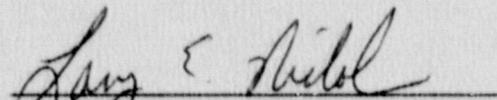


U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos.: 50-317/90-25; 50-318/90-25
License Nos.: DPR-53/DPR-69
Licensee: Baltimore Gas and Electric Company
Post Office Box 1475
Baltimore, Maryland 21203
Facility: Calvert Cliffs Nuclear Power Plant,
Units 1 and 2
Location: Lusby, Maryland
Inspection conducted: September 16, 1990 to October 20, 1990
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11/8/90
Date

Inspection Summary: This inspection report documents routine and reactive inspections during day and backshift hours of station activities including: plant operations; radiological protection; surveillance and maintenance; emergency preparedness; security; engineering and technical support; and safety assessment/quality verification.

Results: A non-cited violation was identified in which the licensee exceeded technical specification 3.0.5 limiting condition for operation. An unresolved item was identified regarding licensee review and correction of observed weaknesses in operations. An unresolved item was identified regarding completion of licensee evaluation to determine the root cause and retrospective safety significance of previous operations with tilted ex-core nuclear instrument detectors. An Executive Summary follows.

EXECUTIVE SUMMARY

Plant Operations: (Modules 71707, 93702) Inspection effort during this period focused on the startup and operation of Unit 1. The operations staff was responsive and their performance during the startup was generally good. Taken individually, the operational events that occurred during this inspection period had minimal safety significance. However when viewed collectively, these events and those discussed in NRC inspection report 50-317/90-23 and 50-318/90-23 were of concern and indicate weaknesses in the control of plant equipment and activities. The inspectors expressed concern that the common contributors, if left uncorrected, could lead to more serious events. This concern was discussed with senior station management during the inspection period.

Radiological Protection: (Module 71707) The radiological controls staff was observed to be responsive in anticipating changing radiological conditions. Review of this area identified no adverse findings.

Surveillance and Maintenance: (Modules 61726, 62703) Initial implementation of a quarterly system schedule program for coordinating maintenance appears sound. Routine review of maintenance and surveillance activities found that they were performed effectively and that problems were addressed and resolved in a conservative manner.

Emergency Preparedness: (Module 71707) Routine review in this area identified no noteworthy findings.

Security: (Module 71707) The licensee identified a failure to post adequate compensatory guards prior to lifting an equipment hatch. Licensee response to this event was adequate. Routine review in this area identified no additional noteworthy findings.

Engineering and Technical Support: (Modules 71707, 90712, 92700)

The engineering support for the operation of unit 1 was found to be generally thorough and well-documented. The inspectors noted with concern the inability of the licensee to implement a comprehensive and quantifiable service water heat exchanger monitoring program prior to Unit 1 startup.

Safety Assessment/Quality Verification: (Modules 71707, 30703) The Startup Review Board provided an effective medium for communication and problem resolution.

DETAILS

1. Summary of Facility Activities

Unit 1 began the inspection period in cold shutdown. A startup was performed and the unit was taken to full power. A chronology of the significant events of this evolution was as follows:

September 17, 0245 hours: Entered Mode 4

September 23, 1005 hours: Entered Mode 3

October 3, 0613 hours: Achieved Criticality

October 4, 0643 hours: Parallel to Grid

October 12, 0300 hours: Unit 1 at 100% power.

Unit 2 remained defueled for the extended Cycle 8 refueling outage with the fuel in the spent fuel pool. Repair of the steam generator thermal sleeves was completed during this inspection period.

2. Plant Operations

2.1 Operational Safety Verification

The inspectors observed plant operation and verified that the facility was operated safely and in accordance with licensee procedures and regulatory requirements. Regular tours were conducted of the following plant areas:

- control room
- primary auxiliary building
- radiological control point
- electrical switchgear rooms
- auxiliary feedwater pump rooms
- security access point
- protected area fence
- intake structure
- diesel generator rooms
- turbine building

Control room instruments and plant computer indications were observed for correlation between channels and for conformance with technical specification (TS) requirements. Operability of engineered safety features, other safety related systems and onsite and offsite power sources was verified. The inspectors observed various alarm conditions and confirmed that operator response was in accordance with plant operating procedures. Routine operations surveillance testing was also observed. Compliance with TS and implementation of appropriate action statements for equipment out of service was inspected. Plant radiation monitoring system indications and plant stack traces were reviewed for unexpected changes. Logs and records were reviewed to determine if entries were accurate and identified equipment status or deficiencies. These records included operating logs, turnover sheets, system safety tags, temporary modifications, and

the jumper and lifted lead book. Plant housekeeping controls were monitored, including control and storage of flammable material and other potential safety hazards. The inspectors also examined the condition of various fire protection, meteorological, and seismic monitoring systems. Control room and shift manning were compared to regulatory requirements and portions of shift turnovers were observed. The inspectors found that control room access was properly controlled and that a professional atmosphere was maintained.

