

APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-285/88-03

License: DPR-40

Docket: 50-285

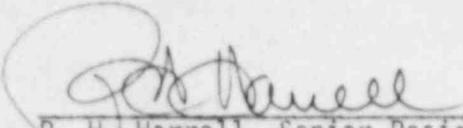
Licensee: Omaha Public Power District
1623 Harney Street
Omaha, Nebraska 68102

Facility Name: Fort Calhoun Station

Inspection At: Fort Calhoun Station, Blair, Nebraska

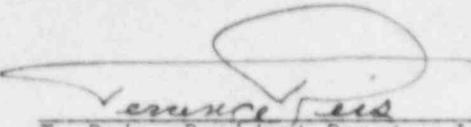
Inspection Conducted: January 1-31, 1988

Inspector:



P. H. Harrell, Senior Resident Reactor
Inspector

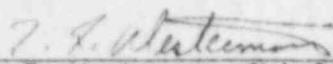
2-15-88
Date



T. Reis, Resident Reactor Inspector

2-15-88
Date

Approved:



T. F. Westerman, Chief, Project
Section B, Division of Reactor Projects

2-23-88
Date

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Inspection SummaryInspection Conducted January 1-31, 1988 (Report 50-285/88-03)

Areas Inspected: Routine, unannounced inspection including followup on previously identified items, licensee event report followup, operational safety verification, plant tours, safety-related system walkdown, monthly maintenance observations, monthly surveillance observations, security observations, radiological protection observations, and in-office review of periodic and special reports.

Results: Within the 10 areas inspected, no violations or deviations were identified.

DETAILS1. Persons Contacted

- *W. Gates, Plant Manager
- C. Brunnert, Supervisor, Operations Quality Assurance
- *M. Core, Supervisor, Maintenance
- *T. Dexter, Supervisor, Security
- J. Foley, Supervisor, I&C and Electrical Field Maintenance
- *L. Gundrum, Plant Licensing Engineer
- *B. Hansher, Licensing Engineer
- J. Kocy, Acting Reactor Engineer
- J. Lechner, Plant Engineer
- *K. Morris, Division Manager, Quality Assurance and Regulatory Affairs
- *T. Patterson, Supervisor, Technical
- *G. Roach, Supervisor, Chemical and Radiation Protection
- *J. Spilker, Senior Nuclear Production Engineer, Operations
- D. Trausch, Supervisor, Operations
- S. Willrett, Supervisor, Administrative Services and Security

*Denotes attendance at the monthly exit interview.

The NRC inspectors also contacted other plant personnel, including operators, technicians, and administrative personnel.

2. Followup on Previously Identified Items

- a. (Open) Unresolved Item 285/8710-05: Review of the amount of trisodium phosphate dodecahydrate (TSP) stored in containment.

This item was related to an apparent discrepancy between the Technical Specifications (TS) and the Updated Safety Analysis Report (USAR) as to how much TSP should be stored in containment. The TS states that 40 cubic feet is required; whereas, the USAR states that 3000 pounds of TSP is required.

The licensee performed a calculation to determine the amount of TSP that should be stored in containment. The calculation performed by the licensee was documented in Operations Support Analysis Report (OSAR) 87-56. Based on the results of the calculation, the licensee reached the following conclusions. At the maximum boric acid volumes and concentrations contained in the affected reactor plant systems, 2108 pounds of TSP is required to raise the value of pH to greater than 7.0. With a value of 2108 pounds, the amount required by the TS, 40 cubic feet, provided an excess of 663 pounds; and the amount required by the USAR, 3000 pounds, provided an excess of 892 pounds.

An NRC inspector reviewed the calculation documented in OSAR 87-56 to verify that the calculation was properly completed and that the

conclusions reached by the licensee were adequate. Based on this review, the NRC inspector determined that the licensee had provided an adequate amount of TSP in containment.

The licensee stated that the description in the USAR of the amount of TSP required to be stored in containment would be updated to reflect the requirements stated in the TS. This item remains open pending the issuance of an update to the USAR by the licensee.

- b. (Closed) Open Item 285/8729-03: Abnormalities noted during performance of Procedure SP-STROKE-1.

