the technical specifications, and the licensee's procedures required by technical specifications as criteria for determining compliance. During the inspection, the inspectors interviewed the radiation protection manager, radiation protection supervisors, and radiation workers. The inspectors performed independent radiation dose rate measurements and reviewed the following items:

- Performance indicator events and associated documentation packages reported by the licensee in the Occupational Radiation Safety Cornerstone
- Conformity of electronic personal dosimeter alarm set points with survey indications and plant policy; workers' knowledge of required actions when their electronic personnel dosimeter noticeably malfunctions or alarms
- Physical and programmatic controls for highly activated or contaminated materials (non-fuel) stored within spent fuel and other storage pools

- Self-assessments, audits, licensee event reports, and special reports related to the access control program since the last inspection
- Corrective action documents related to access controls
- Licensee actions in cases of repetitive deficiencies or significant individual deficiencies
- Changes in licensee procedural controls of high dose rate - high radiation areas and very high radiation areas
- Controls for special areas that have the potential to become very high radiation areas during certain plant operations
- Posting and locking of entrances to all accessible high dose rate - high radiation areas and very high radiation areas

Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of 12 of the required 21 samples as defined in Inspection Procedure 71121.01-05.

b. Findings

No findings of significance

**2OS2 ALARA Planning and Controls (71121.02)**

a. Inspection Scope

The inspectors assessed licensee personnel's performance with respect to maintaining individual and collective radiation exposures as low as is reasonably achievable. The inspectors used the requirements in 10 CFR Part 20 and the licensee's procedures required by technical specifications as criteria for determining compliance. The inspectors interviewed licensee personnel and reviewed the following:

- Current 3-year rolling average collective exposure
- Five outage work activities scheduled during the inspection period and associated work activity exposure estimates which were likely to result in the highest personnel collective exposures
- Site-specific trends in collective exposures, plant historical data, and source-term measurements
- Site-specific ALARA procedures

- Three work activities of highest exposure significance completed during the last outage
- Intended versus actual work activity doses and the reasons for any inconsistencies
- Interfaces between operations, radiation protection, maintenance, maintenance planning, scheduling and engineering groups
- Integration of ALARA requirements into work procedure and radiation work permit (or radiation exposure permit) documents
- Person-hour estimates provided by maintenance planning and other groups to the radiation protection group with the actual work activity time requirements
- Shielding requests and dose/benefit analyses
- Dose rate reduction activities in work planning
- Postjob (work activity) reviews
- Assumptions and basis for the current annual collective exposure estimate, the methodology for estimating work activity exposures, the intended dose outcome, and the accuracy of dose rate and man-hour estimates
- Exposures of individuals from selected work groups
- Records detailing the historical trends and current status of tracked plant source terms and contingency plans for expected changes in the source term due to changes in plant fuel performance issues or changes in plant chemistry
- Source-term control strategy or justifications for not pursuing such exposure reduction initiatives
- Self-assessments, audits, and special reports related to the ALARA program since the last inspection
- Resolution through the corrective action process of problems identified through postjob reviews and postoutage ALARA report critiques
- Corrective action documents related to the ALARA program and follow-up activities, such as initial problem identification, characterization, and tracking
- Effectiveness of self-assessment activities with respect to identifying and addressing repetitive deficiencies or significant individual deficiencies

Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of 10 of the required 15 samples and 10 of the optional samples as defined in Inspection Procedure 71121.02-05.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES**

**40A1 Performance Indicator Verification (71151)**

.1 Data Submission Issue

a. Inspection Scope

The inspectors performed a review of the data submitted by the licensee for the first Quarter 2009 performance indicators for any obvious inconsistencies prior to its public release in accordance with Inspection Manual Chapter 0608, "Performance Indicator Program."

This review was performed as part of the inspectors' normal plant status activities and, as such, did not constitute a separate inspection sample.

b. Findings

No findings of significance were identified.

.2 Safety System Functional Failures (MS05)

a. Inspection Scope

The inspectors sampled licensee submittals for the Safety System Functional Failures performance indicator for both Units 1 and 2 for the period from the third quarter 2008 through the first quarter 2009. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73," definitions and guidance were used. The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, issue reports, event reports and NRC integrated inspection reports for the period of July 2008 through March 2009 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of two safety system functional failures samples as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.3 Reactor Coolant System Specific Activity (BI01)

a. Inspection Scope

The inspectors sampled licensee submittals for the reactor coolant system specific activity performance indicator for both Units 1 and 2 for the period from the third quarter 2008 through the second quarter 2009. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in NEI Document 99-02, Revision 5, "Regulatory Assessment Performance Indicator Guideline," was used. The inspectors reviewed the licensee's reactor coolant system chemistry samples, technical specification requirements, issue reports, event reports, and NRC integrated inspection reports for the period from July 2008 through March 2009 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. In addition to record reviews, the inspectors observed a chemistry technician obtain and analyze a reactor coolant system sample. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of two reactor coolant system specific activity samples as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.4 Reactor Coolant System Leakage (BI02)

a. Inspection Scope

The inspectors sampled licensee submittals for the reactor coolant system leakage performance indicator for both Units 1 and 2 for the period from the third quarter 2008 through the second quarter 2009. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in NEI Document 99-02, Revision 5, "Regulatory Assessment Performance Indicator Guideline," was used. The inspectors reviewed the licensee's operator logs, reactor coolant system leakage tracking data, issue reports, event reports, and NRC integrated inspection reports for the period of July 2008 through March 2009 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of two reactor coolant system leakage samples as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.5 Drill/Exercise Performance (EP01)

a. Inspection Scope

The inspectors sampled licensee submittals for the Drill/Exercise Performance performance indicator for the period from the second quarter 2008 through the first quarter 2009. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in Nuclear Energy Institute Document 99-02, Revision 5, "Regulatory Assessment Performance Indicator Guideline," was used. The inspectors reviewed the licensee's records associated with the performance indicator to verify that the licensee accurately reported the indicator in accordance with relevant procedures and the Nuclear Energy Institute guidance. Specifically, the inspectors reviewed licensee records and processes including procedural guidance on assessing opportunities for the performance indicator; assessments of performance indicator opportunities during predesignated control room simulator training sessions, performance during the 2008 biennial exercise, and performance during other drills. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of the drill/exercise performance sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.6 Emergency Response Organization Drill Participation (EP02)

a. Inspection Scope

The inspectors sampled licensee submittals for the Emergency Response Organization Drill Participation performance indicator for the period from the second quarter 2008 through the first quarter 2009. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in Nuclear Energy Institute Document 99-02, Revision 5, "Regulatory Assessment Performance Indicator Guideline," was used. The inspectors reviewed the licensee's records associated with the performance indicator to verify that the licensee accurately reported the indicator in accordance with relevant procedures and the Nuclear Energy Institute guidance. Specifically, the inspectors reviewed licensee records and processes including procedural guidance on assessing opportunities for the performance indicator, rosters of personnel assigned to key emergency response organization positions, and exercise participation records. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of the emergency response organization drill participation sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.7 Alert and Notification System (EP03)

a. Inspection Scope

The inspectors sampled licensee submittals for the Alert and Notification System performance indicator for the period from the second quarter 2008 through the first quarter 2009. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in Nuclear Energy Institute Document 99-02, Revision 5, "Regulatory Assessment Performance Indicator Guideline," was used. The inspectors reviewed the licensee's records associated with the performance indicator to verify that the licensee accurately reported the indicator in accordance with relevant procedures and the Nuclear Energy Institute guidance. Specifically, the inspectors reviewed licensee records and processes including procedural guidance on assessing opportunities for the performance indicator and the results of periodic alert notification system operability tests. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of the alert and notification system sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.8 Occupational Exposure Control Effectiveness (OR01)

a. Inspection Scope

The inspectors sampled licensee submittals for the Occupational Radiological Occurrences performance indicator for the fourth quarter of 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in NEI Document 99-02, Revision 5, "Regulatory Assessment Performance Indicator Guideline," were used. The inspectors reviewed the licensee's assessment of the performance indicator for occupational radiation safety to determine if indicator related data was adequately assessed and reported. To assess the adequacy of the licensee's performance indicator data collection and analyses, the inspectors discussed with radiation protection staff, the scope and breadth of its data review, and the results of those reviews. The inspectors independently reviewed electronic dosimetry dose rate and accumulated dose alarm and dose reports and the dose assignments for any intakes that occurred during the time period reviewed to determine if there were potentially unrecognized occurrences. The

inspectors also conducted walkdowns of numerous locked high and very high radiation area entrances to determine the adequacy of the controls in place for these areas.

