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

May 2, 2012

Christopher J. Schwarz, Site Vice President
Arkansas Nuclear One
Entergy Operations, Inc.
1448 SR 333
Russellville, AR 72802-0967

SUBJECT: ARKANSAS NUCLEAR ONE – NRC COMPONENT DESIGN BASIS INSPECTION REPORT 05000313/2012007 AND 05000368/2012007

Dear Mr. Schwarz:

On March 16, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Arkansas Nuclear One, Units 1 and 2. The enclosed inspection report documents the inspection results which were discussed on March 16, 2012, with Mr. M. Chisum, General Manager, and other members of your staff.

The inspection 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.

Based on the results of this inspection, the NRC has identified three findings that were evaluated under the risk significance determination process. Violations were associated with all of the findings. All of the findings were found to have very low safety significance (Green) and the violations associated with these findings are being treated as non-cited violations, consistent with the NRC Enforcement Policy.

If you contest these non-cited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Arkansas Nuclear One. The information you provide will be considered in accordance with Inspection Manual Chapter 0305. In addition, if you disagree with the characterization of the crosscutting aspect assigned to 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.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Document Access and Management 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/

Thomas R. Farnholtz, Branch Chief
Engineering Branch One
Division of Reactor Safety

Docket Nos: 05000313, 05000368
License Nos: DPR-51, NPF-6

Enclosure: Inspection Report 05000313/2012007 and 05000368/2012007
w/ Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	50-313, 50-368
License:	DPR-51, NPF-6
Report No.:	05000313/2012007 and 05000368/2012007
Licensee:	Entergy Operations, Inc.
Facility:	Arkansas Nuclear One, Units 1 and 2
Location:	1448 SR 333 Russellville, AR 72802-0967
Dates:	February 13, 2012, to March 16, 2012
Team Leader:	G. A. George, Senior Reactor Inspector, Engineering Branch 1
Inspectors:	C. Denissen, Reactor Inspector A. Fairbanks, Reactor Inspector N. Okonkwo, Reactor Inspector C. Steely, Operation Engineer
Accompanying Personnel:	C. Baron, Contractor, Beckman and Associates S. Kobylarz, Contractor, Beckman and Associates
Approved By:	Thomas R. Farnholtz, Branch Chief Engineering Branch 1

SUMMARY OF FINDINGS

IR 05000313; 05000368/2012007; February 13, 2012 – March 16, 2012; Arkansas Nuclear One; baseline inspection, NRC Inspection Procedure 71111.21, "Component Design Basis Inspection."

The report covers an announced inspection by a team of five regional inspectors and two contractors. Three findings were identified. All of the findings were of very low safety significance (Green). The final significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 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

Cornerstone: Mitigating Systems

- Green. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion XII, "Control of Measuring and Test Equipment," which states, in part, "measures shall be established to assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting quality are properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits." Specifically, prior to March 16, 2012, the licensee failed to establish measures to assure that pressure and temperature instruments used in monitoring and preventive maintenance for Unit 1 and Unit 2 safety-related 480 Vac load center transformers were calibrated and adjusted at specified periods to maintain accuracy within necessary limits. This finding was entered into the licensee's corrective action program as Condition Report CR-ANO-C-2012-00657.

  The team determined that the failure to calibrate pressure and temperature instruments for Unit 1 and Unit 2 safety-related load center transformers X5, X6, 2X25, and 2X26 was a performance deficiency. This finding was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee's programmatic failure to calibrate pressure and temperature instruments for Unit 1 and Unit 2 safety-related 480 Vac load center transformers would challenge the operability of the transformers. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in a loss of operability or functionality. Specifically, the licensee confirmed, through portable measurement equipment, that each transformer's gas coolant pressure and temperature were not in a condition which challenged operability during the previous 12 years. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance. (Section 1R21.2.1)

- Green. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that "measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in §50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions." Specifically, prior to March 16, 2012, the licensee failed to translate the site extreme maximum outside air temperatures, as stated in the updated safety analysis report, into calculations that determined the combustion air temperature available for the Unit 2 emergency diesel generators. This finding was entered into the licensee's corrective action program as Condition Reports CR-ANO-2-2012-00436 and CR-ANO-2-2012-00486.

  The team determined that the failure to translate the updated safety analysis report design basis for site extreme maximum temperature into combustion air temperature calculations was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee failed to evaluate the effects of increased combustion air temperature on the load capacity of the Unit 2 emergency diesel generators, when outside air temperature reaches the design basis extreme maximum temperature. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in a loss of operability or functionality. Specifically, the team confirmed that historical outside air temperature was never in a condition that resulted in the loss of required diesel load capacity during accident conditions. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance. (Section 1R21.2.11)

- Green. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that "measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in §50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions." Specifically, prior to March 16, 2012, the licensee failed to ensure that design basis information associated with the emergency feedwater pump runout conditions were correctly translated into design basis calculations for required net positive suction head, pump motor requirements, and emergency diesel generator loading. This finding was entered into the licensee's corrective action program as Condition Report CR-ANO-2-2012-00501.

  The team determined that the failure to translate the correct brake horsepower during runout conditions for the emergency feedwater pump 2P-7B pump impeller into design basis calculations for required net positive suction head and emergency diesel generator loads was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to correctly translate the actual brake

horsepower resulted in the reduction of available emergency diesel generator capacity margin from 3 percent to 1.6 percent. This represented a 47 percent decrease in margin on a low margin component. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in a loss of operability or functionality. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance. (Section 1R21.2.14)

B. Licensee-Identified Violations

No findings were identified.

REPORT DETAILS

1 REACTOR SAFETY

Inspection of component design basis verifies the initial design and subsequent modifications and provides monitoring of the capability of the selected components and operator actions to perform their design basis functions. As plants age, their design basis may be difficult to determine and important design features may be altered or disabled during modifications. The plant risk assessment model assumes the capability of safety systems and components to perform their intended safety function successfully. This inspectable area verifies aspects of the Initiating Events, Mitigating Systems, and Barrier Integrity cornerstones for which there are no indicators to measure performance.

1R21 Component Design Basis Inspection (71111.21)

To assess the ability of the Arkansas Nuclear One, Units 1 and 2, equipment and operators to perform their required safety functions, the team inspected risk significant components and the licensee's responses to industry operating experience. The team selected risk significant components for review using information contained in the Arkansas Nuclear One, Units 1 and 2, Probabilistic Risk Assessments and the U. S. Nuclear Regulatory Commission's (NRC) standardized plant analysis risk model. In general, the selection process focused on components that had a risk achievement worth factor greater than 1.3 or a risk reduction worth factor greater than 1.005. The items selected included components in both safety-related and nonsafety-related systems including pumps, circuit breakers, heat exchangers, transformers, and valves. The team selected the risk significant operating experience based on its collective past experience.

.1 Inspection Scope

To verify that the selected components would function as required, the team reviewed design basis assumptions, calculations, and procedures. In some instances, the team performed calculations to independently verify the licensee's conclusions. The team also verified that the condition of the components was consistent with their design bases and that the tested capabilities met the required criteria.