This item concerned apparent physical abnormalities with plant equipment noted by auxiliary building operators during the performance of Procedure SP-STROKE-1, "Inservice Testing of Air-Operated, CQE Valves." CQE is the licensee's designation for safety-related equipment. Procedure SP-STROKE-1 was developed to test and monitor air-operated CQE valves that are not included in the licensee's inservice inspection program to evaluate the effect of water introduced into the plants instrument air system. Specifically, the regulators for several air motors exhibited what was noted by the licensee as abnormal noise and/or chattering. The NRC inspector witnessed the performance of the test on November 18, 1987, but could not find any followup action initiated on the abnormalities noted at that time.

The licensee's plant engineering staff reviewed the test results provided in Procedure SP-STROKE-1 and initiated maintenance orders (MO) to address the problems noted during the performance of the procedure. The NRC inspector reviewed MO 875606 and 875607 that were issued for checking of the regulators on Valves HCV-2808B, 2810A, 804C, and 805B. Based on the review of the work and retesting performed, it appears that the remarks noted during the performance of the test have been satisfactorily addressed. The NRC inspectors will continue to monitor the licensee's efforts related to Procedure SP-STROKE-1.

- c. (Open) Open Item 285/8733-04: Potential problem with the operability of Emergency Diesel Generator (EDG) 2.

This open item was related to the potential inoperability of EDG 2. On the day after performing surveillance tests of EDG 2 in November and December 1987, the NRC inspector noted a layer of lubricating oil in the sightglass for the cooling water surge tank. The licensee was notified and began an evaluation to determine the possible source of the lubricating oil. To assist in the performance of the evaluation, the licensee obtained the services of a field service technician from the Morrison-Knudsen Company to perform an onsite observation of the operation of EDG 2.

On January 6, 1988, EDG 2 was operated fully loaded for a period of 4 hours. During operation, the technician noted no problems with the engine; however, a 1-inch layer of oil accumulated in the sightglass. On January 8, 1988, EDG 2 was operated fully loaded for a period of 2 hours. Following this 2-hour run, a layer of oil of less than 1/8 inch accumulated in the sightglass.

The licensee performed an evaluation of the data that was obtained through operation of EDG 2, as documented in an internal memorandum (FC-051-88) dated January 11, 1988. The results of the evaluation indicated that EDG 2 had been operable since oil was first detected in November 1987. The basis of the evaluation was that the oil entered the cooling water system when an overheating condition occurred on September 23, 1987. When the engine automatically tripped due to high temperatures in the cooling system, thermal growth of mechanical joints (O-ring seals and threaded connections) allowed oil to pass from the oil to the water system. Once the oil entered the water system, EDG 2 had to be operated for a number of times to flush the oil from the cooling system to the sightglass. As the level of oil in the sightglass has continued to drop over the last three EDG 2 runs, it indicates that oil is not continuing to leak into the water system. Based on the evaluation, the licensee concluded, with concurrence from the contractor technician, that EDG 2 was capable of performing its intended safety function.

The NRC inspector reviewed the data obtained and the evaluation performed by the licensee. It appeared that the licensee had performed an adequate evaluation as to the operability of EDG 2.

The technician recommended that the licensee take actions in the future to ensure that EDG 2 remained in a satisfactory condition. The recommendations were to continue to monitor the sightglass for signs of oil, clean the sightglass after each run for ease of monitoring for the presence of oil, and increase the monthly surveillance test from a 1-hour to a 3-hour run. The licensee agreed to implement the recommendations of the technician.

This item remains open pending the implementation of the recommendations by the licensee and a review of the licensee actions by the NRC inspector.

- d. (Open) Open Item 285/8733-05: Followup on an event where water was introduced into the instrument air system.

This open item was related to the licensee's performance of a review to determine all interfaces between the instrument air system and all plant water systems. The initial followup, performed in October 1987, identified three instrument air/water interfaces, which were subsequently disconnected to prevent the potential of water entering the instrument air system. In a continuing effort to identify other

instrument air/water interfaces, the licensee has reviewed system configurations to determine if other interfaces exist. In December 1987 additional interfaces were identified.

The licensee performed an evaluation of the interfaces identified in December 1987. The interfaces consisted of air-operated, pinch-type and diaphragm-type valves where failure of a rubber valve component could allow water to enter the instrument air system. The evaluation performed by the licensee was documented in an internal memorandum (FC-1980-87) dated December 21, 1987.