These activities constitute completion of the occupational radiological occurrences sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.9 Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual Radiological Effluent Occurrences (PR01)

a. Inspection Scope

The inspectors sampled licensee submittals for the Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual Radiological Effluent Occurrences performance indicator for the fourth quarter of 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in NEI Document 99-02, Revision 5, "Regulatory Assessment Performance Indicator Guideline," was used. The inspectors reviewed the licensee's issue report database and selected individual reports generated since this indicator was last reviewed to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous effluent summary data and the results of associated offsite dose calculations for selected dates during the fourth quarter of 2008 to determine if indicator results were accurately reported. The inspectors also reviewed the licensee's methods for quantifying gaseous and liquid effluents and determining effluent dose. Additionally, the inspectors reviewed the licensee's historical 10 CFR 50.75(g) file and selectively reviewed the licensee's analysis for discharge pathways resulting from a spill, leak, or unexpected liquid discharge focusing on those incidents which occurred over the last few years.

These activities constitute completion of the radiological effluent technical specifications/offsite dose calculation manual radiological effluent occurrences sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

## 40A2 Identification and Resolution of Problems (71152)

### Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Physical Protection

#### .1 Routine Review of Identification and Resolution of Problems

##### a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that they were being entered into the licensee's corrective action program at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. The inspectors reviewed attributes that included: the complete and accurate identification of the problem; the timely correction, commensurate with the safety significance; the evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent of condition reviews, and previous occurrences reviews; and the classification, prioritization, focus, and timeliness of corrective actions. Minor issues entered into the licensee's corrective action program because of the inspectors' observations are included in the attached list of documents reviewed.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure, they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

##### b. Findings

No findings of significance were identified.

#### .2 Daily Corrective Action Program Reviews

##### a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's corrective action program. The inspectors accomplished this through review of the station's daily corrective action documents.

The inspectors performed these daily reviews as part of their daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

##### b. Findings

No findings of significance were identified.

### .3 Selected Issue Follow-up Inspection

#### a. Inspection Scope

During a review of items entered in the licensee's corrective action program, the inspectors recognized a corrective action item documenting an issue associated with the incorrect assembly of a station component. The inspectors selected this issue for review because it was similar to prior instances where station personnel had performed work outside of the scope of work orders which had resulted in equipment deficiencies. These deficiencies were not discovered prior to returning equipment to service; and the inspectors determined that, if this practice continued, it could have a negative impact on other station equipment and cause plant transients. The inspectors selected this issue for review because improper work not discovered prior to returning equipment to service could have a negative impact on other station equipment and cause plant transients. The inspectors considered the following, as applicable, during the review of the licensee's actions: (1) complete and accurate identification of the problem in a timely manner; (2) evaluation and disposition of operability/reportability issues; (3) consideration of extent of condition, generic implications, common cause, and previous occurrences; (4) classification and prioritization of the resolution of the problem; (5) identification of root and contributing causes of the problem; (6) identification of corrective actions; and (7) completion of corrective actions in a timely manner.

These activities constitute completion of one in-depth problem identification and resolution sample as defined in Inspection Procedure 71152-05.

#### b. Findings

Introduction. The inspectors identified a finding associated with a station planner's failure to follow procedure which resulted in inadequate work instructions. This is not a violation because the isophase blower is not safety-related equipment. Specifically, contrary to Station Procedure EN-WM-105, "Planning" Revision 5, the work instructions generated to replace worn parts for isophase blower C-8A, did not provide sufficient details, nor provide references to appropriate instructions which provided sufficient detail, concerning reassembly of the damper positioner. This resulted in the positioner being incorrectly reassembled during the maintenance which caused the damper to not open or shut reliably.

Description. On November 5, 2008, during Refueling Outage 1R21, maintenance personnel performed corrective work on the Unit 1 isophase blower C-8A's damper positioner using station Work Order 00080217. The purpose of the work was to identify the extent of the repairs necessary and to replace/manufacture parts to enact the identified repairs. When work was completed, the operations department elected not to perform postmaintenance testing of the blower in accordance with Station Procedure OP-1025.033, "Control of Post Maintenance Testing," Revision 8.

Following completion of the refueling outage, on April 8, 2009, while operators were attempting to swap isophase fans, it was discovered that the damper for isophase blower C-8A failed to open without manual force being applied. This was documented in Condition Report CR-ANO-1-2009-0753. Subsequently, Work Order 00190239 was

generated to restore/verify the reliability of the suction dampers for isophase blower C-8A. Work was completed on April 15, 2009. Subsequently, operators initiated Condition Report CR-ANO-1-2009-0804 which identified that, following the maintenance, the damper for isophase blower C-8A did not actuate properly.

Work Order 00190916 was written to address this ongoing issue. During performance of this work order, the fix-it-now team and system engineer determined that the damper positioner had been incorrectly assembled on the drive motor shaft. This resulted in incorrect operation of the damper. It was also determined that this damper was last disassembled during Refueling Outage 1R21 using Work Order 00080217. The licensee entered this issue into their corrective action program as Condition Report CR-ANO-1-2009-0865.

During the inspectors review, they noted that all three work orders were classified as reference level work orders. However, the inspectors noted the work orders to be vague and did not provide sufficient guidance to accomplish the stated purposes nor did they reference any other manuals or documents with detailed instructions. The inspectors determined this to be contrary to Station Procedure EN-WM-105, Revision 5, "Planning," which states, in part, in Section 5.2[4](e) that for reference packages the planner will identify what needs to be done and refer to approved references for work instructions. As such, the inspectors determined that the planner had failed to follow station procedure and generate a reference work package with a level of detail above skill of the craft which referred to appropriate references to provide necessary guidance to perform the desired work, and this had resulted in the damper positioner being assembled incorrectly.

Analysis. The failure of station planners to follow the requirements of Station Procedure EN-WM-105 and generate a reference work package with a level of detail above skill of the craft which referred to appropriate references to provide necessary guidance was a performance deficiency. The finding was more than minor because it affected the procedure quality attribute of the Initiating Events Cornerstone, and it directly affected the cornerstone objective to limit the likelihood of those events that upset plant stability during power operations. Using Inspection Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, this finding was determined to have very low safety significance because it did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions would not be available. The finding had a crosscutting aspect in the area of human performance associated with work practices [H.4(b)], in that the licensee failed to define and effectively communicate expectations regarding procedural compliance and personnel followed procedures. Specifically, station planners failed to follow Procedure EN-WM-105 when developing work instructions for a reference level work package which resulted in an inadequate work package for the planned activities for the isophase blower.

