

APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION

REGION IV

NRC Inspection Report: 50-285/89-17

Licensee: DPR-40

Docket: 50-285

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

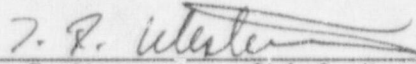
Facility Name: Fort Calhoun Station (FCS)

Inspection At: FCS, Blair, Nebraska

Inspection Conducted: April 1-30, 1989

Inspectors: P. H. Harrell, Senior Resident Inspector  
T. Reis, Resident Inspector  
T. O. McKernon, Reactor Inspector

Approved:

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

6-1-89  
Date

Inspection Summary

Inspection Conducted April 1-30, 1989 (Report 50-285/89-17)

Areas Inspected: Routine, unannounced inspection including review of previously identified items; operational safety verification; plant tours; monthly maintenance observations; monthly surveillance observations; security observations; radiological protection observations; and in-office review of periodic, special, and nonroutine event reports.

Results: During this inspection period, the NRC inspectors reviewed the areas discussed below. The discussion provides an overall evaluation of each area.

The NRC inspectors reviewed the actions taken by the licensee in response to previously identified items. Based on reviews of the actions taken by the licensee, it appeared that the licensee had appropriately implemented both the short- and long-term actions to prevent recurrence of the identified problems and concerns.

During observations of activities and evolutions performed by the operations staff, the NRC inspectors noted no problems with the performance of the staff.

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It appeared that the licensee's operations staff performed their duties in a professional manner to ensure safe plant operation.

The NRC inspectors performed numerous tours of the plant during this inspection period. In prior inspection periods, numerous concerns were identified during plant tours; however, no significant concerns were identified during this inspection period. It appeared that the licensee has increased the quantity and quality of their tours to identify potential nonconforming items.

Maintenance and surveillance activities were observed by the NRC inspectors during this inspection period. During observation of these activities, the NRC inspectors noted that the activities were performed in a professional manner. For those specific activities where anomalies were noted during testing, prompt action was taken by the licensee to ensure that the problem was corrected.

During observations of the activities and tasks performed by security and health physics personnel, the NRC inspectors noted that these personnel performed their duties in a professional manner. No observations or concerns were identified with these activities during this inspection period.

DETAILS1. Persons Contacted

- G. Peterson, Manager, Fort Calhoun Station
- \*L. Kusek, Acting Plant Manager, Fort Calhoun Station
- J. Adams, Reactor Engineer
- J. Bobba, Supervisor, Radiation Protection
- C. Brunnert, Supervisor, Operations Quality Assurance
- \*J. Fisicaro, Manager, Nuclear Licensing and Industry Affairs
- R. Garfoot, System Engineer, Toxic Gas Monitors
- J. Gasper, Manager, Training
- J. MacKinnon, Acting Division Manager, Production Engineering Division
- \*R. Jaworski, Manager, Station Engineering
- J. Kecz, Supervisor, System Engineering
- \*F. Kenney, Supervisor, Access Authorization Programs
- \*J. Lechner, Senior Design Engineer
- D. Lieber, Supervisor, Security Operations
- \*D. Lovett, Supervisor, Radiological Protection Operations
- \*T. Mathews, Station Licensing Engineer
- \*D. Matthews, Supervisor, Station Licensing
- K. Miller, Supervisor, Maintenance
- \*W. Orr, Manager, Quality Assurance/Quality Control
- \*R. Phelps, Manager, Design Engineering
- A. Richard, Manager, Quality Assurance and Quality Control
- R. Ronning, System Engineer, Emergency Diesel Generators
- \*C. Simmons, Station Licensing Engineer
- F. Smith, Plant Chemist
- \*M. Tesar, Supervisor, Technical and General Employee Training
- D. Trausch, Supervisor, Operations
- S. Willrett, Supervisor, Administrative Services

\*Denotes attendance at the monthly exit interview.

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

2. Plant Status

During this inspection period, the licensee operated the plant at approximately 100 percent power. On April 18, 1989, power level was reduced to 95 percent so that a steam leak could be repaired on Feedwater Heater 5B. Power was returned to 100 percent on the same day.

On April 28, 1989, a power reduction was commenced at a rate of 5 percent per hour to place the plant in Mode 2 (hot standby). The power reduction was initiated for the performance of a main turbine overspeed trip test, maintenance (replacement of insulators and ground wires on power poles) on the 161-kV offsite power distribution system, and performance of a

full-flow test on the auxiliary feedwater pumps. At the end of this inspection period, the plant remained in Mode 2.

3. Review of Previously Identified Items (92701 and 92702)

- a. (Closed) Open Item 285/8823-02: Resolution of the discrepancy between the Updated Safety Analysis Report (USAR) and the Technical Specifications (TS) for the raw water (RW) pumps.

This item involved a discrepancy between the USAR and the TS with respect to the flow provided by the RW pumps. The USAR states that two RW pumps are required to supply sufficient flow to shut down the plant; whereas, the TS required that only one RW pump be operable.

To address this discrepancy, the licensee submitted a request for amendment of the TS to the NRC's Office of Nuclear Reactor Regulation (NRR). The request proposed that the operability statement for the RW pumps be changed to reflect the flow requirements needed to shut down the plant.