The team reviewed maintenance work records, corrective action documents, and industry operating experience records to verify that licensee personnel considered degraded conditions and their impact on the components. For the review of operator actions, the team observed operators during simulator scenarios, as well as during simulated actions in the plant.

The team performed a margin assessment and detailed review of the selected risk-significant components to verify that their design bases have been correctly implemented and maintained. This design margin assessment considered original design issues, margin reductions because of modifications, and margin reductions identified as a result of material condition issues. Equipment reliability issues were also considered in the selection of components for detailed review. These included items such as failed performance test results; significant corrective actions; repeated maintenance; 10 CFR 50.65(a)1 status; operable, but degraded, conditions; NRC

resident inspector input of problem equipment; system health reports; industry operating experience; and licensee problem equipment lists. Consideration was also given to the uniqueness and complexity of the design, operating experience, and the available defense in-depth margins.

The inspection procedure requires a review of 15 to 25 total samples that include risk-significant and low design margin components, containment related components, and operating experience issues. The sample selection for this inspection was 16 components, one of which was associated with containment; five operating experience items; and six event based activities associated with the components. The selected inspection and associated operating experience items supported risk significant functions including the following:

a. Electrical power to mitigation systems: The team selected several components in the electrical power distribution systems to verify operability to supply alternating current (ac) and direct current (dc) power to risk significant and safety-related loads in support of safety system operation in response to initiating events such as loss of offsite power, station blackout, and a loss-of-coolant accident with offsite power available. As such, the team selected:

- Unit 1, 4160 Vac Emergency Switchgear A3
- Unit 1, DC Bus D01 and 125 Vdc Distribution Panel D21
- Unit 1, Motor Control Center B61
- Unit 2, Emergency Diesel Generator 2DG2
- Unit 2, 480 V Vital Bus 2B63

b. Mitigating systems needed to attain safe shutdown: The team reviewed components required to perform the safe shutdown of the plant. As such, the team selected:

- Unit 1, Turbine Driven Emergency Feedwater Pump P-7A
- Unit 1, Emergency Diesel Generator/Service Water Motor Operated Valve CV-3807
- Unit 1, Reactor Building Coolers
- Unit 1, Borated Water Storage Tank T-3
- Unit 1, Decay Heat Removal Heat Exchanger E-35A
- Unit 1, Low Pressure Injection Motor Operated Valves CV-1276 and CV-1277
- Unit 1, Emergency Safety Actuation Loop Pressure Transmitter PT-1021
- Unit 2, High Pressure Safety Injection Pump 2P-89B
- Unit 2, Emergency Feedwater Motor Driven Pump 2P-7B
- Unit 2, Safety-Related Condensate Storage Tank 2T41B
- Unit 2, Emergency Cooling Pond

.2 Results of Detailed Reviews for Components

.2.1 Unit 1, 4160 Vac Emergency Switchgear A3

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, calculations, maintenance and test procedures, and

condition reports associated with the 4160 Vac emergency switchgear A3. The team also performed a visual inspection to assess the installation configuration, material condition, and potential vulnerability to hazards of the switchgear. Furthermore, the team reviewed testing and calibration of the local instrumentation and alarms. Specifically, the team reviewed:

- Component maintenance history and corrective action program reports to verify the monitoring of potential degradation.
- Calculations for electrical distribution, system load flow/voltage drop, short-circuit, and electrical protection to verify that bus capacity and voltages remained within minimum acceptable limits.
- The protective device settings and circuit breaker ratings to ensure adequate selective protection coordination of connected equipment during worst-case short circuit conditions.
- Procedures for circuit breaker preventive maintenance, inspection, and testing to compare maintenance practices against industry and vendor guidance.
- Arkansas Nuclear One response to NRC Information Notice 2006-31, "Inadequate Fault Interrupting Rating of Breakers."

b. Findings

1. Failure to Calibrate Unit 1 and Unit 2 480 Vac Transformer Instrumentation

Introduction. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion XII, "Control of Measuring and Test Equipment" involving the failure to assure that instruments, and other measuring and testing devices, used in activities affecting quality were properly calibrated and adjusted at specified periode to maintain accuracy within necessary limits. Specifically, the licensee failed to calibrate temperature and pressure gages used in preventive maintenance for Unit 1 and Unit 2 safety-related 4160/480 Vac load center transformers X5, X6, 2X25, and 2X26.

Description. Unit 1 transformer X5 is a safety-related 480 Vac load center transformer which is supplied by the Unit 1 4160 Vac emergency switchgear A3. Transformer X5 has local pressure and temperature instruments, PI-1105 and TIS-1105. These instruments are used by operations and maintenance personnel to ensure that transformer X5 has the appropriate level of gas coolant to ensure operability of the transformer. If pressure of the coolant is too low, the licensee would have to reduce the capacity of the transformer by 50 percent and declare it inoperable.

The team reviewed the preventive maintenance procedure for Unit 1 transformer X5. This preventive maintenance procedure recorded the indicated measurements from transformer X5's local pressure and temperature instruments. After recording the pressure and temperature, the procedure requires maintenance personnel to compare these measurements to a pressure-temperature graph to determine if corrective action is necessary to maintain the amount of gas coolant within specified limits in transformer X5.

Since local indications PI-1105 and TIS-1105 were used in preventive maintenance and monitoring of the safety-related 480 Vac transformer X5, the team requested the

calibration records for the instrumentation. The licensee told the team that the instrumentation was never calibrated. Since the instrumentation was never calibrated, the team requested the calibration records for instrumentation in the remaining Unit 1 and Unit 2 safety-related 480 Vac load center transformers X6, 2X25, and 2X26. Unit 2 transformers 2X25 and 2X26 are the same gas-cooled transformer model as Unit 1 transformers X5 and X6. The licensee confirmed that the instruments for the remaining transformers were never calibrated.

The licensee acknowledged that it used measurement instruments that were not calibrated in an activity affecting safety-related equipment. The licensee entered the missed calibrations into the corrective action program as Condition Report CR-C-2012-00657. To ensure operability, the licensee took measurements of the transformers' pressures and temperatures using calibrated, portable measuring equipment. The results of the measurement activity found that the pressure indication for transformers X5, 2X25, and 2X26 were outside of the +/- 2 percent accuracy specified by the vendor. Although the measured indications of the transformers were outside the vendor specified accuracy, the licensee confirmed that each transformer's gas coolant pressure and temperature were not in a condition which challenged operability during the previous 12 years.

Analysis. The team determined that the failure to calibrate pressure and temperature instruments for Unit 1 and Unit 2 safety-related load center transformers X5, X6, 2X25, and 2X26 was a performance deficiency. This finding was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee's programmatic failure to calibrate pressure and temperature instruments for Unit 1 and Unit 2 safety-related 480 Vac load center transformers would challenge the operability of the transformers. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in a loss of operability or functionality. Specifically, the licensee confirmed, through portable measurement equipment, that each transformer's gas coolant pressure and temperature were not in a condition which challenged operability during the previous 12 years. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance.