Enforcement. The affected isophase blower was not safety related, therefore, no violation of NRC requirements occurred. The licensee has entered this issue into their corrective action program as Condition Report CR-ANO-1-2009-865: FIN 05000313/2009003-02, "Failure to Follow Station Planning Procedure Results in an Inadequate Work Instructions."

#### .4 Selected Issue Follow-up Inspection

##### a. Inspection Scope

During a review of items entered in the licensee's corrective action program, the inspectors recognized a corrective action item documenting installation of previously identified defective material in the plant. The inspectors selected this issue for review because it was similar to a prior instance where station personnel had failed to properly control nonconforming components which resulted in their installation into safety-related systems. The inspectors determined that the failure to properly control defective material could have a significant impact on station equipment and result in systems not being able to perform their design functions. The inspectors selected this issue for review because the failure to properly control defective material could have a significant impact on station equipment and result in the system not being able to perform their design functions. The inspectors considered the following, as applicable, during the review of the licensee's actions: (1) complete and accurate identification of the problem in a timely manner; (2) evaluation and disposition of operability/reportability issues; (3) consideration of extent of condition, generic implications, common cause, and previous occurrences; (4) classification and prioritization of the resolution of the problem; (5) identification of root and contributing causes of the problem; (6) identification of corrective actions; and (7) completion of corrective actions in a timely manner.

The inspectors considered the following, as applicable, during the review of the licensee's actions: (1) complete and accurate identification of the problem in a timely manner; (2) evaluation and disposition of operability/reportability issues; (3) consideration of extent of condition, generic implications, common cause, and previous occurrences; (4) classification and prioritization of the resolution of the problem; (5) identification of root and contributing causes of the problem; (6) identification of corrective actions; and (7) completion of corrective actions in a timely manner.

These activities constitute completion of one in-depth problem identification and resolution sample as defined in Inspection Procedure 71152-05.

##### b. Findings

Introduction. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XV, "Nonconforming Materials, Parts, or Components," associated with the licensee's failure to properly control nonconforming components. Specifically, in 1997 the licensee identified that two check valves, which had been installed in the postaccident monitoring system, had a defective design that prevented them from seating all of the way. However, the stations material control system was not updated with this information and this model valve was subsequently issued for use in the high pressure safety injection pressurization system which resulted in leakage due to the valves failure to completely seat.

Description. In January 2004 the licensee detected the presence of a gas void in the recirculation piping of high pressure safety injection pump 2P-89B. This issue was entered into the corrective action program as Condition Report CR-ANO-2-2004-0065.

The void was vented and periodic monitoring was established. This periodic monitoring revealed that reformation of the gas bubbles was occurring and it was determined that this could challenge the operability of the pump. On June 10, 2004, under the direction of Engineering Evaluation ER-ANO-2000-3275-003, Revision 0, "Engineering Evaluation in Support of Temporary Alterations to Install SIT Fill System to "B" HPSI Header," the licensee installed a temporary fill system to the high pressure safety injection header B to prevent gas void formation.

On November 19, 2007, under the direction of Engineering Change EC-704, "HPSI Pressurization System Creation," Revision 0, the licensee installed a permanent pressurization system on the high pressure safety injection system. This system consisted of two independent pumps, one for each high pressure safety injection header, which were separated from the headers by two in line check valves 2HPS-36, -38, -31, and -33), which served as the safety related boundary for the system.

On January 11, 2008, during initial testing of the pressurization system, Condition Reports CR-ANO-2-2009-0041 and CR-ANO-2-2009-0042 were initiated to document the failure of check valves 2HPS-31, -36, and -38 to meet the established seat leakage criteria of less than 6 drops per minute, with actual leakage being 8 drops per minute, 12 drops per minute, and 74 drops per minute, respectively. Condition Report CR-ANO-2-2009-0042 was closed to Condition Report CR-ANO-2-2009-0041 and the corrective actions were to raise the allowable leakage of the valves and replace the valves. Station Procedure OP-2104.039, "HPSI System Operation," Revision 50, was revised to incorporate that, if the leak rate was equal to or exceeded 30 drops per minute, a condition report was to be written and the valves were to be considered operable as long as leak rate was less than 90 drops per minute.

Subsequently, on July 24, 2008, quarterly testing was performed on valves 2HPS-38 and no leakage was observed. However, during quarterly testing performed on October 16, 2008, the obtained leak rate of valve 2HPS-38 was 30 drops per minute (no condition report written to document this issue). During quarterly testing performed on January 8, 2009, the obtained leak rate of valve 2HPS-38 was 60 drops per minute. This was documented as Condition Report CR-ANO-2-2009-0035 which was closed to Work Order 51685532 which had been written to replace valve 2HPS-38. Subsequently, on April 30, 2009, the obtained leak rate of valve 2HPS-38 was 72 drops per minute. Condition Report CR-ANO-2-2009-1012 was written to document this issue.

On May 20, 2009, Work Order 13665 was performed to replace valves 2HPS-36 and -38 with new check valves of the same manufacturer and model. Following installation, the valves were tested and the obtained leak rate of valve 2HPS-38 was too large to quantify in terms of drops per minute, a steady stream of water was observed at the collection point. This was documented in Condition Report CR-ANO-2-2009-1166. This condition report was closed to Condition Report CR-ANO-2-2009-1012.

The licensee performed an apparent cause evaluation as documented in Condition Report CR-ANO-2-2009-1012. In this evaluation while reviewing external/internal operating experience, the licensee determined that the model check valves used for valves 2HPS-36 and -38 had previously been determined to have design deficiencies that prevented them from meeting their seat leakage criteria as documented in station

Engineering Report ER-973741E201, "Equivalency of PASS Check valves 2PS120 and 2PS164," Revision 0. The licensee determined that, when this was identified, no actions were taken to remove the valves from the supply system or place them on hold. This had resulted in the same model valve being used for valves 2HPS-36 and -38, which had resulted in the identified leakage. Valves 2HPS-31 and -33 used a different style valve from a different manufacturer.

The inspectors reviewed the licensee's apparent cause evaluation for this issue. The inspectors concluded that the licensee was correct in the identified apparent cause. However, the inspectors determined that the licensee's corrective actions were not sufficient to address the cause of this issue. Specifically, the licensee had not specified any corrective actions to address the identified weakness with the material control system with respect to how identified defective material would be controlled/removed to ensure that it could not be installed in the plant again. During this review, the inspectors also determined that this issue was similar to a previous instance identified in Condition Report CR-ANO-1-2008-2578, where the licensee had failed to take appropriate corrective actions for identified deficient material and this material was installed into the plant. The inspectors again noted that there were no corrective actions specified for the material control system with respect to how identified defective material would be controlled/removed to ensure that it could not be installed in the plant again. The inspectors informed the licensee of their concerns.

Analysis. The failure to control nonconforming components in order to prevent inadvertent installation or use was a performance deficiency. The performance deficiency was more than minor because it affected the design control attribute of the Barrier Integrity Cornerstone and it directly affected the cornerstone objective to provide reasonable assurance that the physical design barriers protect the public from radionuclide releases caused by accidents or events. Using Inspection Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, this finding was determined to have very low safety significance because the finding (1) did not represent a degradation of the barrier functions of the control room or auxiliary building, (2) did not represent a degradation of the barrier function of the control room against smoke or a toxic atmosphere, (3) did not represent an actual open pathway in the physical integrity of reactor containment, and (4) did not involve an actual reduction in the function of hydrogen ignitors in the reactor containment. The finding was determined to have a crosscutting aspect in the area of Problem Identification and Resolution associated with the Corrective Action Program [P.1(c)], in that the licensee failed to thoroughly evaluate problems such that the resolutions address causes and extent of conditions, as necessary. This is indicative of current plant performance because the licensee continues to inadequately evaluate issues and develop appropriate resolutions.