On April 14, 1989, NRR issued Amendment 120 to the TS. The amendment changed the operability requirements of the RW pumps. Based on issuance of the amendment, this item is considered closed.

- b. (Closed) Severity Level IV Violation 285/8823-03: Ion exchange resin improperly stored in Room 69.

Section 3.3 of the Updated Fire Hazards Analysis (UFHA) and Section 3.3.1 of Procedure SO-G-6, "Housekeeping," state, in part, that unused ion exchange resins should be stored in an area protected by an automatic detection sprinkler installation. The NRC inspector noted that during July 1988, the licensee stored eight barrels of unused ion exchange resin in Room 69 which does not have a sprinkler system installed.

The licensee admitted to the violation and cited a delay in a resin fill evolution and unfamiliarity of operations personnel with the requirements of the UFHA regarding resin storage as causes for the violation.

As immediate corrective action, upon notification of the condition, the licensee removed only a portion of the resin. The licensee stated this action was based on a review of the UFHA for Fire Zone 20.7. Section 5.2 of the UFHA for Fire Zone 20.7 contains a list of allowable transient combustible levels for Room 69 which includes 1000 pounds of unused resin. The engineer responding was not aware of the inconsistency which existed in the UFHA in that Section 3.3 implied that all resin should be stored in an area protected by automatic detection sprinkler system. Further, he was not aware the requirement was reiterated in Procedure SO-G-6. After a followup conversation with the NRC inspector the following day,

which uncovered the inconsistencies, the remaining resin was removed and properly stored.

To prevent recurrence of the situation, the licensee committed to perform the following:

- (1) Change the wording of Procedure SO-G-6 to reflect that unused resin "shall" be stored in an area protected by a sprinkler system versus "should".
- (2) Revise the UFHA to resolve the inconsistency between Sections 5.2 and 3.3.
- (3) Revise Procedure SO-G-6 to include a mechanism for identification of special requirements pertaining to combustible materials storage and use and to resolve any conflicts with the UFHA.
- (4) Maintain a controlled copy of the UFHA in the control room and train all operations personnel on its content.

The NRC inspector reviewed the major rewrite to Procedure SO-G-6, which was issued on March 24, 1989. In addition to specifically addressing the requirements for storage of unused resin, the revision expands on housekeeping deficiencies in relation to fire protection and industrial safety concerns. It appeared the licensee had provided a mechanism for identification of special requirements pertaining to combustible materials storage and use.

The NRC inspector verified that the licensee had revised the UFHA to resolve the discrepancy between Sections 5.2 and 3.3. This was accomplished by rewriting Section 3.3 to read that unused ion resin is to be stored in an area protected by an automatic detection suppression system unless the presence of the resin is analyzed. This revision was issued in September 1988. The NRC inspector verified that a controlled copy of the UFHA is maintained in the control room.

It appeared that the corrective actions taken by the licensee should preclude recurrence of improper storage of unused resin if procedural adherence is followed. Based on the above, this violation is considered closed.

- c. (Closed) Open Item 285/8836-01: Installation of test tees for instrument air (IA) accumulator assemblies.

This item involved a problem encountered by the licensee during testing of the check valve for the IA accumulator assembly for Valve YCV-1045A. The testing identified that the check valve was leaking due to a sliver of metal lodged between the seat and disc. The licensee determined that the sliver was from a compression

fitting that was routinely disconnected and reconnected to perform the monthly surveillance test.

To resolve this problem, the licensee installed a test tee with a valve upstream of the check valve. The valve is used to bleed the air pressure off the supply line upstream of the check valve in lieu of disconnecting the compression fitting.

To address the generic aspects of this problem, the licensee has installed test tees and valves upstream of the check valves for all IA accumulators that are tested quarterly, except for the accumulator assembly for Valve HCV-712A. Valve HCV-712A is installed in the ventilation system for the spent fuel pool and serves to place the high-efficiency filter in service whenever fuel is being moved in the spent fuel pool. The valve fails as is on the loss of instrument air pressure.

Procedure OP-11, "Reactor Core Refueling Procedure," was issued to require that Valve HCV-712A be placed in the filtering position prior to fuel movement. Based on the established administrative controls for valve positioning, the licensee determined that the accumulator assembly is not required to be tested.

The NRC inspector toured the plant to verify that test tees and valves had been installed for the appropriate accumulator assemblies. The NRC inspector reviewed Procedure OP-11 to verify that adequate administrative controls had been established for Valve HCV-712A. No problems were noted during the reviews.

- d. (Closed) Severity Level IV Violation 285/8846-03: Failure to properly post radiation areas.

In October 1988, the NRC inspector identified a concern where a new type of tag employed by the licensee to identify hot spots, or localized areas of intense radiation, could only be identified on one side. It is common practice to hang the tags and, therefore, the potential existed for an individual to be close to a hot spot and not realize it. The licensee promptly responded to this concern by revising Procedure VII-9-25, "Radiation Hot Spot Verification/Update," to provide instructions that all free-hanging hot spot tags shall be identifiable from either side.

On December 2 and 6, 1988, the NRC inspector noted the licensee failed to install hot spot tags that could be identified from either side in that six hot spot tags in the auxiliary building could only be identified from one side.