Enforcement. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion XII, "Control of Measuring and Test Equipment," which states, in part, "measures shall be established to assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting quality are properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits." Contrary to the above, the licensee failed to establish measures to assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting quality were properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits. Specifically, prior to March 16, 2012, the licensee failed to establish measures to assure that pressure and temperature instruments used in monitoring and preventive maintenance for Unit 1 and Unit 2 safety-related 480 Vac load center transformers were calibrated and adjusted at specified

periods to maintain accuracy within necessary limits. This finding was entered into the licensee's corrective action program as Condition Report CR-ANO-C-2012-00657. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a non-cited violation consistent with the NRC Enforcement Policy: NCV 05000313; 05000368/2012007-01, "Failure to Calibrate Unit 1 and Unit 2 480 Vac Transformer Instrumentation."

.2.2 Unit 1, DC Bus D01 and 125 Vdc Distribution Panel D21

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with safety-related dc bus D01 and 125 Vdc distribution panel D21 to ensure design basis requirements were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Circuit breaker short circuit calculations, sizing calculations, coordination studies, voltage drop calculations, and circuit breaker maintenance activities.
- DC bus circuit breaker maintenance activities and testing procedures to ensure the installed circuit breakers were appropriate for the design of the system.
- Preventive maintenance activities for the distribution bus and circuit breakers were verified to maintain the system according to manufacturer recommendations.
- Separation criteria to ensure the dc bus met required separation criteria between Class 1E and Non-class 1E loads.
- Past modifications associated with the systems.

b. Findings

No findings were identified.

.2.3 Unit 1, Motor Control Center B61

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with safety-related motor control center B61. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Component maintenance history and corrective actions to verify the monitoring and correction of potential degradation.

- Calculations for electrical distribution system load flow/voltage drop, short-circuit, and electrical protection and coordination to verify that bus capacity and voltages are maintained within limits during accident conditions.
- Schematic diagrams and design basis documents for electrical distribution system serving the motor control center to identify requirements and interfaces.
- Circuit breaker preventive maintenance, inspection, and testing procedures to determine if procedures incorporated industry and vendor recommendations.

b. Findings

No findings were identified.

.2.4 Unit 1, Turbine Driven Emergency Feedwater Pump P-7A

a. Inspection Scope

The team reviewed the updated safety analysis report, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the turbine driven emergency feedwater pump P-7A. The team also performed walkdowns and conducted interviews with system and design engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Calculations addressing emergency feedwater pump performance requirements during design basis accidents.
- Calculations addressing the setpoints and timing associated with transferring the suction of the emergency feedwater pump to an alternate water supply.
- Calculations addressing the normal and overspeed setpoints for operation of the turbine driven emergency feedwater pump.
- Recent system health reports, selected condition evaluations, and corrective actions to assess the current condition of the equipment.
- Calculations addressing the uncertainties of the instruments used to verify pump performance during required technical specification surveillances, with focus on the measurement of pump flow, flow element uncertainty, and associated developed head.
- Quarterly and full flow surveillance procedures and test results used to monitor potential emergency feedwater pump degradation.
- Calculations addressing the maximum turbine driven emergency feedwater pump room temperature with and without room cooling available.
- Calculations addressing the potential flooding of the turbine driven emergency feedwater pump room.

b. Findings

No findings were identified.

.2.5 Unit 1, Emergency Diesel Generator/Service Water Motor Operated Valve CV-3807

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the emergency diesel generator/service water motor operated valve CV-3807. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Schematics for the emergency diesel generator/service water valve motor starter.
- Vendor nameplate data and specifications for the motor.
- Calculations for determining minimum motor terminal voltage under design/licensing basis conditions.
- Calculations for determining minimum contactor terminal voltage under design/licensing basis conditions.
- Calculations for the motor starter breaker and motor thermal overload heater selection.
- Environmental design requirements under design/licensing basis conditions.
- Valve thrust requirements for design/licensing basis conditions.
- Completion of last preventive maintenance work orders for motor starter breaker testing.

b. Findings

No findings were identified.

.2.6 Unit 1, Reactor Building Coolers

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the reactor building coolers. The team also conducted interviews with design engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically the team reviewed:

- Schematics of record for the reactor building cooling fan motor breaker.
- Vendor nameplate data and specifications for the motor.
- Calculations for determining minimum motor terminal voltage under design/licensing basis conditions.
- Calculations and supporting documentation for determining brake horsepower loads.
- Calculations of record for the motor overcurrent protection settings and alarms.
- Completion of last preventive maintenance work orders for the pump motor breaker overcurrent trip unit.
- Calculations addressing required heat removal performance requirements during design basis accidents with maximum service water system temperatures.

- Calculations addressing the required service water and air flow for adequate heat removal.
- Calculations addressing the required fan motor power under postulated accident containment conditions.
- Recent system health reports, selected condition evaluations, and corrective actions to assess the current condition of the equipment.
- Surveillance procedures and test results used to monitor potential service water flow and air flow degradation.

b. Findings

No findings were identified.

.2.7 Unit 1, Borated Water Storage Tank T-3

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the borated water storage tank T-3. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Piping, instrumentation, and structural drawings.
- Tank draindown analysis to verify adequate net positive suction head to emergency core cooling system pumps.
- Tank draindown analysis to verify potential air entrainment into emergency core cooling system piping would not impact pump performance.
- Operator actions associated with realignment of the emergency core cooling system suction from the tank to the containment sump.
- Impact of 30-year wall degradation evaluation on seismic analysis.
- Stroke time tests of tank and containment sump isolation valves.
- Program for maintaining vendor manuals up-to-date.
- Tank vent sizing calculation which demonstrates the acceptability of the pressure drop in the tank during draindown.
- Yearly visual inspections of Plastite liner.
- Operator actions associated with design requirements to throttle broken high pressure injection line.
- Pre-throttling of the high pressure injection system manual valves.
- Inspections of the vent at the top of the tank.

b. Findings

No findings were identified.

.2.8 Unit 1, Decay Heat Removal Heat Exchanger E-35A

a. Inspection Scope

The team reviewed the updated safety analysis report, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the decay heat removal heat exchanger E-35A. The team also performed walkdowns and conducted interviews with system and design engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Calculations addressing decay heat removal heat exchanger performance requirements during design basis accidents.
- Recent system health reports, selected condition evaluations, and corrective actions to assess the current condition of the equipment.
- Calculations addressing the uncertainties of the instruments used to verify heat exchanger thermal performance during Generic Letter 89-13 testing.
- Generic Letter 89-13 testing procedures and test results used to monitor potential heat transfer degradation.
- The frequency of heat exchanger inspections and cleaning to verify the required component performance, as well as compliance with Generic Letter 89-13 commitments.

b. Findings

No findings were identified.

.2.9 Unit 1, Low Pressure Injection Motor Operated Valves CV-1276 and CV-1277

a. Inspection Scope

The team reviewed the updated safety analysis report, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the low pressure injection system motor operated valves CV-1276 and CV-1277. The team also performed walkdowns and conducted interviews with system and design engineering personnel to ensure the capability of these components to perform their desired design basis function. Specifically, the team reviewed:

- Calculations addressing required thrust for the motor operated valves to verify their capability to operate under the most limiting conditions.
- Calculations addressing the weak link analyses for these motor operated valves to verify their capability to operate under the most limiting conditions without damage.
- Calculations addressing the potential of pressure locking of these motor operated valves to verify their capability of opening when required.
- Inservice and diagnostic testing procedures and results used to monitor potential valve degradation or improper adjustment.
- Calculations addressing the maximum differential pressure across the valves to verify the capability of the valves to open under post-accident conditions.