The results of the evaluation performed by the licensee indicated that the probability of water entering the instrument air system was extremely low. The construction of the air-operated valves, manufactured by Sanders, Grinnell, and Galigher, are such that two barriers within the valve must fail for water to reach the instrument air piping. If the two internal valve failures did occur, pressure in the instrument air system would have to be lost because the air pressure is greater than the water pressure. Since three failures must occur for water to enter the air system, the licensee concluded that the probability was extremely low. For this reason, the licensee left the interfaces installed in the plant.

The NRC inspector reviewed the memorandum issued by the licensee that evaluated the instrument air/water interfaces and vendor drawings of the internal construction of the valves. Based on this review, it appeared that the licensee had adequately addressed the potential for wetting the instrument air system through the specific valves evaluated by the licensee.

The memorandum issued by the licensee also stated that the systems engineer for the instrument air system would walkdown the entire system to identify any other interfaces that might exist. The walkdown is currently scheduled by the licensee to be completed within the next 6 months. This item remains open pending the completion of the walkdown by the licensee and a review of the results by the NRC inspector.

3. Licensee Event Report (LER) Followup

Through direct observation, discussions with licensee personnel, and review of records, the following event reports were reviewed to determine that reportability requirements were fulfilled, immediate corrective action was accomplished, and corrective action to prevent recurrence had been accomplished in accordance with TS.

The LER listed below remains open:

87-014 Setpoint drift of the pressurizer code safety valves

The LERs listed below are closed:

- 87-027 Inadvertent actuation of the containment isolation actuation signal
- 87-036 Inadvertent actuation of the auxiliary feedwater actuation signal

A discussion of each LER is provided below.

- a. LER 87-014 provided information regarding one of two pressurizer code safety valves found to be out of specification during the performance of Surveillance Test ST-PSV-1, "Pressurizer Code Safety Valve Test." During the 1987 refueling outage, ST-PSV-1 was performed and a pressurizer code safety Valve RC-141 lifted at 2643 psia which is 3.85 percent above the valve's nameplate setpoint value of 2545 psia. This exceeded the minimum operability requirement of TS 2.1.6(1) which requires both the pressurizer code safety valves to be operable with their lift settings between 2500 and 2545 psia with a tolerance of plus or minus 1 percent. The second pressurizer code safety Valve RC-142 was found to lift at 2498 psia, which is within the required tolerance.

The licensee performed an analysis as documented by OSAR 87-17. The OSAR analyzed the loss-of-load event using the actual as-found setpoints of three steam safety valves which were out of tolerance as reported in LER 87-003 and the pressurizer code safety valve actual as-found setpoint to determine the safety significance of the out-of-specification conditions. The analysis found the resulting pressure transients were below the design basis acceptance criteria provided in Section 14.9 of the USAR.

The NRC inspector reviewed OSAR 87-17 in conjunction with Section 14.9 of the USAR. Based on this review, it appeared that the licensee's conclusion that the condition posed no significant safety hazard was correct.

The valves were recalibrated and tested twice, prior to reinstallation, to ensure operability and repeatability. In evaluating this LER, the NRC inspector noted that the licensee had not taken actions to prevent recurrence of the setpoint drift problem. In discussions with the licensee, it was agreed that a review of the feasibility of revising the test procedure to make laboratory conditions more closely approximate actual installed conditions would be performed. The licensee stated that a revision to this LER would be issued in the near future to include a description of the planned corrective action. This LER will remain open pending issuance and review of the LER revision.

- b. LER 87-027 reported an inadvertent actuation of the containment isolation actuation signal (CIAS) due to operator error during the performance of Surveillance Test ST-ESF-2. During performance of the test, the technician placed the pressurizer pressure low signal test

switch for Channel B in the test position prior to isolating Channel B of the CIAS, resulting in a CIAS actuation. All engineered safeguards equipment functioned as designed. All systems were returned to normal within 3 1/2 minutes.

To prevent future CIAS actuations due to this type of error, the licensee revised Procedure ST-ESF-2 to require personnel to place the CIAS override switch in the test position prior to initiating a CIAS trip.