In response, the licensee admitted the violation as stated and cited failure of radiation protection supervisors to follow Procedure VII-9-25 and insufficient training on the procedure

revision as reasons for the violation. To prevent recurrence of the violation, the licensee has taken the following corrective actions:

- (1) Surveyed the auxiliary building hot spot postings and corrected them, where necessary.
- (2) Had radiation protection supervisors review Procedure VII-9-25 to ensure understanding of the requirements.
- (3) Trained all field health physics personnel on the procedural requirement.
- (4) Modified the unused reserves of hot spot tags to ensure the tags are two sided.

The NRC inspector reviewed training records to verify all health physics personnel had received instruction on the requirements of Procedure VII-9-25. Additionally, the NRC inspector toured the auxiliary building on numerous occasions and had not noted any repeat occurrences of inadequate posting of hot spots.

Based on the training of the health physics personnel and the continuing licensee management emphasis on strict procedural adherence, it appeared the licensee had taken appropriate corrective actions to prevent recurrence of the violation.

- e. (Closed) Severity Level IV Violation 285/8903-01: Lack of drawing control for temporary modifications (TMs).

The basis for this violation was that the licensee did not have a process to ensure transmittal of system design changes made by TMs to the control room drawings, utilized by the plant operations staff, in a timely manner.

The licensee admitted to the violation as stated and cited inadequacy of Procedure SO-0-25, "Temporary Modification Control," as the reason for the violation. Procedure SO-0-25, Revision 26, that was in effect at the time of the violation, did not specify the actions to be taken to update the control room drawings when a TM was installed.

As immediate corrective action, the licensee performed a review of all existing TMs and updated the control room drawings to reflect the installation of the TMs. This task was accomplished prior to leaving Mode 5 (refueling shutdown) during the January 1989 plant startup.

To preclude future violations, the licensee issued a revision to Procedure SO-0-25. The procedure provided specific instructions to be taken during the evaluation and verification processing of the temporary modification control form (Form FC-66) to provide updating of the control room drawing(s) when a TM is to be installed in the field.

The NRC inspector reviewed the revision and found that it assigned responsibility for control room drawing revision(s) to the system engineer. The instructions were clear and specific and, if followed, will ensure that drawings used by the operations department accurately reflect the as-built condition of the plant.

The NRC inspector reviewed Form FC-66. This form is used to request, describe, evaluate, review, and facilitate installation and restoration of TMs. It was found that the form had been revised to require verification from the system engineer that the control room drawing(s) affected by the TM had been appropriately marked.

The NRC inspector examined the control room drawings on a sampling basis and that found the drawings currently reflect the TMs installed in the plant. The NRC inspector discussed the newly implemented drawing markup program with several operators. All operators indicated the new system was helpful and not burdensome.

The NRC inspector was concerned that there was no evidence of training having been conducted on the various responsibilities assigned by the implementation of the revision to Procedure SO-0-25. The NRC inspector discussed this with the Supervisor, System Engineering, who indicated that he was aware of this weakness. He indicated that he was committed to providing training on the revision of Procedure SO-0-25 as a result of weaknesses identified by the NRC Operational Safety Team Inspection, documented in NRC Inspection Report 50-285/88-201.

Based on the implementation of the revisions to Procedure SO-0-25 and Form FC-66, and the review of marked-up control room drawings, it appeared the licensee had taken adequate corrective action to ensure that information concerning field changes was appropriately transmitted to the control room drawing(s) for use by operations personnel. The issue of formal training on the requirements of Procedure SO-0-25 will be addressed during review of the licensee's response to Unresolved Item 285/88201-05 of NRC Inspection Report 50-285/88-201. This violation is considered closed.

- f. (Closed) Open Item 285/8903-08: A loop seal for a pressurizer code safety valve was not established during plant startup.

This open item was identified due to the problems encountered by the licensee in establishing a loop seal during plant startup from the 1988 refueling outage. The loop seal was not established in the piping between a pressurizer code safety valve (RC-141) and the pressurizer. In addition, during the plant startup, Valve RC-141 experienced weeping problems that caused a high temperature indication on the safety valve tailpipe.

The licensee performed an extensive review to determine why a loop seal was not formed during startup. The licensee's review did not



firmly establish the reason that a loop seal was not formed. The licensee did determine that new insulation was installed on the loop seal piping during the refueling outage. The licensee reviewed the design documentation and determined that insulation should be installed on the piping and determined that the presence of the insulation should not affect the capability of establishing a loop seal.

During plant startup, the licensee identified a problem that caused plant heatup to be halted. The problem was with the expansion bellows on the main steam line. It was determined that, should the bellows rupture, the steam impingement could cause a failure of the concrete base mat located directly beneath the main steam line. The details of the bellows problem is discussed in paragraph 14.d of NRC Inspection Report 50-285/89-03. At the time the problem was identified, the plant heatup was halted and the plant conditions held at a reactor coolant system (RCS) temperature of approximately 300°F until the bellows design modification was installed. The design modification took approximately 3 days. The licensee stated that they felt that the most probable cause of the failure to form a loop seal was due to stopping the normal plant heatup.