- Calculations addressing the minimum voltage available at the valves' motor terminals under postulated accident conditions.
- Operating procedures to verify that these valves would actually be operated under conditions consistent with the design analyses.

b. Findings

No findings were identified.

.2.10 Unit 1, Emergency Safety Actuation Loop Pressure Transmitter PT-1021

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the emergency safety actuation loop pressure transmitter PT-1021. The team also conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Calibration and surveillance test procedures.
- Reactor system calibration, functional tests, and surveillance tests for PT-1021.
- Logic diagrams; vendor manuals, bulletins, and correspondence; troubleshooting procedures and grounding/shielding configurations.
- Safety-related calculations addressing required reactor protection system temperature and pressure during design basis accidents.
- Calculations addressing the uncertainties of the instruments used to verify the emergency safety actuation system functions during technical specification surveillances.
- Operating experience associated with Rosemount transmitters for applicability to PT-1021.

b. Findings

No findings were identified.

.2.11 Unit 2, Emergency Diesel Generator 2DG2

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the emergency diesel generator 2DG2 and its jacket water heat exchanger. The team also performed walkdowns, and conducted interviews with system and design engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically the team reviewed:

- Schematics for the emergency diesel start circuits and trip circuits.
- Schematics of the generator field flash and breaker close circuits and trip circuits.

- Vendor nameplate data and specifications for the generator.
- Calculations for determining diesel generator load under design/licensing basis conditions.
- Calculations and supporting documentation for determining brake horsepower loads for the major pumps loaded on the diesel generator under design/licensing basis conditions.
- Calculations and supporting documentation for determining minimum voltage at generator field flash relays, starting air solenoids, generator breaker trip coils, and generator breaker close coils under design/licensing basis conditions.
- Completion of last preventive maintenance work orders for the generator field flash, diesel engine trip devices enabled during design/licensing basis conditions, pump motor breaker overcurrent relays, and pump motor breaker close coils and trip coils.
- Plant meteorological temperature data for July and August for the past 10 years.
- Calculations and supporting documentation that supported diesel generator combustion air temperature for design/licensing basis conditions.
- Performance testing of the jacket water heat exchanger in accordance with the Generic Letter 89-13 commitments.
- Periodic cleaning of the jacket water heat exchanger.
- Jacket water expansion tank capability to support diesel cooling for the 30-day mission time of the emergency diesel generator.
- Chemical composition of the jacket water.
- Heat transfer capacity of the jacket water heat exchanger which included a comparison of tube plugging assumptions to the actual number of tubes plugged.

b. Findings

1. Failure to Translate Extreme Maximum Outside Air Temperatures into Calculations for Unit 2 Diesel Combustion Air

Introduction. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," involving the failure to translate the site extreme maximum outside air temperatures that may be expected at the site, as stated in the Arkansas Nuclear One, Unit 2, Updated Safety Analysis Report Subsection 2.3.2.2.2, into calculations determining combustion air temperature available for Unit 2 emergency diesel generator combustion.

Description. The team reviewed the calculation for diesel generator room ventilation, CALC-91-E-0090-02, "ANO-2 EDG Room Ventilation." This calculation assumed the maximum room temperature of the Unit 2 emergency diesel generator rooms considered the maximum outside air temperature for the room inlet air temperature was 100 degrees Fahrenheit. This outside air temperature was based on data taken from American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) design 1 percent outside air temperature tables for Little Rock and Fort Smith, Arkansas. Calculation CALC-91-E-0090-02 determined that the room ventilation would maintain each room at less than 120 degrees Fahrenheit assuming 100 degrees Fahrenheit outside air temperature. Since combustion air for the Unit 2 emergency diesel generators is taken from each emergency diesel generator's respective room, the licensee concluded that combustion air for each emergency diesel generator would

remain below the vendor specified maximum combustion air temperature of 120 degrees Fahrenheit.

The team reviewed recent site meteorological temperature data for July and August since 2003. This review identified that site area temperature exceeded 100 degrees Fahrenheit on at least nine different occasions. In August 2011, the site temperature exceeded 100 degrees Fahrenheit for approximately 9 hours, with a maximum temperature greater than 110 degrees Fahrenheit for 2 hours. Based on this information, the team determined that Arkansas Nuclear One's analysis for the maximum combustion air temperature at the emergency diesel generator air intake did not consider the impact of outside air temperatures exceeding 100 degrees Fahrenheit. Additionally, the analysis did not consider the impact of the outside air temperature reaching the site maximum temperature of 113 degrees Fahrenheit, as described in the Arkansas Nuclear One, Unit 2, Updated Safety Analysis Report Subsection 2.3.2.2.

As a result of the team's concern, the licensee contacted the emergency diesel generator vendor, Fairbanks Morse. The vendor stated that the diesel generator load capacity should be derated at 0.125 percent per degree Fahrenheit above the 120 degrees Fahrenheit combustion air temperatures. The team's evaluation concluded that a site area temperature of 113 degrees Fahrenheit could potentially result in a diesel combustion air temperature that exceeded 120 degrees Fahrenheit in the diesel generator rooms and would result in an unanalyzed condition for the impact on the load capacity of the diesel generator. Additionally, the team identified that there were no operations procedures available to take action to mitigate the effect an extreme outside air temperature would have on combustion air and room ventilation for the emergency diesel generators.

Analysis. The team determined that the failure to translate the updated safety analysis report design basis for site extreme maximum temperature into combustion air temperature calculations was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee failed to evaluate the effects of increased combustion air temperature on the load capacity of the Unit 2 emergency diesel generators, when outside air temperature reaches the design basis extreme maximum temperature. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in a loss of operability or functionality. Specifically, the team confirmed that historical outside air temperature was never in a condition that resulted in the loss of required diesel load capacity during accident conditions. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance.

Enforcement. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that "measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in §50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into

specifications, drawings, procedures, and instructions." Contrary to the above, the licensee failed to assure that applicable regulatory requirements and the design basis were correctly translated into specifications, drawings, procedures, and instructions. Specifically, prior to March 16, 2012, the licensee failed to translate the site extreme maximum outside air temperatures, as stated in the updated safety analysis report, into calculations that determined the combustion air temperature available for the Unit 2 emergency diesel generators. This finding was entered into the licensee's corrective action program as Condition Reports CR-ANO-2-2012-00436 and CR-ANO-2-2012-00486. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a non-cited violation consistent with the NRC Enforcement Policy: NCV 05000368/2012007-02, "Failure to Translate Extreme Maximum Outside Air Temperatures into Calculations for Unit 2 Diesel Combustion Air."