The NRC inspector reviewed the revised procedure against the previous procedure and had a licensed reactor operator walk through the applicable steps on the control board to determine how the inadvertent CIAS was actually caused. Based on the review and walkthrough performed, it appears that the procedure revision will reduce the probability of another inadvertent CIAS occurring due to improper switch operation. It appeared that the event occurred due to human error and not an inadequate procedure.

- c. LER 87-036 reported an event where, due to personnel error, both auxiliary feedwater pumps were started inadvertently. During performance of Surveillance Test ST-FW-3, "Auto Initiation of Auxiliary Feedwater," the operator was required to place the switches for Channels A and B of the auxiliary feedwater signal override circuitry, in the override position.

The operator was also required to place both steam generator auxiliary feedwater feed valves in the override position. When properly aligned, the simulated low steam generator level signal will activate the sensor logic, alarming the appropriate annunciators while overriding the start signal to the auxiliary feedwater pumps.

On November 11, 1987, while performing ST-FW-3 on Steam Generator RC-2A, the operator placed the Channel A auxiliary feedwater actuation signal (AFAS) override switch for RC-2A in the override position as required by procedure. He then inadvertently placed the Channel A AFAS override switch for Steam Generator RC-2B to the override position as opposed to the Channel B switch for Steam Generator RC-2A. The operator then simulated the low steam generator level signal on Steam Generator RC-2A, but since Channel A was the only channel overridden, the low steam generator level signal on Channel B initiated the AFAS. The AFAS started both auxiliary feedwater pumps, but since the auxiliary feedwater valves were in the override position, no auxiliary feedwater entered the steam generator. The operator realized the error and quickly turned off the pumps. The switches were then correctly aligned and the remainder of the surveillance was completed without incident. All affected systems performed as designed.

As corrective action, the licensee issued a revision to Procedure ST-FW-3 and revised the labeling of the override switches involved.

The NRC inspector reviewed the procedure revision and examined the labeling changes on the affected control boards. The procedure revision changed information in the procedure that had been provided as "notes," informing the operator that certain steps will initiate auxiliary feedwater and to adhere to them carefully, to "caution" statements. These caution statements were then placed earlier in the procedure.

The NRC inspector walked down the control boards, AI-66A and AI-66B, which contain the AFAS actuation and control switches. The NRC inspector examined the labeling of the switches the day following the incident and after they were changed for clarification purposes. While the replaced labels were technically adequate, the new labels made it more readily apparent which switch was for Channel A and B, respectively.

Based on the actions taken by the licensee, it appears that the probability of recurrence of this event due to operator error has been greatly reduced.

No violations or deviations were identified.

4. Operational Safety Verification

The NRC inspector conducted reviews and observations of selected activities to verify that facility operations were performed in conformance with the requirements established under 10 CFR, administrative procedures, and the TS. The NRC inspector made several control room observations to verify the following:

- . Proper shift staffing
- . Operator adherence to approved procedures and TS requirements
- . Operability of reactor protective system and engineered safeguards equipment
- . Logs, records, recorder traces, annunciators, panel indications, and switch positions complied with the appropriate requirements
- . Proper return to service of components
- . MO initiated for equipment in need of maintenance
- . Appropriate conduct of control room and other licensed operators
- . Management personnel toured the control room on a regular basis

No violations or deviations were identified.

5. Plant Tours

The NRC inspector conducted plant tours at various times to assess plant and equipment conditions. The following items were observed during the tours:

- . General plant conditions, including operability of standby equipment, were satisfactory.
- . Equipment was being maintained in proper condition, without fluid leaks and excessive vibration.
- . Plant housekeeping and cleanliness practices were observed, including no fire hazards and the control of combustible material.
- . Performance of work activities was in accordance with approved procedures.
- . Portable gas cylinders were properly stored to prevent possible missile hazards.
- . Tag out of equipment was performed properly.
- . Management personnel toured the operating spaces on a regular basis.
- . The auxiliary feedwater pumps were not steam bound.

During tours of the plant, the following items were noted:

- . Penetration F-11 is a canister-type penetration assembly used for the routing of cables from the outside to the inside of containment. As a canister-type penetration, the canister is pressurized to 15 psig with nitrogen and the pressure is monitored on a local pressure gage.

During a tour on January 26, 1988, the NRC inspectors noted that the pressure in Penetration F-11 indicated approximately 2 psig. The NRC inspector discussed the condition of a pressure loss with licensee personnel. Licensee personnel stated that an evaluation would be performed to determine the significance of the loss of pressure in the penetration canister.