The licensee performed an evaluation to determine if Valve RC-141 was weeping or simmering. Used in this context, weeping is a condition where the valve is leaking by the seat, and simmering is considered to be a condition where the valve is at, or near, its setpoint and is an indication that the valve is ready to lift. Based on the evaluation, the licensee stated that the valve appeared to be weeping. In discussions with the valve manufacturer, the licensee determined that uneven heating of the valve disc could occur if a loop seal is not present. The uneven heating of the disc can cause disc warpage which will cause small amounts of steam to be passed through the valve.

The licensee removed the insulation on the loop seal piping, reestablished the loop seal, and reinstalled the insulation. Since the loop seal has been established, no additional problems have been noted.

The NRC inspector reviewed the actions taken by the licensee. The actions appeared to adequately address the problem of weeping of Valve RC-141. The NRC inspector will monitor the next plant startup to verify proper operation of the pressurizer code safety valves. Based on the discussion provided above, this item is closed.

- g. (Closed) Unresolved Item 285/8909-07: Seismic qualification of the eyewash supply line.

This item involved a concern that the water supply line for the eyewash stations located in the battery rooms was not seismically qualified. The lack of qualification of the line established the

possibility that the line could fail and spray water on the station batteries. The water spray could potentially affect the operability of the batteries.

In NRC Inspection Report 50-285/89-09, it was stated that the licensee would perform a seismic calculation to verify the installation of the eyewash supply line. The inspection report also stated that the calculation would be forwarded to NRR for review. Subsequent to the issuance of this unresolved item, a discussion was held between the licensee, the NRP project manager, and the NRC inspector. During this discussion, it was decided that the licensee would make changes to the appropriate procedure to control the water supply to the eyewash stations in lieu of performing a seismic calculation.

The licensee revised Procedure ST-DC-1, "Station Batteries," to provide instructions to open the eyewash supply valve when battery surveillance testing is performed and shut the valve when testing has been completed. Procedure ST-DC-1 is the only licensee procedure that provides instructions for battery testing where the potential exists for the use of the eyewash station. This approach will ensure that the eyewash stations are available when personnel are working in the battery rooms but ensures that the water supply is secured when the battery rooms are unoccupied.

The NRC inspector reviewed the revision to Procedure ST-DC-1. Based on this review, it appeared that the licensee adequately addressed the concerns related to the water supply for the eyewash stations.

No violations or deviations were identified.

#### 4. Operational Safety Verification (71707)

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

- ° Proper shift staffing was maintained and conduct of control room personnel was appropriate.
- ° Operator adherence to approved procedures and TS requirements was evident.
- ° Operability of reactor protective system, engineered safeguards equipment, and the safety parameter display system was maintained. If not, the appropriate TS limiting condition for operation (LCO) was met.

- ° Logs, records, recorder traces, annunciators, panel indications, and switch positions complied with the appropriate requirements.
- ° Proper return to service of components was performed.
- ° Maintenance orders (MO) were initiated for equipment in need of maintenance.
- ° Management personnel toured the control room on a regular basis.
- ° Control room access was properly controlled.
- ° Control room annunciator status was reviewed to verify operator awareness of plant conditions.
- ° Mechanical and electrical temporary modification logs were properly maintained.
- ° Engineered safeguards systems were properly aligned for the specific plant condition.

During this inspection period, the NRC inspector reviewed the following items:

- a. On April 11, 1989, during the performance of operator license examinations by license examiners from the NRC Region IV office, it was noted that Procedure OI-SI-2, "Safety Injection-Normal Operation," appeared to be inadequate in that the procedure could not be performed as written. The operator was simulating the performance of an evolution to drain and refill the safety injection tank (SIT). Step 3 of Procedure OI-SI-1 stated that the high-pressure safety injection (HPSI) pump shall be started. Step 5 of the procedure stated that the HPSI pump started in Step 4 should be stopped. The procedure could not be performed as written since the pump was started in Step 3.

The NRC license examiner was concerned since he was aware that the evolution of draining and refilling the SIT had occurred twice on the previous operating shift and did not believe that a procedure change had been initiated to correct the erroneous information contained in Step 5. It appeared that operations personnel were not complying with procedures as written, and were not initiating changes to correct the errors in procedures. The NRC license examiner's concerns were relayed to the NRC inspector.

The NRC inspector discussed this concern with operations personnel to determine why procedures were not being corrected. During these discussions, the following concerns were identified by operations personnel:

- (1) The licensee is in the process of upgrading all safety-related procedures by completely rewriting and reissuing them. The procedure upgrade program is being performed by a procedures upgrade group which is part of Project 1991.

The operations personnel were under the impression that they were not to change any procedures until the upgraded procedure had been issued. They felt that they were to use the existing procedure until the new one was issued because only the procedures upgrade group could make changes.

- (2) The operators had previously attempted to provide procedural changes to the procedures upgrade group and the changes were rejected. In one example cited by an operator, he took the initiative to revise a seldomly used procedure to reflect the actual way the evolution was performed, had the procedure reviewed by his peers to verify accuracy, and submitted the procedure change to the procedures upgrade group. The operator stated that the group refused to issue the procedure revision since they weren't working on that particular procedure at the time. After the operator sternly insisted that the procedure be revised, the group issued the procedure change.