Enforcement. In accordance with 10 CFR Part 50, Appendix B, Criterion XV, "Nonconforming Materials, Parts, or Components," requires, in part, that measures shall be established to control materials, parts, or components which do not conform to requirements in order to prevent their inadvertent use or installation. These measures shall include, as appropriate, procedures for identification, documentation, segregation, disposition, and notification to affected organizations. Contrary to the above requirement, the licensee failed to ensure that a model of check valve that had been determined to have a deficient design in 1997 was controlled and not issued for use or

installation. This resulted in subsequent failure of check valve 2HPS-38. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program as Condition Report CR-ANO-2-2009-1012, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000368/2009003-03, "Failure to Prevent the Installation of Nonconforming Components."

#### **4OA3 Event Follow-up (71153)**

##### **.1 Unplanned Loss of Main Feedwater Pump P-1B**

###### Inspection Scope

On April 9, 2009, the inspectors responded to the Unit 1 control room due to an unplanned loss of main feedwater pump P-1B which resulted in a runback to 40 percent reactor power. The inspectors observed control room operators, walked down control panels, and discussed the sequence of events with operators, the shift manager, and other operations personnel and determined that the reactor responded as expected, no abnormalities occurred and that operators responded as licensee procedures and training would dictate. The inspectors also reviewed the initial licensee notification to verify that it met the requirements specified in NUREG-1022, Revision 2, "Event Reporting Guidelines."

##### **b. Findings**

Introduction. The inspectors documented a Green self-revealing finding associated with the trip of main feed pump P-1B on April 9, 2009. Specifically, the main feed pump tripped due to an intermittent electromagnetic interference signal. This interference caused the digital speed monitor to sense an over speed condition and generate a trip signal for the main feed pump turbine when no such condition actually existed. This issue was the result of the licensee not properly implementing a modification whose purpose it was to noise harden the main feed pumps control cabinets.

Description. On April 9, 2009, while Unit 1 was operating at 100 percent power main feed pump P-1B tripped, which caused the integrated control system to perform an unplanned automatic power reduction to 40 percent power. Operations reviewed all indications and concluded that the cause of the pump trip was a sensed over speed condition associated with the digital speed monitor. However, when operators reviewed plant computer data, they determined that at the time of the trip the main feed pumps speed was steady at 5300 RPM, which was below the digital speed monitors over speed trip setpoint is 6300 RPM. Therefore, the operators concluded that there were no indications of an actual over speed condition. The licensee entered this into their corrective action program as Condition Report CR ANO-1-2009-0760.

The licensee performed a root cause analysis of this issue as documented in Condition Report CR ANO-1-2009-0760. During their investigation, the licensee determined that in 1996, the main feed pump controls had been replaced with the currently installed system using Design Change Package DCP-93-1013, Revision 0, "ICS and MFWP Turbine Control Modifications." Part of this change was to also install electromagnetic

interference improvements to the cabinets based on recommendations provided by a vendor for the purpose of noise hardening the cabinets. However, during their review, the licensee discovered that not all of these changes relative to the digital speed probe had been implemented. Specifically, shields had not been landed where the cables entered the cabinet; instead they were still terminated on the terminal block in the back of the cabinet. This was determined to make the digital speed monitor susceptible to electromagnetic interference.

The licensee also noted that there were many similarities between this event and what was seen in the September 2006 trip of the main feed pump A, documented in Condition Report CR ANO-1-2006-1399. As such, when the licensee reviewed the root cause analysis performed for this issue and noted that extensive troubleshooting activities confirmed that the digital speed monitor unit could fail when exposed to electromagnetic interference, no actions were implemented to correct this condition. Most of the corrective actions addressed the stations equivalency process, which had allowed an A/C unit to be installed on the cabinet with no EMI/RFI evaluation, and this had been the cause of the trip.

The licensee performed a failure modes analysis of this issue but, since the failure mode was intermittent and the digital speed monitor is still installed in the cabinet, the exact root cause was not determined. However, the licensee identified as the possible root cause that the original design of the digital speed monitor was inadequate, in that it has been proven to be susceptible to EMI/RFI and this is considered to be the most probable cause. The licensee also identified as possible contributing causes: (1) corrective actions for a previously identified event were not adequate to prevent recurrence and (2) inadequate implementation of vendor recommendations for EMI/RFI hardening of the main feed pump control system.

Analysis. The licensee's failure to properly implement a modification to noise harden the main feed pump control cabinets was a performance deficiency. The performance deficiency was more than minor because it affected the design control attribute of the Initiating Events Cornerstone, and it directly affected the cornerstone objective to limit the likelihood of those events that upset plant stability during power operations. Using Inspection Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, this finding was determined to have very low safety significance because it did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions would not be available. The finding was determined to have a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program [P.1(c)], in that the licensee failed to thoroughly evaluate problems such that the resolutions address causes and extent of conditions, as necessary. This is indicative of current plant performance because the licensee continues to inadequately evaluate issues and develop appropriate resolutions.

Enforcement. While a performance deficiency was identified with regard to the trip of main feed water pump P-1B, this pump was not safety related, therefore, no violation of NRC requirements occurred. The licensee has entered this issue into their corrective action program as Condition Report ANO-1-2009-0760: FIN 05000313/2009003-04, "Trip of a Main Feed Pump Due to Electromagnetic Interference."

## 40A5 Other Activities

### .1 Quarterly Resident Inspector Observations of Security Personnel and Activities

#### a. Inspection Scope

During the inspection period, the inspectors performed observations of security force personnel and activities to ensure that the activities were consistent with Arkansas Nuclear One's security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

#### b. Findings

No findings of significance were identified.

### .2 Operation of an Independent Spent Fuel Storage Installation at Operating Plants (60855.1); Review of 10 CFR 72.212(b) Evaluations at Operating Plants (60856.1)

#### a. Inspection Scope

At the time of this inspection, the Arkansas Nuclear One independent spent fuel storage installation contained 29 loaded Holtec HI-STORM casks and 24 loaded VSC-24 casks that were located on 2 separate independent spent fuel storage installation pads. The licensee had recently elected to adopt the requirements contained in Holtec HI-STORM Certificate of Compliance 1014, License Amendment 5, and the HI-STORM Final Safety Analysis Report, Revision 7, for use during the current cask loading campaign.

Portions of the canister loading operations were observed that were associated with HI-STORM Cask 30. Loading activities in process included the use of the forced helium dehydrator to remove the moisture from the multi-purpose canister, the use of the supplemental cooling system, helium backfill operation, and multi-purpose canister closure welding.

The characteristics of the spent fuel assemblies selected for loading into Cask 30 were reviewed and found to be in compliance with Certificate of Compliance 1014 technical specification requirements. The fuel assemblies had been selected for loading in accordance with the requirements contained in licensee Procedure 1302.028, "Fuel Selection Criteria for Dry Storage," Revision 15.

A tour of the independent spent fuel storage installation was performed by the inspectors. The condition of the HI-STORM and VSC-24 storage casks and the associated vents were determined to be adequate. There was no flammable or combustible material being stored in the independent spent fuel storage installation area.

The inspectors noticed the sequencing of the HI-STORM cask placement onto the independent spent fuel storage installation pad did not match any of the three cask placement sequences that had been evaluated and documented in Calculation CALC-01-E-0012-01, Revision 0, "Reinforced Concrete ISFSI Pad Design for the Holtec Dry Cask Storage System," for the settlement and seismic analysis. Conversations with design engineering personnel were inconclusive as to whether the cask sequencing evaluated in the calculation enveloped the current cask sequencing due to a lack of documentation of the design assumptions that had been used. The licensee initiated Condition Report CR-ANO-C-2009-00715 to document the potential discrepancy. The licensee was ultimately able to determine that the original calculation did in fact bound the cask placement sequence that was in use.