By the end of this inspection period, the licensee had not completed the evaluation. This item remains unresolved pending the completion of an evaluation by the licensee and a review of the licensee's conclusions by the NRC inspector. (285/8803-01)

- . During a tour of the plant, the NRC inspectors noted that Valve CH-198, a check valve, was being used as an outside containment isolation valve. Criterion 55 of Appendix A to 10 CFR Part 50 states that a simple check valve may not be used as the automatic isolation valve outside containment. The NRC inspectors discussed this concern

with licensee personnel. Licensee personnel stated that the NRC had previously approved the use of a check valve for containment isolation and that the documentation would be provided to the NRC inspectors.

The licensee did not provide the NRC inspectors, prior to the end of this inspection period, with documentation that indicated that the use of a check valve as an outside containment isolation had been approved by the NRC. This item remains open pending a review of the documentation by the NRC inspectors. (285/8803-02)

During a tour of the intake structure, the NRC inspectors noted that the raw water pump area is susceptible to flooding that could cause the loss of all four of the raw water pumps. The area is constructed such that no barriers for flooding control are installed between the pumps. The NRC inspectors reviewed Procedure AOP-18, "Loss of Raw Water," to determine what actions would be taken by the licensee in response to a loss of all raw water pumps event. During review of Procedure AOP-18, the NRC inspectors determined that the procedure did not address steps to preclude or minimize flooding.

The NRC inspectors discussed this item with licensee personnel. Licensee personnel stated that a review of the procedure for clarity would be performed. This item remains open pending a review of AOP-18 by the licensee. (285/8802-03)

During a tour of the auxiliary building, the NRC inspectors noted an excessive buildup of corrosion products on the support for Valve HCV-2988, a cross-connect valve between the safety injection and charging systems. The NRC inspectors notified the licensee of the condition of the valve supports.

In response to this item, the licensee issued MO 880406 for cleaning and painting of the valve support. The cleaning and painting of the support has been completed.

During a tour of the plant, the NRC inspectors reviewed the controls available to the licensed operators on the alternate shutdown panel (ASP). During review of the ASP, the NRC inspectors became concerned as to whether or not the licensee performed surveillance testing of the control circuitry located on the ASP. The NRC inspectors discussed this concern with licensee personnel. Licensee personnel stated that surveillance testing was performed and that documentation could be provided to indicate testing results.

The licensee had not provided the documentation prior to the end of this inspection period. This item remains open pending the licensee providing the documentation and a review of the documentation by the NRC inspectors. (285/8803-04)

No violations or deviations were identified.

6. Safety-Related System Walkdown

The NRC inspector walked down accessible portions of the following safety-related system to verify system operability. Operability was determined by verification of selected switch positions. The system was walked down using the drawing and procedure noted.

- . 125-Volt DC System (Procedure OI-EE-3, Checklist A, Revision 21 and Figure 8.1-1 of the USAR, Revision 32)

During the walkdown, the NRC inspector noted no problems between the drawing, procedure, and plant as-built conditions for the selected areas checked.

No violations or deviations were identified.

7. Monthly Maintenance Observations

The NRC inspector reviewed and/or observed selected station maintenance activities on safety-related systems and components to verify the maintenance was conducted in accordance with approved procedures, regulatory requirements, and the TS. The following items were considered during the reviews and/or observations:

- . The TS limiting conditions for operation were met while systems or components were removed from service.
- . Approvals were obtained prior to initiating the work.
- . Activities were accomplished using approved MO and were inspected, as applicable.
- . Functional testing and/or calibrations were performed prior to returning components or systems to service.
- . Quality control records were maintained.
- . Activities were accomplished by qualified personnel.
- . Parts and materials used were properly certified.
- . Radiological and fire prevention controls were implemented.

The NRC inspector reviewed and/or observed the following maintenance activities:

- . Monthly preventative maintenance of the security uninterruptable power source batteries (PM 8800394)
- . Troubleshooting of spontaneous cycling of Intercept Valves IV-1 and IV-2 (MO 880298)

- . Investigation of stroke time on Valve HCV-484 (MO 880288)
- . Repair of air regulators for Valves HCV-804C and HCV-805B (MO 875607)
- . Repair of regulators for Valves HCV-2808B and HCV-2810A (MO 875606)
- . Cleaning and painting of the support for Valve HCV-2988 (MO 880406)

No violations or deviations were identified.