The NRC inspector discussed the above concerns with licensee management. In response to these concerns, the plant manager issued a memorandum, on April 18, 1989, to all control room personnel. The memorandum stated that it appeared operations personnel were frustrated with the procedure upgrade process and the operators feel that interim upgrades to procedures are not encouraged while the upgrade process is proceeding. The memorandum added that procedural input to the upgrade process by operations personnel is highly valued and that if a procedure cannot be performed as written, then the appropriate on-the-spot change must be made.

Although no specific reasons or procedural requirements could be identified by the NRC inspector as to why operations personnel could not make on-the-spot changes, the concerns discussed above are considered a problem since operations personnel perceive that they are not allowed to change procedures. It appears that the memorandum issued by the plant manager addressed the problem.

The NRC inspector performed a followup review to determine whether or not a change was made to Procedure 01-SI-1 on April 11, 1989. The NRC inspector noted that a procedure change had been made to correct Step 5 but could not establish the exact time when the on-the-spot change was made.

The NRC inspectors will continue to review the performance of evolutions to verify that operation of plant equipment, maintenance activities, performance of surveillance tests, and other proceduralized activities are being performed in accordance with written instructions.

- b. Throughout this inspection period, the licensee experienced problems maintaining the boron concentration in SIT SI-6C. There are two check valves installed in series between the SIT and the RCS. The check valves had been leaking, causing coolant from the RCS to leak into Tank SI-6C. This small leakage (estimated by the licensee to be 0.1 gallons per minute) caused the dilution of the boric acid solution in SIT SI-6C, since the boric acid concentration in the RCS is lower than the concentration in the tank. The RCS boron concentration was approximately 1100 parts per million (ppm); whereas, the concentration in the tank is maintained above 1800 ppm. Due to the check valve leakage, the concentration in the tank dropped to as low as approximately 1820 ppm.

To increase the boron concentration in SIT SI-6C, the licensee has been draining the tank and then refilling the tank with boric acid solution from the safety-injection and refueling water tank (SIRWT) using a HPSI pump. The boric acid concentration in the SIRWT is normally maintained around 1900 ppm.

Due to dilution of the boron concentration in SIT SI-6C, the licensee had to drain and refill the tank on four occasions during this inspection period. Each time SIT SI-6C was drained, the licensee entered a 1-hour TS LCO. To avoid repeated entry into the LCO, the licensee developed and implemented an alternate means of adding boric acid to the tank. As provided by the instructions in Procedure SP-SITFILL-1, "Injection of Concentrated Boric Acid Into Safety Injection Tank SI-6C," attached to MO 892537, the licensee added boric acid solution directly to SIT SI-6C via the tank sampling line. A portable pump and barrel of boric acid solution was transported into containment and the solution was pumped into the tank. A sample was taken and the resulting solution was approximately 3300 ppm. The licensee sparged SIT SI-6C with nitrogen, resampled, and determined that the concentration was approximately 2040 ppm. The evolution was performed without any problems.

Prior to performing the filling of SIT SI-6C, the licensee generated a 10 CFR Part 50.59 evaluation to address this evolution. The evaluation concluded that the evolution did not involve an unreviewed safety question.

The NRC inspector reviewed Procedure SP-SITFILL-1 and the 50.59 evaluation to verify compliance with the appropriate regulations. No problems were noted during the reviews.

- c. The licensee has experienced problems with maintaining the toxic gas monitors (TGM) in an operational condition due to recurring anomalies

with the monitors. An instrumentation and control (I&C) technician was attempting to repair the TGMs and alertly noted that the booster pumps (a pump installed for each monitor that takes a suction from the roof sample point and discharges to the suction of the monitor pump) had not previously been tested to verify the pump flow rate.

The licensee issued Procedures CP-6286A-M, "Hydrogen Fluoride Monitor A;," CP-6286B-M, "Hydrogen Fluoride Monitor B;," CP-6288A-M, "Chlorine Monitor A," and CP-6288B-M, "Chlorine Monitor B;" to provide instructions for testing the booster pumps. The test results indicated that the flow rate was approximately 4.5 liters per minute; whereas, the acceptance criteria required a minimum flow rate of 6.5 liters per minute.

Based on the low flow of the booster pumps, the TGMs were declared inoperable. At the time of discovery of the problem, the control room ventilation system was in the 100 percent recirculation mode. TS 2.22 requires that any time both channels of the TGMs are inoperable, the control room will be in full recirculation. The ventilation was in recirculation because the TGMs were out of service.

The licensee replaced the booster pumps with like-for-like replacements and reperformed the flow rate test. The pumps successfully passed the test.

Due to the reduced flow rate, it could not be determined whether or not the TGMs could meet the design basis acceptance criteria for response time. The lower flow rate causes the response time to increase. The licensee is currently performing an evaluation to determine if the response time is within the specified limit. This item remains unresolved pending the completion of the evaluation by the licensee. (285/8917-01)

No violations or deviations were identified.

#### 5. Plant Tours (71707)

The NRC inspectors 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.
- ° Valves and/or switches for safety-related systems were in the proper position.

- ° 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.