In addition to normal utility working hours, the review of plant operations was routinely conducted during portions backshifts (evening shifts) and deep backshifts (weekend and midnight shifts). Extended coverage was provided for 96 hours during backshifts and 58 hours during deep backshifts. Operators were alert and displayed no signs of inattention to duty or fatigue.

2.2 Engineered Safety Features System Walkdown

In addition to routine observations made during regular plant tours, the inspectors conducted walkdowns of the accessible portions of selected safety related systems. The inspectors verified system operability through reviews of valve lineups, control room system prints, equipment conditions, instrument calibrations, surveillance test frequencies and results, and control room indications. Additionally, outstanding maintenance orders and nonconformance reports on the system were reviewed to determine their impact on system operability. The inspectors performed walkdowns of the following unit 1 systems during the inspection period:

- Containment Iodine Removal System
- Low Pressure Safety Injection System
- Auxiliary Feedwater System
- 125V DC System

The inspectors found no unacceptable conditions.

2.3 Followup of Events Occurring During Inspection Period

During the inspection period, the inspectors provided onsite coverage and followup of unplanned events. Plant parameters, performance of safety systems, and licensee actions were reviewed. The inspectors confirmed that the required notifications were made to the NRC. During event followup, the inspectors reviewed the corresponding CCI-118N (Calvert Cliffs Instruction) "Nuclear Operations Section Initiated Reporting Requirements" documentation, including the event details, root cause analysis, and corrective actions taken to prevent recurrence. The following events were reviewed.

a. Feedwater Flow Transmitter Isolation

Unit 1 was restarted with the feedwater flow transmitters to both steam generators (S/G) inadvertently isolated. Following criticality on October 3, 1990, the feed flow transmitter to the No. 12 steam generator did not come on scale. Instrument technicians entered the containment early the next morning (10/4) and discovered that the root isolation valves for flow transmitter FT-1121 were closed. The technicians opened the valves, recalibrated the flow instrument, and thus corrected the problem with the No. 12 S/G feedwater flow. The unit was subsequently paralleled to the grid and ramped to approximately 25% power.

While increasing reactor power, the control room operators noticed that the feedwater flow to the No. 11 S/G appeared higher than normal. With both steam generators steaming about the same and their levels remaining constant, the licensee began to question the accuracy of the No. 11 S/G feedwater flow. A containment entry was made that night (10/4) and the root isolation valves for the No. 11 S/G feedwater flow transmitter (FT-1111) were found closed. These valves were opened and the indicated feedwater flow returned to normal. The licensee has concluded that these valves were closed but leaked enough to provide a differential pressure and therefore a flow signal.

The safety significance of this event was analyzed by the licensee and determined to be minimal. These flow transmitters do not provide an input to any engineering safety feature actuation system, although they are used for determining the calorimetric power level. Because the indicated flow for No. 11 S/G was somewhat higher than the actual flow, the calorimetric power was indicating approximately 5% higher than actual power. When nuclear instrumentation power was adjusted to match calorimetric power, the protective setpoint would be reached earlier during an operating transient. The control room operators were observed to be controlling the plant using the most conservative indications. Administrative controls already in place would have prevented a nonconservative nuclear instrumentation adjustment if the indicated feedwater flow had been erroneously low and resulted in an incorrect calorimetric power that was lower than actual power.

These instruments are listed in the technical specification as required post-accident instrumentation. The licensee was unable to determine why these feedwater flow instruments were included as post-accident monitoring instruments since auxiliary feedwater flow is measured by a separate set of transmitters. A licensing effort has been initiated to remove this requirement from the TS.

The licensee management responded to this event by mandating that an event review be conducted prior to any further power escalation. This review concluded that the procedure for verifying containment integrity (STP-O-55A) was used to close the valves after an operations valve lineup had verified that the valves were open. The operators that used the STP did not implement the accompanying controls to ensure that the valves were appropriately repositioned. This problem appears to have been caused by a combination of an unclear procedure and an inattention to detail. The licensee conducted an extensive followup review and determined that this was an isolated case.