8. Monthly Surveillance Observations

The NRC inspector observed selected portions of the performance of and/or review of completed documentation for the TS-required surveillance testing on safety-related systems and components. The NRC inspector verified the following items during the testing:

- . Testing was performed by qualified personnel using approved procedures.
- . Test instrumentation was calibrated.
- . The TS limiting conditions for operation were met.
- . Removal and restoration of the affected system and/or component were accomplished.
- . Test results conformed with TS and procedure requirements.
- . Test results were reviewed by personnel other than the individual directing the test.
- . Deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel.

The NRC inspector observed and/or reviewed the documentation for the following surveillance test activities. The procedures used for the test activities are noted in parenthesis.

- . Monthly testing and loading of EDG 2 (ST-ESF-6)
- . Quarterly inservice test of the chemical and volume control system valves (ST-ISI-CVCS-1)
- . Monthly testing of the heated-junction thermocouple system (ST-HJTC-1)
- . Inservice testing of raw water system valves (ST-ISI-RW-1)

- . Monthly testing of safety injection system valves (ST-SI/CS-1)

No violations or deviations were identified.

9. Security Observations

The NRC inspector verified the physical security plan was being implemented by selected observation of the following items:

- . The security organization was properly manned.
- . Personnel within the protected area (PA) displayed their identification badges.
- . Vehicles were properly authorized, searched, and escorted or controlled within the PA.
- . Persons and packages were properly cleared and checked before entry into the PA was permitted.
- . The effectiveness of the security program was maintained when security equipment failure or impairment required compensatory measures to be employed.
- . The PA barrier was maintained and the isolation zone kept free of transient material.
- . The vital area barriers were maintained and not compromised by breaches or weaknesses.
- . Illumination in the PA was adequate to observe the appropriate areas at night.
- . Security monitors at the secondary and central alarm stations were functioning properly for assessment of possible intrusions.

During a plant tour, the NRC inspector identified a violation of the approved security plan. The details of the violation are provided in NRC Inspection Report 50-285/88-08.

No violations or deviations were identified in this inspection report.

10. Radiological Protection Observations

The NRC inspector verified that selected activities of the licensee's radiological protection program were implemented in conformance with the facility policies and procedures and in compliance with regulatory requirements. The activities listed below were observed and/or reviewed:

- . Health physics (HP) supervisory personnel conducted plant tours to check on activities in progress.

- . Radiation work permits contained the appropriate information to ensure work was performed in a safe and controlled manner.
- . Personnel in radiation controlled areas (RCA) were wearing the required personnel monitoring equipment and protective clothing.
- . Radiation and/or contaminated areas were properly posted and controlled based on the activity levels within the area.
- . Personnel properly frisked prior to exiting an RCA.

During a plant tour, the NRC inspector noted a violation related to HP activities. The details of the violation are provided in NRC Inspection Report 50-285/88-05.

No violations or deviations were identified in this inspection report.

11. In-office Review of Periodic and Special Reports

In-office review of periodic and special reports was performed by the NRC resident inspector and/or the Fort Calhoun project inspector to verify the following, as appropriate:

- . Reports included the information required by appropriate NRC requirements.
- . Test results and supporting information were consistent with design predictions and specifications.
- . Planned corrective actions were adequate for resolution of identified problems.
- . Any information contained in the report was classified as an abnormal occurrence.

The NRC inspectors reviewed the following:

- . December monthly operating report, dated January 14, 1988
- . Monthly operations report for December 1987, undated

No violations or deviations were identified.

12. Unresolved Item

An unresolved item is a matter about which more information is required in order to determine whether it is acceptable, a violation, or a deviation. One unresolved item is discussed in this inspection report.

<u>Item</u>	<u>Paragraph</u>	<u>Subject</u>
285/8803-01	5	Review of the operability of Penetration F-11

13. Exit Interview

The NRC inspector met with Mr. W. G. Gates (Plant Manager) and other members of the licensee staff at the end of this inspection. At this meeting, the NRC inspector summarized the scope of the inspection and the findings.