During a tour of the plant on April 21, 1989, the NRC inspector noted considerable vibration on the 1-inch piping from each main steam line below the high pressure turbine to Valves MOV-CV-2, MOV-CV-4, SPDV-3, and SPDV-4. The concern was brought to the attention of the secondary systems lead engineer. On April 24, 1989, a memorandum was generated from system engineering to design engineering requesting analysis of the condition.

The NRC inspector noted that the steam lines in question are not safety grade but their failure could cause a challenge to safety systems. The concern is considered an open item pending review of input from design engineering. (285/8917-02)

No violations or deviations were identified.

#### 6. Monthly Maintenance Observations (62703)

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

- ° The TS LCOs were met while systems or components were removed from service.
- ° Approvals were obtained prior to initiating the work.
- ° Activities were accomplished using approved MOs 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 inspectors observed the following maintenance activities:

- ° Repair of an oil leak on the steam-driven auxiliary feedwater pump (MO 892354)
- ° Troubleshooting the reason for the fuel oil transfer pump on Emergency Diesel Generator (EDG) 1 not pumping (MO 892187)
- ° Troubleshooting digital outputs for sequential permissives used in the rod drive system resulting from conflicts between software and hardware contact states (MO 892457)
- ° Repair of a clogged raw water strainer (MO 891921)
- ° Erection of scaffolding in the station battery rooms (MO 892421)

A discussion of each item is provided below:

- a. On April 12, 1989, the NRC inspector observed licensee personnel repair an oil leak on the turbine-driven auxiliary feedwater pump (FW-10) in accordance with MO 892354. It was initially reported that the leak rate was approximately 0.5 pints every 20 minutes and the oil was leaking through an oil sightglass.

The licensee investigated and noted that the sightglass for monitoring the oil flow to the governor for Pump FW-10 was cracked and was leaking. The personnel performing the maintenance estimated the actual leak rate to be approximately 20 drops per minute. After discussions with the pump manufacturer, the licensee discovered that the oil adjustment knob was incorrectly set. The licensee found the knob to be fully open. The knob should have been set for a flow rate of five drops per minute. The licensee adjusted the knob and the oil leak stopped.

Based on the observations of the NRC inspector, it appeared that the licensee personnel performed this maintenance activity in a professional manner. The maintenance personnel also checked the remainder of the oil system for leaks and found none. The NRC inspector also noted that the system engineer was present during the performance of the maintenance to provide guidance to the maintenance personnel. After the maintenance was completed, Pump FW-10 was run to verify satisfactory operation.

- b. During the performance of the surveillance test on EDG 1, the licensee noted that it did not appear that a fuel oil transfer pump (FT-2) was operating properly. The licensee issued MO 892187 to investigate the cause.

Maintenance personnel performed troubleshooting activities on Pump FT-2 to determine why the pump would not properly establish



flow. The craftsmen disassembled the strainer on the pump suction to verify that the strainer was not clogged. The strainer was not clogged; however, the craftsmen noted that it appeared that a threaded pipe elbow connected to the strainer was loose. The loose fitting could have been a potential cause of the problem since air may have leaked into the system.

After tightening the piping elbow and reinstalling the strainer, the licensee tested Pump FT-2 and verified that the pump operated properly by performance of the surveillance test.

During review of this problem, the NRC inspector noted that the licensee has agreed, in a letter dated March 24, 1989, to include the fuel transfer pumps for both EDGs in the inservice testing (IST) program. In the letter, the licensee stated that procedural implementation of the IST requirements would be completed by November 1989.

The licensee reviewed the portion of Procedure ST-ESF-6 that is used to verify operability of the EDG fuel oil transfer pumps. The licensee noted that the guidance for determination of operability could be enhanced. The licensee stated that Procedure ST-EST-6 would be revised to provide improved guidance.

The NRC inspector reviewed Procedure ST-ESF-6 and noted that it appeared that the procedure was adequate as written, but concurs that additional information would improve the procedure.

- c. On April 17, 1989, the NRC inspector observed licensed operators performing a power reduction in order to take Feedwater Heater 5B off line to repair a steam leak. During the reduction from 100-percent to 95-percent power, with power at 98 percent, Control Element Assembly (CEA) Groups 2 and 3 inserted simultaneously with Group 4 control rods while in the manual sequential mode of operation. All three groups were inserted to 124 inches from 126 inches.

Operations noted the improper sequencing immediately and stopped control rod manipulations. Operations then switched to manual individual mode and withdrew Group 2 and 3 rods to 126 inches. Group 4 rods were later inserted to 122 inches for maintenance of axial shape index using the manual individual mode.

The reactor engineer and I&C personnel were promptly summoned to investigate the problem. I&C personnel found that digital outputs for the sequential permissives used in the control rod drive circuits contained conflicts between the software status displayed and the actual state of hardware contacts. The contacts were in a closed state when the software indicated that they were open. The cause of the discrepancy between the computer output signal and the hardware status was not known. As immediate action, I&C personnel cleared the permissive contacts which had allowed Groups 2 and 3 to travel with

Group 4. Operations performed an operability check and found that Groups 2 and 3 no longer traveled with Group 4. The above was accomplished within 1 hour following the occurrence.

The lead electrical engineer initiated an emergency software service request to have the programming department install a patch in the software to enable the computer to capture the differences in digital output states between the software and hardware. Additionally, M/N 892457 was issued for any hardware repair that may be necessary, as well as to provide postmaintenance testing instructions.