The inspectors reviewed the licensee actions in response to this event. This review included attendance at a special Plant Operations and Safety Review Committee (POSRC). Licensee response to this event was determined to be thorough and prompt. The inspectors agreed with the licensee conclusions. Although the safety significance of this item was minimal, it was an example of an inattention to detail regarding plant operations. No additional questions or concerns were identified.

b. Overfill of the Spent Fuel Pool

On October 17, 1990, at approximately 1:57 a.m., operators overfilled the spent fuel pool (SFP) when approximately 12,630 gallons of water was inadvertently transferred from the No. 21 refueling water tank (RWT) to the SFP. The overflow water entered the floor drain system in the auxiliary building and a cable chase located just above the SFP and subsequently spilled into the lower levels of the auxiliary building including the No. 12 emergency core cooling system (ECCS) pump room. Spillage into the lower levels occurred when the floor drain system backed up due to clogging of a strainer in the lines. The licensee has determined that all the water that overflowed the SFP was contained in the auxiliary building. No gaseous or particulate material was released via the ventilation system.

The event was initiated when the operators were preparing to recirculate the No. 21 RWT per section XIV of operating instruction (OI) 24. A drain path from the No. 21 RWT to the SFP was inadvertently established during the valve lineup for recirculation. The path included valve SFP-147 which was opened for an earlier fill of the spent fuel pool and improperly left open during the restoration of that task. Additional facts regarding this event include:

- After notification by health physics personnel that water was flowing down the wall in the 45 foot level, the operators quickly responded and had isolated the flowpath about in 10 minutes.
- The auxiliary building operator performing much of the evolution was relatively inexperienced (he had qualified in early July) and was not directly supervised for this operation. He had not performed any SFP operations with the SFP lined up for cooling without purification as was the case when he took the watch.
- SFP-147 should have been closed per Step 10 in section XIV of OI 24 (the SFP fill procedure). This step was vague and was apparently misinterpreted by the operator involved. The step directs the operator to other sections in OI 24 to either restore or secure purification. Given this general step, operator knowledge that restoration of purification was not desired, and that purification was already "secured", the operator determined that this step was complete. In doing so, the operator failed to close SFP-147 which was the purification return to the SFP.
- There is apparently no clear policy on what self checks are needed to assure that steps in a procedure are appropriately completed.

- Operators have indicated that SFP operations are complicated and were aware of several mishaps. They very strongly stated that they do all operations on this system with the greatest of care because of the potential for mishaps. Operations management is also aware of this potential.
- Operators were not monitoring RWT level indication nor the SFP level.
- The setpoint for the SFP high level alarm is one half inch higher than the overflow to the floor drain system. A problem report was generated on September 28, 1990, by design engineering to address this issue.
- The SFP high level annunciator alarmed sometime earlier in the shift and had not cleared.
- There are at least two field change requests pending implementation and an additional "work smarter" recommendation to address previous SFP overflow events.

While recognizing that operations has taken interim actions to address this issue, the inspectors are concerned with this event and the indications that previous similar events have occurred. This event resulted in radioactive contamination of numerous areas in the auxiliary building, the potential wetting of electrical equipment in the auxiliary building, and the potential flooding of the ECCS pump rooms. An apparent weak procedure, inattention to detail, and unclear management expectations for procedure performance played a role in this event.

c. **Inoperable Control Room HVAC Units**

On October 18, 1990, the licensee determined that the unit 1 technical specification limiting condition for operation 3.0.5 may have been exceeded on October 8, 1990, when the No. 11 control room heating ventilation and air conditioning (HVAC) unit was removed from service for approximately eight hours during preventive maintenance while the emergency power source was inoperable for the No.12 control room HVAC unit.

Preliminary conclusions from the licensee's evaluation indicated that inadequate control of equipment status was a root cause of the event. The licensee also determined that operation of Unit 1 without the emergency power supply to No. 12 control room HVAC unit for an unlimited period of time appears inconsistent with plant safety, although allowed by the technical specifications. The No. 21 emergency diesel generator supplies emergency power to the No. 12 control room HVAC unit and has been inoperable since on or about July 15, 1989.