The Holtec HI-STORM Technical Specification 3.1.2 and VSC-24 Technical Specification 1.3.1 required the licensee to verify that the upper and lower cask vents were clear of obstructions on a daily basis. Selected records documenting daily inspections for August 2006 and September 2007 were reviewed by the inspectors and determined to be adequate.

Annual inspections of the concrete exterior of the VSC-24 casks were required to be performed by VSC-24 Technical Specification 1.3.2. The review of the annual reports for 2005 through 2008 documented that all indications in the concrete greater than 1/2-inch long or 1/4-inch deep had been repaired. No deficiencies were observed that exceeded the technical specification cask repair threshold during the VSC-24 independent spent fuel storage installation tour.

During the previous independent spent fuel storage installation inspection, a violation had been issued for loading damaged fuel assemblies into Holtec canisters not authorized to contain damaged fuel (ML050900432). The licensee reported that the casks containing damaged fuel were being tracked in Procedure OP 1022.012, Revision 31, "Storage, Control & Accountability of Nuclear Fuel." During a review of the procedure, the inspectors noted that one VSC-24 canister was not included in the list of casks containing damaged fuel. The licensee initiated Condition Report CR-ANO-C-2009-00711 to document the omission of the canister serial number in the procedure.

The licensee provided a list of the condition reports that had been initiated in the corrective action system since the last inspection. Selected condition reports were chosen from the list for review. Condition Report CR-ANO-C-2006-00204 documented fuel assemblies that had been loaded into four VSC-24 canisters (MSB-03, -05, -09, and -13) that had been identified post loading as having defects that were larger than pinhole leaks or hairline cracks. The licensee concluded that the fuel loaded into these four canisters met the VSC-24 license conditions for storage. The four VSC-24 canisters in question had been loaded under Revision 0 of the VSC-24 Certificate of Compliance. The license condition in force at the time specified that only intact Zircaloy fuel with no known or suspected gross fuel cladding failures could be loaded into the MSB canisters. Although the fuel assemblies would not be considered as intact under current guidance, the fuel assemblies in question were considered to be intact under the previous cladding requirement since they did not contain gross cladding failures, making them eligible for storage under the VSC-24 Certificate of Compliance, Revision 0, requirements.

Representatives from the Division of Spent Fuel Storage and Transportation, Region IV, and the licensee participated in a conference call and concluded that the final determination reached by the licensee in Condition Report CR-ANO-C-2006-00204 was valid for storage under 10 CFR Part 72.

The licensee reported that there had been no 10 CFR 72.48 evaluations performed since the last inspection. Several of the 10 CFR 72.48 regulatory screenings that had been performed were reviewed along with the screening for the changes to the 10 CFR 72.212 report and were all found to meet regulatory requirements. Selected portions of the revisions to the licensee's 10 CFR 72.212 report incorporating License Amendment 5 and Final Safety Analysis Report, Revision 7, requirements were reviewed. The 10 CFR 72.212 report was found to adequately incorporate the changes associated with the revised Holtec licensing basis.

The inspectors questioned the licensee on the calibration frequency specified for the gauges that measured the pressure during the ASME Code hydrostatic pressure test of the multi-purpose canister. Section III, Article NB-6413 of the ASME Code required that the hydrostatic gauge be tested before each test or series of tests not to exceed a two-week interval. The licensee initiated Condition Report CR-ANO-C-2009-0916 to investigate and review the calibration frequency. The licensee discovered that the gauges used during the hydrostatic tests on Holtec multi-purpose Canisters 1-30 did not meet the two-week calibration frequency. Evaluations were performed to ensure that the gauges were accurate at the time of each hydrostatic test. Pre and postcalibration tests had been performed on each of the gauges used for the hydrostatic tests. In all cases, the gauges were found to be within prescribed accuracy requirements and the hydrostatic tests on the multi-purpose canister confinement welds were determined to be valid. Process changes were implemented to ensure that hydrostatic gauges were calibrated within a two week interval for future multi-purpose canister loading operations. This discrepancy is not safety significant due to the fact that the gauges were calibrated in accordance with the licensee's program and were in fact within prescribed accuracy requirements at the time of the hydrostatic tests. Although this condition requires correction, it constitutes a violation of minor significance that is not subject to enforcement in accordance with Section IV of the NRC Enforcement Policy.

b. Findings

No findings of significance were identified.

**40A6 Meetings**

Exit Meeting Summary

On March 26, 2009, the inspector presented the occupational and public radiation safety inspection results to Mr. R. Dodds, Acting General Manager, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

On May 14, 2009, the inspectors presented the onsite emergency preparedness inspection results to Mr. D. James and other members of the licensee's staff. The licensee acknowledged the issues presented. The inspector confirmed that proprietary, sensitive, or personal information examined during the inspection had been returned to the identified custodian.

On May 15, 2009, the inspector presented the triennial heat sink performance inspection results to Mr. B. Berryman, General Manager Plant Operations, and other members of licensee management. The inspectors confirmed that no proprietary information was reviewed.

On July 9, 2009, the inspectors presented the overall inspection results to you and other members of your licensee staff. The licensee acknowledged the issues presented. The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

#### **40A7 Licensee-Identified Violations**

The following violations of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as NCVs.

- Unit 1 Technical Specification, Section 5.4.1.a, "Procedures," requires, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Regulatory Guide 1.33, Appendix A, Section 3.d, requires, in part, that procedures for startup, operation, and shutdown of safety-related systems should provide instructions, as appropriate for the high pressure injection system. Contrary to the above requirement, the licensee failed to provide adequate procedures which resulted in an improper electrical equipment alignment of the Unit 1 high pressure injection pumps. Specifically, after declaring high pressure injection pump P-36C inoperable, high pressure injection pump P-36C was in a configuration where high pressure injection pump P-36C would auto-start rather than high pressure injection pump P-36B, the operable pump following a loss of coolant accident concurrent with a loss of offsite power. This was licensee identified because the inadequate pump electrical lineup was noted by the next operating shift crew and declared high pressure injection pump P-36C inoperable until the auto-start feature was defeated by racking out the associated breaker. This finding was determined to have very low safety significance because: (1) the finding was not a qualification deficiency that resulted in a loss of functionality of the high pressure injection system; (2) it did not lead to an actual loss of safety function of the system or train; (3) it did not result in the loss of one or more trains of nontechnical specification equipment; (4) it did not represent an actual loss of safety function of one or more nontechnical specification trains of equipment designated as risk-significant per 10 CFR 50.65, for greater than 24 hours; and (5) it did not screen as potentially risk-significant due to a seismic, flooding, or severe weather initiating event. This issue was entered into the licensee's corrective action program as Condition Report CR-ANO-1-2009-0881 which included an apparent cause evaluation.
- Unit 2 Technical Specification, Section 6.4.1.a, "Procedures," requires, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A,

dated February 1978. Regulatory Guide 1.33, Appendix A, Section 9.a, requires, in part, that procedures for maintenance that can affect the performance of safety-related equipment should be properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Contrary to the above requirement, the licensee failed to provide adequate work orders for maintenance performed on service water valves 2CV-1421-2, -1425-1, and -1400-1 from 2002 to 2005. Specifically, steps placed in maintenance Procedure OP-2402.094, to address a previously identified issue in 1997 to securely attach the motor-operated valve splined adaptor to the valve stem during maintenance using spot drilling where the setscrew impacted the key and using Loctite to secure the setscrew, were not referenced or included in any of the applicable work documents for the valves listed above. This was licensee identified because a walkdown performed by operations personnel in April 2009 noted the splined adapters that connect the Limitorque gearbox to the valve stem had slid down and was out of the gearbox on valves 2CV-1421-2 and 2CV-1425-1 and not fully inserted on valve 2CV-400-1. This finding was determined to have very low safety significance because: (1) the finding was not a qualification deficiency that resulted in a loss of operability of the service water system; (2) it did not lead to an actual loss of safety function of the system or train; (3) it did not result in the loss of one or more trains of nontechnical specification equipment; (4) it did not represent an actual loss of safety function of one or more non-technical specification trains of equipment designated as risk-significant per 10 CFR 50.65, for greater than 24 hours; and (5) it did not screen as potentially risk-significant due to a seismic, flooding, or severe weather initiating event. This issue was entered into the licensee's corrective action program as Condition Report CR-ANO-2-2009-00934 which included an apparent cause evaluation.