On April 18, 1989, the computer system department inserted a monitoring program in the rod supervisory sensing system to monitor any mismatches between digital output and actual hardware status and to display alarms. The work was performed under Emergency Software Service Request 89-ERF-007 and the program was tested by Verification and Validation Test Plan YNV-R555-02.00B. The NRC inspector reviewed these completed documents and found no problems.

On April 21, 1989, shift technical advisors performed Procedure ST-CEA-1, "Monthly Test of Power Dependent Insertion Limits, Deviation, and Sequence Monitoring System." This was the formal postmaintenance test for return to service of the manual sequential mode of operation. The NRC inspector reviewed the completed test document and noted no problems.

The NRC inspector was in the control room for the majority of the occurrence and noted the following positive attributes on the part of the plant staff:

- (1) Immediate operator recognition and recovery from a potential significant problem.
- (2) Rapid response from I&C, engineering, computer systems, and plant management to support operations.
- (3) Efficient determination of an operability concern.
- (4) Quick identification of the cause of the problem by skilled technicians.

Overall, the staff's professional actions resulted in a skilled, safe, and indepth recovery from a significant problem. The NRC inspector noted one weakness that existed throughout the event. Immediately after identification of the problem, operations demonstrated operability of the CEAs by exercising them in the manual individual mode. However, from the time of the event on April 17, 1989, until the completion of the postmaintenance test on April 21, 1989, there existed a question of operability of the manual sequential mode of CEA operation. Therefore, the CEA mode selector switch should have been caution tagged to identify the problem. This

was not done. However, subsequent operations shifts were notified of the condition via formal operations correspondence and the shift turnover log.

- d. On April 19, 1989, the NRC inspector witnessed portions of maintenance being performed on raw water pump discharge Strainer AC-12B. The strainer was taken out of service because excessive backpressure indicated clogging. The work was authorized by MO 891921. The NRC inspector verified that AC-12B was properly tagged out prior to being released to the maintenance department. The NRC inspector also noted the licensee had entered a TS 24-hour shutdown LCO for repair of the strainer.

The NRC inspector witnessed maintenance personnel remove a damaged air-operated backwash valve and replace it with a manual ball valve to attempt to backwash the strainer down to an acceptable backpressure. However, this approach was not used because operations personnel were concerned that the backwash line could not be isolated after flushing in order to reinstall the original air-operated, bladder-type valve. Therefore, the air-operated valve was expeditiously repaired, reinstalled, and the strainer was successfully backwashed approximately 1 hour prior to the expiration of the 24-hour LCO.

- e. On April 27, 1989, the NRC inspector noted that painting had begun in the station battery rooms as part of the continuing facilities upgrade program. It was noted that a substantial wooden-frame protective covering had been erected in each of the two battery rooms to prevent contact with the battery terminals while paint was being applied to the interior surfaces of the rooms.

During review of MO 892421, the NRC inspector determined that the licensee had properly designed the protective cover and generated a 10 CFR Part 50.59 evaluation prior to constructing the cover. The erection of scaffolding in areas where safety-related equipment is located, without the performance of a safety analysis, had been a recurring problem at the FCS.

To address the recurring problem, the licensee proceduralized the erection of all scaffolding. It appeared that the licensee had reestablished control over the erection of scaffolding.

No violations or deviations were identified.

#### 7. Monthly Surveillance Observations (61726)

The NRC inspectors observed selected portions of the performance of the TS-required surveillance testing on safety-related systems and components. The NRC inspectors verified the following items during the testing:

- ° Testing was performed by qualified personnel using approved procedures.
- ° Test instrumentation was calibrated.
- ° The TS LCOs 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.
- ° Test was performed on schedule and complied with the TS required frequency.

The NRC inspectors observed the following surveillance test activities. The procedures used for the test activities are noted in parentheses:

- ° Monthly test of EDG 1 (ST-ESF-6)
- ° Monthly test of Channel B of the safety-injection actuation signal (ST-ESF-2)
- ° Monthly test of the containment spray logic (ST-ESF-4)
- ° Monthly test of the recirculation actuation logic (ST-ESF-13)
- ° Full-flow test of the auxiliary feedwater water pumps (SP-FW-11)

A discussion of each surveillance observed is provided below:

- a. On April 5, 1989, the NRC inspector observed the monthly testing of EDG 1. The NRC inspector noted that the testing was performed in accordance with the procedure, as written, and was performed in a professional manner.

During the testing, an anomaly was identified with respect to the operation of the fuel oil transfer pumps. The licensee issued MO 892187 to investigate the pump anomaly. A discussion of the actions taken by the licensee is provided in paragraph 6.b of this inspection report.