.2.12 Unit 2, 480V Vital Bus 2B63

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the essential 480 Vac vital bus 2B63. The team also performed walkdowns, and conducted interviews with system and design engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Calculations for electrical distribution system load flow/voltage drop, short-circuit, and electrical protection to assess the adequacy of design assumptions and to verify that bus capacity and voltages were maintained within acceptable limits.
- The protective device settings and circuit breaker ratings to ensure adequate selective protection coordination of connected equipment during worst-case, short circuit conditions.
- Circuit breaker preventive maintenance, inspection procedures, and testing procedures to determine adequacy relative to industry and vendor recommendations.
- Switchgear room cooler system maintenance and monitoring.

b. Findings

No findings were identified.

.2.13 Unit 2, High Pressure Safety Injection Pump 2P-89B

a. Inspection Scope

The team reviewed the updated safety analysis report, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the high pressure safety injection pump 2P-89B. The team also performed walkdowns, and conducted interviews with system and design engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Calculations addressing high pressure safety injection pump performance requirements during design basis accidents.
- Calculations addressing the adequacy of net positive suction head available under the most limiting post-accident conditions.
- Calculations addressing the minimum and maximum flow conditions for operation of the high pressure safety injection pump.
- Calculations addressing the uncertainties of the instruments used to verify pump performance during required technical specification surveillances, with focus on the measurement of pump flow, flow element uncertainty, and associated developed head.
- Quarterly and full flow surveillance procedures and test results used to monitor potential high pressure safety injection pump degradation.

b. Findings

No findings were identified.

.2.14 Unit 2, Emergency Feedwater Motor Driven Pump 2P-7B

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the emergency feedwater motor driven pump 2P-7B. The team also conducted interviews with design engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Capability of the room cooler to maintain Room 2025 below the qualification temperature of the pump motor.
- Testing of room float level switches.
- Inservice testing of pressure relief valve for the pump suction piping.
- Inservice testing for the pump to verify that test acceptance criteria was consistent with the hydraulic analysis.
- Hydraulic analysis to verify that it appropriately included the flow lost through the minimum flow line.
- Pump net positive suction head calculation to verify that dissolved nitrogen in the quality condensate storage tank was accounted for in the calculation.
- Internal flooding protection for motor control centers.
- Procedures for manual control of emergency feedwater system.
- Schematics for the emergency feedwater pump motor breaker.
- Vendor nameplate data and specifications for the motor.
- Calculations for determining minimum motor terminal voltage under design/licensing basis conditions.
- Calculations and supporting documentation for determining brake horsepower loads.
- Calculations for the motor overcurrent protection settings and alarms.
- Completion of last preventive maintenance work orders for the pump motor breaker overcurrent relays.
- Maintenance work order for pump impeller replacement.

- Piping and instrumentation diagram for the emergency feedwater system.

b. Findings

1. Failure to Translate Emergency Feedwater Pump Runout Flow Condition into Net Positive Suction Head and Diesel Load Calculation

Introduction. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," involving the failure to ensure that design basis information associated with emergency feedwater pump runout conditions was correctly translated into design basis calculations for required net positive suction head, pump motor requirements, and emergency diesel generator loading.

Description. The team reviewed the pump performance data for the new impeller for the Unit 2 emergency feedwater pump 2P-7B to determine how the pump brake horsepower affected the emergency diesel generator loading during design basis conditions. The pump impeller was replaced in October 2000, under corrective Maintenance Action Item MAI-19175, Unit 2.

The team was told that the emergency diesel generator loading calculation was based on maximum flow at pump runout of approximately 900 gallons per minute. From the new pump performance curve, the pump required 624 brake horsepower to achieve the pump runout flow of 900 gallon per minute. The 624 brake horsepower required was translated into the emergency diesel generator loading calculation. However, the design calculations for emergency diesel loads and net positive suction head used the previous pump's bounding condition of flow at pump runout of 1000 gallons per minute. At the bounding pump runout flow condition of 1000 gallons per minute, the new pump impeller's performance curve required approximately 680 brake horsepower. The licensee generated Condition Report CR-ANO-2-2012-0501 to document the condition.

The team identified that the potential effects on required pump net positive suction head and the motor, including the emergency diesel generator loading, were not adequately evaluated when the pump impeller was replaced in October 2000. Based on the immediate operability determination in Condition Report CR-ANO-2-2012-00501, the team found that the available emergency diesel generator margin to the 3135 kW 2-hr rating was reduced from 3 percent to 1.6 percent from the increase in brake horsepower. The increase from 624 to 680 brake horsepower represented a net 46.4 kW increase, including estimated motor efficiency, to the emergency diesel generator loads based on the engineering data that supported the immediate operability determination.

Analysis. The team determined that the failure to translate the correct brake horsepower during runout conditions for the emergency feedwater pump 2P-7B pump impeller into design basis calculations for required net positive suction head and emergency diesel generator loads was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to correctly translate the actual brake horsepower resulted in the reduction of available emergency diesel generator capacity margin from 3 percent to 1.6 percent. This represented a 47 percent

decrease in margin on a low margin component. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in a loss of operability or functionality. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance.

Enforcement. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that "measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in §50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions." Contrary to the above, the licensee failed to assure that applicable regulatory requirements and the design basis were correctly translated into specifications, drawings, procedures, and instructions. Specifically, prior to March 16, 2012, the licensee failed to ensure that design basis information associated with the emergency feedwater pump runout conditions were correctly translated into design basis calculations for required net positive suction head, pump motor requirements, and emergency diesel generator loading. This finding was entered into the licensee's corrective action program as Condition Report CR-ANO-2-2012-00501. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a non-cited violation consistent with the NRC Enforcement Policy: NCV 05000368/2012007-03, "Failure to Translate Unit 2 Emergency Feedwater Pump Runout Flow Condition into Net Positive Suction Head and Diesel Load Calculation."

.2.15 Unit 2, Quality Condensate Storage Tank 2T41B

a. Inspection Scope

The team reviewed the updated safety analysis report, selected drawings, emergency and normal operating procedures, calibration test results, design calculations, and condition reports associated with the quality condensate storage tank 2T41B. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Updated safety analysis report commitments.
- Vendor drawings of the tank and vortex breaker.
- Calibration test results for the tank level instrumentation.
- Nitrogen sparging requirement calculations.
- Tornado missile impact analysis calculations and calculations supporting the volume of the tank required for tornado missile protection.
- Calculations to determine the tank level required for technical specification volume.
- Calculations to evaluate the potential for vortexing.
- Emergency feedwater system, makeup water degasification system, and condensate transfer system operating procedures.
- Engineering request for emergency feedwater alignment to the tank.

b. Findings

No findings were identified.

.2.16 Unit 2, Emergency Cooling Pond

a. Inspection Scope

The team reviewed the updated safety analysis report, selected drawings, surveillance test results, design calculations, and condition reports associated with the emergency cooling pond. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Updated safety analysis report commitments.
- Emergency cooling reservoir design drawings.
- Emergency cooling pond spillway replacement design drawings.
- Surveillance test results for depth measurements and visual inspection of the emergency cooling pond.
- Surveillance test results for the temperature of the emergency cooling pond from June through September.
- Design calculations for the replacement of the emergency cooling pond spillway, including slope stability evaluation, hydraulic evaluation, and seismic load determination.
- Calculations for the service water pipe intake and discharge at the emergency cooling pond.

b. Findings

No findings were identified.