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

T. Armstrong, Chemistry  
B. Berryman, General Manager Plant Operations  
D. Bice, Acting Licensing Manager  
P. Butler, System Engineer  
B. Daiber, System Engineering Manager  
S. Darby, Senior Project Manager  
D. Eichenberger, Specialist, Licensing  
R. Fowler, Senior Emergency Preparedness Planner  
R. Gresham, Senior Emergency Preparedness Planner  
R. Holeyfield, Manager, Emergency Preparedness  
D. James, Director, Nuclear Safety Assurance  
D. Macphee, Design Engineer  
D. Moore, Manager, Radiation Protection  
N. Mosher, Licensing Specialist  
S. Pyle, Licensing Specialist  
C. Reasoner, Director of Engineering  
W. Renz, Director, Entergy Emergency Preparedness  
B. Sebring, Supervisor, Radiation Protection  
C. Sesny, Heat Exchanger Engineer  
D. Stoltz, ALARA Coordinator  
P. Weaver, Lead Auditor  
F. VanBuskirk, Licensing Specialist  
C. Walker, Senior Reactor Engineer  
R. Walters, Operations Manager  
P. Williams, Manager, Design Engineering

#### **NRC Personnel**

J. Josey, Resident Inspector  
J. Rotton, Resident Inspector  
A. Sanchez, Senior Resident Inspector

### **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

#### **Opened and Closed**

05000313/2009003-01	NCV	Failure to Follow Procedure and Perform Postmaintenance Testing Prior to Declaring Equipment Operable (Section 1R13)
05000313/2009003-02	FIN	Failure to Follow Station Planning Procedure Results in an Inadequate Work Instructions (Section 4OA2)

05000368/2009003-03	NCV	Failure to Appropriately Identify and Implement Adequate Corrective Actions to Correct a Condition Adverse to Quality Associated with the Material Control System (Section 4OA2)
05000313/2009003-04	FIN	Trip of a Main Feed Pump Due to Electromagnetic Interference (Section 4OA3)

**LIST OF DOCUMENTS REVIEWED**

**Section 1RO1: Adverse Weather Protection**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION/ DATE</u>
1203.025	Natural Emergencies	27
2203.008	Natural Emergencies	17
1203.037	Abnormal ES Bus Voltage and Degraded Offsite Power	6
1015.044	Summer Reliability Operations	6
PL-159	Summer Reliability Plan	0
ENS-DC-201	ENS Transmission Grid Monitoring	3

CONDITION REPORTS

ANO-C-2008-0033	ANO-C-2008-1096	ANO-C-2008-1170	ANO-C-2009-0474
ANO-C-2008-0380	ANO-C-2008-0296	ANO-C-2008-1813	ANO-2-2009-0509

**Section 1RO4: Equipment Alignment**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
OP-2140.037	Alternate AC Diesel Generator Operations	17
OP-1104.002	Makeup and Purification System Operation	63
OP-2104.040	LPSI System Operations	46
OP-2104.036	Emergency Diesel Generator Operations	64
OP-1104.024	Instrument Air System	33
OP-1104-036	Emergency Diesel Generator Operation	49

Drawings

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
M-2232	Safety Injection System	117

**Section 1RO5: Fire Protection**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
FHA	Arkansas Nuclear One Fire Hazards Analysis	11
PFP-U1	ANO Prefire Plan (Unit 1)	9
PFP-U2	ANO Prefire Plan (Unit 2)	9

CALCULATIONS

<u>NUMBER</u>	<u>TITLE</u>
CALC-85-E-0053-051	Fire Area EE Combustible Loading Calculation
CALC-85-E-0053-050	Fire Area B Combustible Loading Calculation

DRAWING

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
FZ-2151, Sheet 1	No title for this document	2
FZ-1044, Sheet 1	No title for this document	2
FZ-1041, Sheet 1	No title for this document	2
FZ-2004, Sheet 1	No title for this document	2

**Section 1RO6: Flood Protection Measures**

CALCULATIONS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
CALC-89-E-0048-35	ANO-2 Internal Flood Analysis	0
CALC-92-R-0024-01	Flooding Evaluation INPO SOER 85-5	0
CALC-92-R-0034-01	Flooding Evaluation INPO SOER 85-5 2 <sup>nd</sup> Iteration	0

CONDITION REPORTS

CR ANO-1-2009-0565                      CR ANO-1-2009-0568                      CR ANO-1-2009-0737

MISCELLANEOUS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
ULD-0-TOP-17	ANO Flooding Topical	0

**Section 1RO7: Heat Sink Performance**

Calculations

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
CALC-88-E-0032-05	Unit 2 Containment Service Water Cooling Coils Thermal Performance	3
CALC-89D-2049-01	Unit 2 Service Water System Water Hammer Analysis	0
CALC-89D-2049-10	Water Hammer Load Reconciliation for the Reactor Building Cooling Coil Service Water Supply and Return Lines	0
CALC-89D-2049-02	Water Hammer Mitigation Analysis	0
CALC-99-R-2006-01	American Air Filter Test Report AAF-TR-7101	001-03-0
CALC-91-R-2013-01	Service Water Performance Testing Methodology	21

CONDITION REPORTS

CR ANO-2-2008-00950                      CR ANO-2-2009-00540                      CR ANO-C-2007-01202  
CR ANO-2-2008-01409                      CR ANO-2-2009-00878                      CR ANO-C-2008-02550  
CR ANO-2-2009-00278                      CR ANO-1-2009-0955

ENGINEERING REPORTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
ER-ANO-2005-0168-000	Evaluate 2E-35A Shutdown Cooling Heat Exchanger Thermal Performance in 2R17	0
Engineering Change 3930	Evaluation of 2E35B Thermal Performance Test	0
Engineering Change 3680	Unit 2 Emergency Diesel Generator, 2K-4A & 2K-4B, Thermal Test Results for Cycle 19	0

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
OP-1052.007	Secondary Chemistry Monitoring	027
OP-1306.019	Annual Emergency Cooling Pond Sounding	009-01-0
OP-1608.007	Eradication of Fish and Algae Monitoring at the Emergency Cooling Pond	003
OP-1628.013	Addition of Non-Oxidizing Biocide	006-01-0
OP-1628.014	Operation of the Oxidizing Biocide System	15
OP-1628.026	Sampling Unit 2 Service Water and Auxiliary Cooling Water	003-02-0
OP-1628.029	Sampling Unit 1 Service Water and Auxiliary Cooling Water	004-02-0
OP-2311.001	Shutdown Cooling Heat Exchanger Performance Test	005-00-0
OP-2311.002	Service Water System Flow Test	017
OP-1309.018	EDG Cooler Thermal Test	004-02-0