On April 17, 1989, the NRC inspector witnessed the performance of surveillance testing of EDG 2. The test was performed by licensed operators with an approved, up-to-date procedure. The primary

purposes of this test were to verify that the diesel generator started, came up to speed and voltage output, properly loaded electrically, and maintained continuous power output within specifications. During performance of the test, operations noted some trouble in maintaining continuous power output at the specified maximum of 2402 kW for 1 hour. On the output of both emergency response facility computers and the analog control room instrumentation, the power output was noted to swing widely. All operators involved had noted some variance of this parameter in the past but never of such magnitude. The system engineer, electrical maintenance supervisor, and lead I&C technician were summoned to investigate. The I&C technician determined that the computer output accurately reflected the power output. After approximately  $\frac{1}{2}$  hour, the power fluctuations dampened out and the test was successfully completed. MO 892447 was written to troubleshoot the cause of the malfunction, adjust or repair, as required, and reperform Procedure ST-ESF-6 to verify proper control.

In discussions with the Supervisor, Electrical Maintenance, the NRC inspector learned that no anomalies could be found with the generator. The supervisor believed the fluctuation in generator output to be attributed to fluctuations on the grid. MO 892447 was voided.

In further discussions with the diesel generator system engineer, it was found that engineering was concerned with proper operation of the governor. They have arranged for a factory representative to inspect the governor during a future test. Engineering initiated MO 892680 which requires consulting with Woodward, the governor manufacturer. This MO is still outstanding at this time. The NRC inspector will perform routine followup on the completion of MO 892680.

- b. On April 6, 1989, the NRC inspector observed the surveillance testing of the Channel B safety-injection actuation signal, containment spray logic, and recirculation actuation logic. During observation of these testing activities, the NRC inspector noted that the testing was performed in accordance with the instructions provided by the procedure and in a professional manner.

During testing of the safety-injection actuation signal logic per Procedure ST-ESF-2, a relay failed to trip when the test was initially performed. The same procedural step was reperformed and the relay tripped. Personnel performing the testing issued MO 892219 to document the test anomaly and initiate a review of why the relay did not initially operate. The licensee lubricated the relay and reperformed the complete test. The testing was reperformed without problems.

- c. On April 29, 1989, the NRC inspectors observed the performance of the full-flow test for the auxiliary feedwater pumps. The test was performed in accordance with the instructions provided in Procedure SP-FW-11, "Auxiliary Feedwater Pump Operational Test."

During observation of the testing, the NRC inspectors noted no problem with the performance of the test. The test was well coordinated by the system engineer and professionally performed by all the individuals involved.

This test was performed to address a concern identified by an NRC inspector on the Maintenance Team Inspection (MTI). The data from the tests were forwarded to the MTI team leader for review. The results of the data review will be documented in NRC Inspection Report 50-285/89-01.

No violations or deviations were identified.

8. Security Observations (71707)

The NRC inspectors verified that 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.

No violations or deviations were identified.

9. Radiological Protection Observations (71707)

The NRC inspectors 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.
- ° HP technicians were using calibrated instrumentation.
- ° Radiation work permits contained the appropriate information to ensure that 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 and were properly frisked prior to exiting an RCA.
- ° Radiation and/or contaminated areas were properly posted and controlled based on the activity levels within the area.

No violations or deviations were identified.

10. In-Office Review of Periodic, Special, and Nonroutine Event Reports (90712 and 90713)

In-office review of periodic, special, and nonroutine event reports was performed by the NRC inspectors to verify the following, as appropriate:

- ° Correspondence 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.
- ° Whether or not any information contained in the correspondence report should be classified as an abnormal occurrence or additional reactive inspection is warranted.
- ° Correspondence did not contain incorrect, inadequate, or incomplete information.

The NRC inspectors reviewed the following correspondence:

- ° Closeout of Concerns in Safety Enhancement Program, dated April 5, 1989
- ° Revision 1 to the Safety Enhancement Program, dated April 5, 1989
- ° Special Report on Inoperability of Inadequate Core Cooling Instrumentation Used for Postaccident Monitoring, dated April 5, 1989

- Request for Alternate Schedule for Submittal of NRC Bulletin 88-10 Written Response, dated April 3, 1989
- 1988 Refueling Outage Type B and C Local Leak Rate Test Summary, dated April 3, 1989
- Completion Schedule for Surveillance Testing of Alternate Shutdown Panel, dated April 7, 1989
- Failure to Perform Surveillance Test ST-FP-2 Within Required Interval (LER 89-008), dated April 6, 1989
- Response to NRC Generic Letter 88-17, dated April 11, 1989
- Emergency Safeguards Actuation Due to Personnel Error (LER 88-038-01), dated April 19, 1989
- Monthly Operations Report for March 1989, Undated
- Status of Implementation of TMI Action Plan Items, dated April 18, 1989
- OPPD Response to the Station Blackout Rule as it Applies to the Fort Calhoun Station, dated April 17, 1989
- Fort Calhoun Station Radiation Protection Enhancement Program, Bimonthly Status Report, dated April 17, 1989
- March Monthly Operating Report, dated April 14, 1989
- 161-kV Power Supply Reliability Review, dated April 21, 1989
- Independent Nuclear Appraisal, dated April 21, 1989
- Inadequate Analysis for Feedwater Regulating Valves (LER 89-007), dated April 24, 1989

No violations or deviations were identified.

#### 11. Exit Interview

The NRC inspector met with Mr. L. T. Kusek (Acting Plant Manager) and other members of the licensee staff on May 9, 1989. The meeting attendees are listed in paragraph 1 of this inspection report. At this meeting, the NRC inspectors summarized the scope of the inspection and the findings.