.3 Results of Reviews for Operating Experience

.3.1 Inspection of NRC Information Notice 2010-26, "Submerged Electrical Cables"

a. Inspection Scope

The team reviewed the licensee's evaluation of Information Notice 2010-26, "Submerged Electrical Cables," to verify that a program was in place to address areas that could contain submerged cables and address industry operating experience. The team verified that the licensee's review adequately addressed the issues in the information notice. Additionally, the team reviewed actions completed in Condition Report CR-ANO-C-2010-03250 to verify that corrective actions were implemented to prevent undesirable conditions.

b. Findings

No findings were identified.

.3.2 Inspection of NRC Information Notice 2005-30, "Safe Shutdown Potentially Challenged by Unanalyzed Internal Flooding Events and Inadequate Design"

a. Inspection Scope

The team reviewed the licensee's evaluation of Information Notice 2005-30, "Safe Shutdown Potentially Challenged by Unanalyzed Internal Flooding Events and Inadequate Design." The team reviewed the licensee's existing evaluation and performed independent reviews of plant areas to verify adequate protection from postulated internal flooding events.

b. Findings

No findings were identified.

.3.3 Inspection of NRC Information Notice 2011-02, "Operator Performance Issues Involving Reactivity Management at Nuclear Power Plants"

a. Inspection Scope

The team reviewed the licensee's evaluation of Information Notice 2011-02, "Operator Performance Issues Involving Reactivity Management at Nuclear Power Plants." The team reviewed the licensee's reported reactivity management issues to verify that NRC and industry operating experience were adequately addressed. Specifically, the team evaluated the adequacy of the corrective action plan and procedural changes resulting from the unintended trip of Arkansas Nuclear One, Unit 1, on April 25, 2010.

b. Findings

No findings were identified.

.3.4 Inspection of Information Notice 2007-34, "Operating Experience Regarding Electric Circuit Breakers"

a. Inspection Scope

The team reviewed the licensee's evaluation of Information Notice 2007-34, "Operating Experience Regarding Electric Circuit Breakers," to verify that the licensee addressed industry operating experience and maintenance issues associated with circuit breakers. The team verified that the licensee's review adequately addressed the issues in the information notice. The team verified that the licensee addressed common circuit breaker problems and implemented adequate maintenance practices for installed circuit breakers.

b. Findings

No findings were identified.

.3.5 Inspection of NRC Information Notice 2010-14, "Containment Concrete Surface Condition Examination Frequency and Acceptance Criteria"

a. Inspection Scope

The team reviewed the licensee's evaluation of NRC Information Notice 2010-14, "Containment Concrete Surface Condition Examination Frequency and Acceptance Criteria," to verify that the review adequately addressed the industry operating experience. The team reviewed the licensee's containment inservice inspection program plans, procedures, and a sample of the licensee's five-year concrete surface examination reports. The team verified that the examinations were conducted at the appropriate frequency. Additionally, the team reviewed condition reports associated with the examinations and conducted interviews with program engineering personnel to ensure that the examinations were performed utilizing the appropriate acceptance criteria in accordance with American Concrete Institute guidance.

b. Findings:

No findings were identified.

.4 Results of Reviews for Operator Actions

The team selected risk-significant components and operator actions for review using information contained in the licensee's probabilistic risk assessment. This included components and operator actions that had a risk achievement worth factor greater than two or Birnbaum value greater than 1E-6.

a. Inspection Scope

For the review of operator actions, the team observed operators during simulator scenarios associated with the selected components as well as observing simulated actions in the plant. The selected operator actions were:

- Unit 1, borated water storage tank suction transfer to containment sump within 3 minutes.
- Unit 1, emergency feedwater pump suction transfer to service water within 30 minutes.
- Unit 1, placement of standby non-nuclear intermediate cooling water heat exchanger in service to cool nuclear loop intermediate cooling water within 30 minutes.
- Unit 2, recovery from an uncontrolled boron dilution within 15 minutes.
- Unit 2, exiting from control room when deemed uninhabitable within 10 minutes.
- Unit 2, alignment of high pressure safety injection standby pump to alternate high pressure safety injection header within 30 minutes.

b. Findings

No findings were identified.

4 OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

The team reviewed condition reports and corrective actions associated with the selected components, operator actions and operating experience notifications. Those adverse conditions that were reviewed are noted in the attachment to this report.

4OA6 Meetings, Including Exit

On March 16, 2012, the team leader presented the preliminary inspection results to Mr. M. Chisum, General Manager, and other members of the licensee's staff. On March 20, 2012, the team leader conducted a telephonic final exit meeting with Ms. N. Mosher, Licensing Specialist. The licensee acknowledged the findings during each meeting. While some proprietary information was reviewed during this inspection, no proprietary information was included in this report.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel
E. Allen, Engineer, Electrical Design Engineering
T. Arnold, Supervisor, Operations Training
D. Bice, Acting Manager, Licensing
B. Buser, Engineer, Electrical Design Engineering
K. Butler, Engineer, Civil Design Engineering
M. Chisum, General Manager, Plant Operations
R. Cuilty, ANO-1 Operations
G. Dobbs, Supervisor, Electrical Design Engineering
R. Fuller, Manager, Nuclear Oversight
P. Jackson, ANO-1 Operations
D. James, Director, Nuclear Safety Assurance
R. Kulbeth, Configuration Management
D. MacPhee, Engineer, Mechanical Design Engineering
N. Mosher, Licensing Specialist, Licensing
C. O'Dell, Acting Manager, Operations
S. Pyle, Manager, Licensing
D. Smith, Engineer, Mechanical Design Engineering

NRC Personnel
A. Sanchez, Senior Resident Inspector
S. Rotton, Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000313; 05000368/2012007-01	NCV	Failure to Calibrate Unit 1 and Unit 2 480 Vac Transformer Instrumentation (Section 1R21.2.1)
05000368/2012007-02	NCV	Failure to Translate Extreme Maximum Outside Air Temperatures for Unit 2 Diesel Combustion Air (Section 1R21.2.11)
05000368/2012007-03	NCV	Failure to Translate Unit 2 Emergency Feedwater Pump Runout Flow Condition into Net Positive Suction Head and Diesel Load Calculation (Section 1R21.2.14)

LIST OF DOCUMENTS REVIEWED

Calculations

NUMBER	TITLE	REVISION
01-E-0044-01	QCST Level for Required TS Volume	0
09-E-0002-01	ANO-1 Start-up 2 Fast and Manual Transfer Capability	1
1304.164	Unit 1 Reactor Protection System channel A refueling calibration	14
2306.024	Unit 2 Relief Valve Setpoint Testing	12
4.6.1	SW Pipe Intake & Discharge at Emergency Cooling Pond	0
82-D-2086-01	Volume of T-41B Requiring Tornado Missile Protection	4
82-D-2086-150	Moderate Energy Line Break Analysis	1
82-D-2086-20	QCST N2 Sparging Requirements	0
82-D-2086-60	Design Calc for T-41B	4
83D-2181-01	Corridor 2104 – Maximum Depth of Ponding After Drainage Upgrade	3
84-E-0083-01	General Criteria for Safety Buses	10
84-E-0083-02	BKR 152/301	1
84-E-0083-13	BKR 152/401	1
84-E-0083-26	BKR 52/523 Plant Protection Study	1
84-E-0083-30	BKR 52/612	3
84-E-0083-32	BKR 52/621	1
84-E-0083-42	MCC-B61	2