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
ALO-2008-0063	Heat Sink Performance Assessment	February 16-20, 2009
EC 6968	Document Results of 2R19 As-Left Service Water Flow Test	0
EN-DC-316	Nuclear Management Manual – Heat Exchanger	0

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
	Program	
Unit 1 Final Safety Analysis Report, Section 9.3.2.1	Service Water and Intermediate Cooling Water Systems	Amendment 21
Unit 2 Final Safety Analysis Report, Section 9.2.1	Service Water System	Amendment 20
Letter 0CAN019012	Response to Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment"	January 26, 1990
Letter 0CAN079005	Supplemental Information Related to NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment"	July 2, 1990
Letter 0CAN119010	Revision to Response to Generic Letter 89-13	November 30, 1990
Letter 1CAN119016	Information About the Modifications to Be Deferred From the Ninth Refueling Outage	November 30, 1990
Letter 0CAN099110	Implementation Status of Four Issues at ANO	October 3, 1991
Letter 1CAN039209	Modified Component Testing List for Generic Letter 89-13	March 20, 1992
Letter 1CAN069202	Completion of ANO-1 Initial Activities for Generic Letter 89-13; Service Water System Problems	June 8, 1992
Letter 2CAN119201	Completion of ANO-2 Initial Activities for Generic Letter 89-13; Service Water System Problems	November 13, 1992
System Training Manual 2-42	Service Water & Auxiliary Cooling Water System	29
TD A220.0110	Installation and Maintenance of the Unit Two Reactor Building Cooling Units	2
TD A220.0140	Installation, Operation and Maintenance for Air Handling Units Model YA	2
ULD-1-SYS-01	ANO-1 Emergency Diesel Generator (EDG) System	5
ULD-1-SYS-10	ANO-1 Service Water Systems	14
ER-ANO-2006-0430-000	2006 Evaluation of U1 EDG Heat Exchanger Thermal Performance test data	0
EC-15052	2008 Evaluation of U1 EDG Heat Exchanger Thermal Performance test data	0

MODIFICATIONS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
Design Change Package 89-2049	Service Water and Auxiliary Cooling Systems Water Hammer Mitigation	0

WORK ORDER PACKAGES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
51048060	1306.019 Annual Emergency Cooling Pond Sounding	01
51051287	2VUC-11A External Inspection and Lube	01
51053280	2VCC-2D SW HX in 2SVF-1D, Cleaning/Inspection	01
51053310	2VCC-2B SW HX in 2SVF-1B, Cleaning/Inspection	01
51053483	2VCC-2C SW HX in 2SVF-1C, Cleaning/Inspection	01
51055706	2VUC-11A Filter Inspection	01
51204021	2311.002 Perform Service Water System Flow Test	01
51211041	1306.019 Annual Emergency Cooling Pond Sounding	01

**Section 1R12: Maintenance Effectiveness**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
EN-DC-203	Maintenance Rule Program	1
EN-DC-204	Maintenance Rule Scope and Basis	1
EN-DC-205	Maintenance Rule Monitoring	2
EN-DC-206	Maintenance Rule (a)(1) Process	1
OP-1104.002	Makeup & Purification System Operation	63

CONDITION REPORTS

CR ANO-C-2009-0710	CR ANO-1-2009-0872	CR ANO-1-2009-0997
CR ANO-1-2008-0171	CR ANO-1-2009-0876	CR ANO-2-2009-1227

## CALCULATIONS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
CALC-89-E-0048-35	ANO-2 Internal Flood Analysis	0
CALC-92-R-0024-01	Flooding Evaluation INPO SOER 85-5	0
CALC-92-R-0034-01	Flooding Evaluation INPO SOER 85-5 2 <sup>nd</sup> Iteration	0

## MISCELLANEOUS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION/ DATE</u>
ULD-0-TOP-17	ANO Flooding Topical	0
ER 974714-R-101	ECCS Flow Instrument Evaluation	1
Plant Impact Statement	500 kV North and South Bus Differential Primary and Backup Relay DC Function Checks	March 30, 2009
	Maintenance Rule Database Performance Criteria Basis, Unit 1 Auxiliary Building Sump	
	Maintenance Rule Database Performance Criteria Basis, Unit 1 Makeup and Purification	
	Maintenance Rule Database Performance Criteria Basis, Unit 1 High Pressure Injection	
	Maintenance Rule Database Performance Criteria Basis, Unit 2 Main Steam	
STM 2-15	Steam Generators & Main Steam System	11
ULD-2-SYS-21	ANO Unit 2 Main Steam	6
ULD-2-SYS-46	ANO Unit 2 Steam Dump and Bypass System (SDBS)	3
	Unit 2 Functional Failure Determination Report 2007-2009	

### **Section 1R13: Maintenance Risk Assessment and Emergent Work Controls**

## PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
COPD-024	Risk Assessment Guidelines	21
OP-1015.001	Conduct of Operations	
EN-MA-125	Troubleshooting Control of Maintenance Activities	4

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
EN-WM-105	Planning	5

CALCULATIONS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
Calc-93-E-0032-01	Temporary Qual of Piping With MOV Supports Removed	1

MISCELLANEOUS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION/DATE</u>
ER-974714-R-101	ECCS Flow Instrument Evaluation Plant Risk Assessment	1 April 16, 2009

CONDITION REPORTS

CR ANO-C-2009-0710	CR ANO-1-2009-0876	CR ANO-2-2009-1227
CR ANO-1-2008-0171	CR ANO-1-2009-0997	
CR ANO-1-2009-0872		

WORK ORDER

00196452

**Section 1R15: Operability Evaluations**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
EN-OP-104	Operability Determinations	3
1309.018	EDG Cooler Thermal Test	004-02-0
2104.033	Containment Atmosphere Control	56
2107.001	Electrical System Operations	71

CONDITION REPORTS

CR ANO-C-2009-0478	CR ANO-2-2004-0026	CR ANO-2-2009-0864
CR ANO-1-2004-0454	CR ANO-2-2004-1279	CR ANO-2-2009-0878
CR ANO-1-2009-0877	CR ANO-2-2005-0366	CR ANO-2-2009-1071
CR ANO-1-2009-0955	CR ANO-2-2005-2426	CR ANO-2-2009-1105
CR ANO-1-2009-1045	CR ANO 2-2009-1083	
CR ANO-2-1989-0008	CR ANO-2-2009-1268	
CR ANO-2-1990-0485	CR ANO-2-2009-1083	
CR ANO-2-1996-0225	CR ANO-2-2009-0526	
CR ANO-2-2009-1071	CR ANO-2-2009-0540	

MISCELLANEOUS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
ER-91-R-2013-01	Service Water Performance Testing Methodology	21

**Section 1R18: Plant Modifications**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
COPD-024	Risk Assessment Guidelines	21
EN-DC-136	Temporary Modifications	1

MISCELLANEOUS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
EC-14284	Emergency TMOD Opening Cabinet Doors in the Unit 2 Computer Room as a Result of Failure of 2VUC-43	0
EC-14498	Splined Adapter Retainer Collars for 2CV-1425-1, 2CV-1421-2, and 2CV-1400-1	0

**Section 1R19: Postmaintenance Testing**

PROCEDURE

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
OP-1104.002	Makeup and Purification System Operation	63
OP-2304.040	Unit 2 Plant Protection System Channel D Test	37
OP-2304.038	Unit 2 Plant Protection System Channel B Test	39
OP-1104.036	Emergency Diesel Generator Operation	48
OP-1106.006	Emergency Feedwater Pump Operation	76
OP-2104.036	Emergency Diesel Generator Operations	64
OP-2306.005	Maintenance Surveillance on Unit 2 Emergency Diesel Generator 2K-4	27
OP-1412.001	Preventative Maintenance of Limitorque SB/SMB Motor operators	22

WORK ORDERS

51650421                      51684531                      51684522                      51792681  
00196452                      51658807

CONDITION REPORTS

CR ANO-2-2009-1087    CR ANO-2-2009-1088    CR ANO-2-2009-1086

**Section 1R22: Surveillance Testing**

PROCEDURE

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
OP-2104.007	Control Room Emergency Air Conditioning and Ventilation	39
OP-2104.005	Containment Spray	56
OP-2104.039	HPSI System Operation	54
OP-1304.181	Unit 1 RCS Radiation Leak Detection System Quarterly Test	009-00-0

**Section 1EP2: Alert Notification System Testing**

MISCELLANEOUS

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
	Alert and Notification System Report for Arkansas Nuclear One	February 13,

**Section 1EP4: Emergency Action Level and Emergency Plan Changes**

PROCEDURE

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION/ DATE</u>
1903.011	Emergency Response/Notifications	Revision 31

**Section 1EP5: Correction of Emergency Preparedness Weaknesses and Deficiencies**

MISCELLANEOUS

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
QA-7-2008-ANO-1	Emergency Preparedness Program Audit	
QS-2008-ANO-006	Follow-up on Issues from the ANO Emergency Planning Audit	
ANO-2009-0033	SRC Oversight/Licensing/50.59 Subcommittee Meeting Minutes	
ALO-2009-00019	Emergency Plan INPO Based Focused Self Assessment	January 12-16, 2009
HQN-LO-2009-0003	EP INPO Based Focused Self Assessment	December 8, 2008 – January 31, 2009
EP-2008-0010	Emergency Response Organization Full Scale Drill	April 23, 2008
EP-2008-0017	Emergency Response Organization Full Scale Drill	February 20, 2008
EP-2008-0020	Emergency Response Organization- Radiological Emergency Preparedness (REX-2008) Exercise	May 21, 2008

## CONDITION REPORTS

CR ANO-C-2008-1032	CR ANO-C-2008-1327	CR ANO-C-2008-2107
CR ANO-C-2008-1046	CR ANO-C-2008-1328	CR ANO-C-2008-2189
CR ANO-C-2008-1047	CR ANO-C-2008-1899	CR ANO-C-2009-0570
CR ANO-C-2008-1083	CR ANO-C-2008-2032	CR ANO-C-2009-0854
CR ANO-C-2008-1326		

### **Section 1EP6: Drill Evaluation**

#### PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
OP-1903.011J	NUE Emergency Direction and Control Checklist	31
OP-1903.011Y	Drill Use Only: Emergency Class Initial Notification Message	35
OP-1903.011M	Alert Emergency Direction and Control Checklist	31
OP-1903.011U	GE Emergency Direction and Control Checklist	31
OP-1903.011R	SAE Emergency Direction and Control Checklist	31
OP-1903.011Z	Drill Use Only: Emergency Class Followup Notification Message	35
SES-1-002	Dynamic Exam Scenario	7

### **Section 2OS1: Access Controls to Radiologically Significant Areas**

#### PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
1000.031	Radiation Protection Manual	20
1012.018	Administration of Radiological Surveys	11
EN-RP-101	Access Control for Radiologically Controlled Areas	4

#### AUDITS, SELF-ASSESSMENTS, AND SURVEILLANCES

<u>NUMBER</u>	<u>TITLE</u>
ALO-2008-061	Access to Radiologically Significant Areas and ALARA
ALO-2008-004	Alpha Monitoring

CONDITION REPORTS

CR ANO-1-2008-1387                      CR ANO-1-2008-1527                      CR ANO-C-2008-2607  
CR ANO-1-2008-1476                      CR ANO-1-2008-1961

RADIATION WORK PERMITS

<u>NUMBER</u>	<u>TITLE</u>
2008-1472	1R21 Alloy 600 Mitigation Activities
2008-1442	1R21 S/G Primary Side Inspection and Repairs
2008-1430	Refueling Path Activities to Include Remove/Replace RVCH, Remove/Replace Plenum, De-Tensioning & Tensioning Studs
2008-1420	1R21 Scaffold Activates
2008-1471	1R21 Alloy 600 Inspections

**Section 2OS2: ALARA Planning and Controls**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
1601.003	Control of Temporary Shielding	10
1012.032	ALARA Work Control and Planning	0
EN-RP-105	Radiation Work Permits	4
EN-RP-110	ALARA Program	5
EN-RP-206	Dosimeter of Legal Record Quality Assurance	1

SHIELDING PACKAGES

<u>NUMBER</u>	<u>TITLE</u>
06-2-005	Permanent Installation of Shadow Shield Inside "A" HPSI Vault
08-1-016	Primary Shield Wall
08-1-024	Reactor Building Drain Piping, Cold Leg Drains, Piping and Header
08-1-025	R1 336' Elevation, North Cavity, West of "C" Cold Leg
08-1-101	Alloy 600 DMW Mitigation, Decay Heat Nozzle
08-1-106	Alloy 600 DMW Mitigation, Core Flood Nozzle

CONDITION REPORTS

CR ANO-1-2008-1493	CR ANO-1-2008-2069	CR ANO-2-2009-0350
CR ANO-1-2008-1503	CR ANO-1-2008-2097	
CR ANO-1-2008-1523	CR ANO-1-2008-2466	

**Section 40A1: Performance Indicator Verification**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
EN-LI-114	Performance Indicator Process	0

**Section 40A2: Identification and Resolution of Problems**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
EN-WM-105	Planning	5
EN-WM-102	Work Implementation and Closeout	2
OP-2104.039	HPSI System Operation	52

CONDITION REPORTS

CR ANO-1-2008-2578	CR ANO-1-2009-0804	CR ANO-2-2009-1012
CR ANO-1-2009-0753	CR ANO-1-2009-0865	

MISCELLANEOUS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
EC-704	HPSI Pressurization System Creation	0
ER-973741E201	Equivalency of PASS Check Valves 2PS120 and 2PS164	0

**Section 4OA3: Event Follow-Up**

CONDITION REPORTS

ANO-1-2006-1399                      ANO-1-2009-0423                      ANO-1-2009-0760  
ANO-1-2008-0162

MISCELLANEOUS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
DCP-93-1013	ICS and MFWP Turbine Control Modifications	0

**Section 4OA5: Other Activities**

CORRECTIVE ACTION DOCUMENTS

CR ANO-2-2005-00600	CR ANO-C-2006-01271	CR ANO-C-2009-00711
CR ANO-2-2008-01328	CR ANO-C-2006-01920	CR ANO-C-2009-00715
CR ANO-C-2005-00016	CR ANO-C-2007-01203	CR ANO-C-2009-00916
CR ANO-C-2005-00703	CR ANO-C-2008-00269	HQN-2005-0287
CR ANO-C-2005-00756	CR ANO-C-2008-00871	
CR ANO-C-2006-00204	CR ANO-C-2008-02504	
CR ANO-C-2006-00436		

10 CFR 72.48 SCREENINGS

CR ANO-2009-0001	CR ANO-2009-0003	CR ANO-2009-0005
CR ANO-2009-0002	CR ANO-2009-0004	CR ANO-2009-0006

PROCEDURES

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3406.006	Forced Helium Dehydration System Operations	3
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CALCULATIONS

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MISCELLANEOUS

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