Calculations

NUMBER	TITLE	REVISION
84-E-0083-50	DC Load Center D01	3
84-E-0103-01	General Criteria for Safety Buses	9
84-E-0103-12	BKR 152/311	2
85-S-0002-01	ANO-2 Diesel Generator #1 (2KA4) and #2 (2K4B) Loading	18
86-D-1006-09	EFW Pump Suction Pressure Transmitter Loop Error	0
86-D-1101-01	EFIC TDB Setpoint and EFW Time Response Analysis	2
87-D-1051-02	Ponding for EFW Pump P-7A	1
87-E-0026-09	EFW Pump Room Temperature	0
88-E-0012-01	Time After Loss of All FW that Feed & Bleed is Effective to Prevent Core Damage	1
88-E-0035-74	Seismic Calculations for Various Mechanical Equipment Associated with the Diesel Generators at Arkansas Nuclear One Unit - 2	0
88-E-0074-01	ANO 1 EDG Cooling Requirements	2
88-E-0086-09	NRC B-88-04 Review for 2P-89A,B,C Minimum Flow Evaluation	0
88-E-0098-16	Revised Containment Cooler Data for ANO-1	1
88-E-0098-20	ANO-1 DBA Re-analysis	2
89-E-0040-05	RCB Fan Cooler Acceleration Time	0
89-E-0144-01	ANO-2 EDG Loading for Buses 2A3 and 2A4	6
89-E-0144-02	EFW Flow Rates for EDG Load Study	2

Calculations

NUMBER	TITLE	REVISION
91-D-2003-01	Emergency Diesel Generator Capacity Ratings	6
91-E-0090-02	ANO-2 EDG Room Ventilation	1
91-E-0090-06	Heat Load Determination for Room 95, 98, 99, 100, 104, 109, 110, 149 for Post Accident Cooling and Appendix R	5
91-E-0091-01	Design Control Logic Review of Unit 1 Motor Operated Valves	4
91-E-0099-14	ECP Peak Temperature and Inventory Loss Analysis	0
91-E-0099-15	ANO Emergency Cooling Pond Spillway Seismic Load Determination	0
91-E-0099-16	ECP Spillway Hydraulic Evaluation	0
91-E-0099-17	ECP Spillway Downstream Design	0
91-E-0099-18	ECP Spillway Slope Stability Evaluation	0
91-E-0099-19	ECP Spillway Reinforced Concrete Spillway Design	0
91-E-0115-02	Containment Cooler Fan Motor Horsepower Requirement During DBA	1
91-E-0116-01	NPSH Calculation for HPSI and RB Spray	7
92-D-7044-01	Instrument Mounting to transformer X5, X6, 2X25, 2X26	0
92-E-0005-01	Required HPSI System Single Pump Flow	0
92-E-0009-01	AC Motor Operated Valve Terminal Voltage	9
92-E-0021-02	DO1 – DC System Short Circuit Study	4
92-E-0021-08	Class 1E 125VDC Train 1 DC Voltage Drop	1

Calculations

NUMBER	TITLE	REVISION
92-E-0072-02	ANO Unit 2 Class 1E 125 VDC Train 2 DC Voltage Drop Study	1
92-E-0077-04	Unit 1 EFW System Pump Performance Requirements	1
92-R-1040-35	Evaluation of Emergency Feedwater System for ANO	0
93-E-0021-09	SBLOCA ECCS Performance Analysis	0
93-E-0031-01	P7A Design Pressure Rating and Maximum Operating Speeds	1
94-D-6007A-04	Code Qualification of Piping on Isometric 2HCD-310-1	0
94-E-0001-05	ANO Unit 2 Millstone Study Startup No. 3 Cases	0
94-E-0018-02	GL89-10 MOV Power Cable, Breaker, and Thermal Overload (TOL) Device Evaluation	3
94-E-0047-01	Unit 2 EFW Pumps Net Positive Suction Head Evaluation	1
94-E-0093-01	MSLB Recommended Analytical Inputs	0
94-E-0095-01	EFW Pump Room HVAC	0
94-E-0095-13	2025 Heat Load Evaluation	1
94-E-0095-17	Room 2096 Heat Load Evaluation	1
95-E-0001-01	ANO 1 Millstone Study- Main Calculation	0
95-E-0001-06	ANO-1 Millstone Study – Control Circuit Voltage Drop	0
974321L101-04	EFW Turbine Exhaust Stack Pressure Loss	0
974321L101-06	EFW Constant Flow Orifice Bore Diameter Determination	0
97-E-0008-01	BWST Venting Capability	0

Calculations

NUMBER	TITLE	REVISION
97-E-0010-01	EFW Pump Suction Low Pressure Alarm	0
97-E-0212-01	BWST Draindown Analysis	3
97-E-0214-01	Evaluation of Maximum EFW Pump Flowrates	0
98-E-0010-01	ANO 1 EFW Pump Margins for Performance, NPSH, and Minimum Flow	1
98-R-1001-01	ANO 1 EFW Turbine Normal Operating Speed and Overspeed Trip Setpoint Basis Document	0
ANOC-ME-08-00001	Potential for Vortex	0
82-D-2086-151	Q-CST Missile Impact Analysis	0
EC 16818	Add Double Stabs For ITE MCCS 2B-63K6	0
ER 010294	Positive interlock stationary flag rotation on breaker cubicle A302	0
ER 963276	Alternate Taping method for Medium Voltage Switchgear	1
ER 963486	2A3/2A4 Ventilation Requirement for Operability	1
V-1074	Pressure Evaluation	2
V-CV-1276-08	Generic Letter 95-07 Pressure Locking Evaluation	0
V-CV-1276-10	MOV Torque Switch Setpoint	6
V-CV-1277-08	Generic Letter 95-07 Pressure Locking Evaluation	0
V-CV-1277-10	MOV Torque Switch Setpoint	5

Procedures

NUMBER	TITLE	REVISION/DATE
2203.012E	Annunciator 2K05 Corrective Action	35
TD-1005.0150	General Instruction Motor Control Center Series 5600	1
OP-1000.034	Control of Temporary Services and Equipment	3
EN-DC-153	Preventive Maintenance Component Classification	6
EN-DC-148	Vendor Manuals and the Vendor Re-Contact Process	2
EN-MA-138	VLF Tan Delta And Withstand Testing of Electrical Power cables	0
PMEE-113	Power Transformer, Dry Type Gas Filled	4
EN-LI-108-01	10CFR 21 Evaluation And Reporting	2
PMEE-098	Load Center Switchgear Housing, Bus, and Metering (All Voltages)	6
PMEE-04	6900 and 4160 Volt Circuit Breakers	4
COPD.001	Operations Expectations and Standards	55
TD G080.0030	Instruction GEH-1802W Metal-Clad Switchgear Types M26 and M36 for Magna-Blast Air circuit breaker Types AM-4.16 and AM-13.8	2
TD Q011.0040	Qualitrol Remote Thermometer Controller Series QT-104-2	0
TD-I005.0120	Installation and Maintenance Instructions Gas Sealed Transformers Unit Substation Transformers	0
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1416.042	K-line breaker PM	8
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Condition Reports (CR-ANO-…)

1-1995-00433	1-2004-00752	1-2004-00980	1-2006-00762	1-2006-01130
1-2007-01167	1-2007-01681	1-2007-01833	1-2007-02207	1-2007-02216
1-2007-02424	1-2008-00833	1-2008-01973	1-2008-01973	1-2008-01973
1-2008-02183	1-2008-02429	1-2008-02468	1-2009-00358	1-2010-02056
1-2010-03012	1-2011-01407	1-2011-01440	1-2011-02021	1-2011-02134
1-2011-02375	1-2011-03070	2-2008-00251	2-2008-00253	2-2008-01299

Condition Reports (CR-ANO-…)

2-2008-01697	2-2008-01700	2-2008-01700	2-2009-01600	2-2009-01902
2-2010-00164	2-2010-00486	2-2010-01787	2-2010-02219	2-2010-02277
2-2010-02732	2-2010-02748	2-2011-00007	2-2011-00186	2-2011-00353
2-2011-01321	2-2011-02748	2-2011-03151	2-2011-03259	C-2007-00845
C-2007-01265	C-2008-00131	C-2008-00131	C-2008-01374	C-2008-02544
C-2009-00716	C-2010-03250	C-2011-00645	C-2011-03025	

Condition Reports Generated During the Inspection (CR-ANO-…)

1-2012-00284	1-2012-00313	1-2012-00339	1-2012-00342	1-2012-00380
1-2012-00408	1-2012-00425	1-2012-00440	2-2012-00328	2-2012-00330
2-2012-00338	2-2012-00436	2-2012-00486	2-2012-00501	C-2012-00601
C-2012-00657				

Work Orders

00034659	00062774	00116574	00134979	00177519
00214686	00226606	00227443	00231234	00235943
00240256	00254964	00258284	00298672	00300631-01
00301134-01	156600-04	50285078	50965711	50983023
51026384	51031140-01	51055404	51511812-01	51564715
51689538	51799085-01	51801355	52026722	52027430
52032524	52033308-01	52193207	52211292	52215030

Work Orders

52215033	52218289	52218289	52221720	52243850
52254732	52260237	52272017-01	52272115	52274894
52275239	52275248	52281216	52281457	52283832
52303420	52311982	52317692	52319196	52324188-01
52345295	52375020	52715030	962050P201	ER925007L101
PC 86-1235	PMCD-10272	PMCD-11632		

Maintenance Action Items

MAI 11520	MAI 39054	MAI 14890	MAI 66250	MAI 33761
MAI 66236	MAI 952354	MAI 39074		

Miscellaneous

NUMBER	TITLE	REVISION/DATE
	NALCO Analysis of Unit 2 Diesel Generator Jacket Cooling Water	February 29, 2012
	GL 89-13 Thermal Performance Testing 2DG2 (2K-4B) Heat Exchanger Fouling Factor Trend Charts	No Revision/Date
	ECP Temperature Data Spreadsheet	No Revision/Date
0CAN019012	Letter – Response to Generic Letter 89-13	January 26, 1990
0CAN059609	Summary Report of Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerability for Arkansas Nuclear One, Unit 1	0
0CAN109205	Letter – Revised Approach for Compliance to Generic Letter 89-13	October 30, 1992
1304.164	Unit 1 Reactor Protection System channel A refueling calibration	14

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2DG2 (2K-4B)	GL 89-13 Thermal Performance Testing – JW Heat Exchanger Trend Charts	2005-2011
2DG2 (2K-4B)	GL 89-13 Thermal Performance Testing – LO Heat Exchanger Trend Charts	2005-2011
2DG2 (2K-4B)	GL 89-13 Thermal Performance Testing – Air Heat Exchanger Trend Charts	2005-2011
2P-89B	Full Flow IST Trend Data for 2P-89B	2008-2011
2P-89B	Quarterly IST Trend Data for 2P-89B	2008-2011
2P-89B	Availability and Reliability Data for 2P-89B	2010-2012
6600-M-2012	Specification for Emergency Diesel Generators for the Arkansas Nuclear One – Unit 2	3
6600-M-2018-3	Electric Motor Data Sheet 2PM7B	October 27, 1971
CEP-CII-004	General and Detailed Visual Examinations of Concrete Containments	304
CEP-CISI-101	Program Section for ASME Section XI, Division 1 ANO-1 Containment Inservice Inspection Program	2
E-35A	GL 89-13 Thermal Performance Testing – Decay Heat Cooler Trend Charts	2005-2011
EC25967	Upgrade Seismic Monitoring Instrumentation for ANO Units 1 and 2 per Recommendation in PSR Documented in EC-18093	0
EC25968	Remove Peak Recorders XR-8001, XR-8002, XR-8010 and XR-8011 from ANO Unit 1 Containment	0
EC25969	Remove Peak Recorder 2XR-8348 from ANO Unit 2 Containment	0
EC33710	Replace Seismic Monitoring Instrumentation	0
EFW P-7A	IST Trend Data for P-7A	1998-2011
EN 34113	Potential 10 CFR Part 21 Report	1

Miscellaneous

NUMBER	TITLE	REVISION/DATE
ER-002804N201	HPSI Pump Rotating Assembly Upgrade	0
ER-ANO-2002-0528-005	HPSI Pump NPSH Margin Improvement	0
ER-ANO-2006-0389-000	U2 EFW Alignment to QCST Evaluation	0
IN 2005-30 Eval	Impact Evaluation of Information Notice 2005-30	0
IPEEE	Summary Report of IPEEE for Severe Accident Vulnerabilities for ANO 1	May 1996
NES-13	Environmental Qualification - Environmental Service Conditions	10
P.O. 37116 2008-0136	Westinghouse Motor Repair/Refurbishment Report for ANO 125HP Containment Cooling Fan Motor	No Revision/Date
PRA-A1-01-001S11	ANO – Unit 1 System Notebook High Pressure Injection (HPI), Appendix 7	7
QAPM	Entergy Quality Assurance Program Manual	22
SEP-CISI-105	Program Section for ASME Section XI, Division 1 ANO-2 Containment Inservice Inspection Program	0
TDA610.0030	ASCO Catalog Solenoid Valves2, 3, and 4 way	0
TDB580 0110	Installation and Operation Instructions Byron Jackson Pump Type DVMX	8
TDG080-0020	Instructions GEK-7320F Magne-Blast Circuit Breakers	6
U1 System NB	Unit 1 System Notebook	Q3 2011
U2 System NB	Unit 2 System Notebook	Q3 2011
VSF-1A,B,C,D	VSF-1A,B,C,D Air Flow Rate Trending Data	1R16-1R23