The licensee's corrective actions to date include: 1) restoring No. 21 emergency diesel generator to a functional status to support operability of No. 12 control room HVAC; 2) review of other systems common to both units for a similar concern; 3) evaluation to determine a need for a Technical Specification amendment; and 4) interim implementation of an administrative functionality requirement for No. 21 emergency diesel generator to support operability of No.12 control room HVAC. The licensee also plans to revise applicable operating instructions to reinforce control of equipment status for the control room HVAC units and associated sub-systems. The licensee initiated a CCI-118 report and a problem report. Licensee plans to submit a Licensee Event Report.

The inspector determined that the licensee's corrective actions were appropriate and timely. The apparent licensee-identified violation of the unit 1 technical specification limiting condition for operation 3.0.5 is not being cited because the criteria specified in Section V.G. of the Enforcement Policy were satisfied. However, the inspector expressed a concern to licensee management that inadequate control of equipment status is a weakness, which warrants continuing licensee management attention.

The inspectors reviewed the above events in the aggregate and considered the following events from the previous inspection period, Inspection Report 50-317/90-23 and 50-318/90-23:

- Incorrect system alignment resulting in both unit 1 emergency diesel generators being inoperable.
- Inadvertent start of Unit 1 No. 12A reactor coolant pump.
- Loss of Unit 1 shutdown cooling.

Taken individually, the operational events that occurred during this inspection period as well as those identified above had minimal safety significance. However when viewed collectively, these events were of concern and indicate weaknesses in the control of plant equipment and activities. The inspectors expressed concern that the common contributors, if left uncorrected, could lead to more serious events. This concern was discussed with senior station management during the inspection period. This item is unresolved pending licensee review and resolution of this matter. (UNR 50-317/90-25-01; 50-318/90-25-01)

d. **Tilted Nuclear Instrument Detectors**

On August 24, 1990, while in Mode 5, The licensee discovered that the Unit 1 nuclear instrument (NI) ex-core detectors for reactor protection system (RPS) channels "C" and "D" had been in their maintenance position, tangentially tilted, rather than their vertical-operating position, for an undetermined amount of time. The licensee solicited assistance from the reactor vendor for an evaluation of detector operability in the tilted position and requirements to ensure future operability. The power range detectors for RPS channels "A" and "B" are permanently restrained in the vertical position.

The reactor vendor's analysis concluded that the detectors should be considered inoperable in the tilted position. In order to return the detectors to operability, the vendor recommended that the detectors be placed in the vertical position. Although a decalibration existed after returning the detectors to vertical position, the analysis determined that sufficient margin was contained in the trip setpoints to allow operation to 35% power.

In accordance with the reactor vendor's recommendations, the licensee returned the detectors to the vertical position and performed excore Axial Shape Index calibrations on all four channels at 30% power. No discrepancies were noted during the calibrations. At 85% power, another excore Axial Shape Index calibrations was performed to ensure the detectors were calibrated at conditions close to nominal operating conditions. The licensee inspected the Unit 2 excore detectors for a similar discrepancy and found that the NI excore detector for RPS channel "C" was in a tilted position. The detector was returned to the vertical position.

The inspectors determined that the licensee's actions to identify and restore the detectors to an operable condition was appropriate. The licensee's evaluation is ongoing to determine the root cause and retrospective safety significance of previous operations with tilted detectors. The licensee plans to submit a Licensee Event Report to the NRC within the next few weeks, documenting results of their evaluation. This item is unresolved pending completion of the licensee's evaluation (UNR 50-317/90-25-02; 50-318/90-25-02).

2.4 Temporary Modifications for Unit 1

The inspectors examined the licensee's program and instruction (CCI-117) for control of temporary modifications (TMs). The licensee uses TMs to disable, bypass or change systems, subsystems or components when equipment problems or plant circumstances require reconfiguration until the plant can be restored to its original condition or a design change is completed.

The inspectors reviewed CCI-117 and found it clear and consistent with technical specification Section 6.5.1.6. The inspectors found that the licensee maintained a TM log book for both units and log sheets that listed active TMs were placed in front of the log books. The TM log books also contained data packages for all active TMs. Selected data packages for unit 1 were examined and found to be complete. The inspectors also observed that quarterly reviews of TMs had been performed as required by CCI-117. The inspectors noted that the number of active temporary modifications, numbering approximately 50, appeared to be excessive and that about one-third of the active TMs had been in place for 2 or more years. The licensee acknowledged a need to reduce the backlog of TMs and has initiated recommendations to expedite the maintenance and engineering activities for aged temporary modifications. The licensee noted that efforts to ensure long-term control of the number of active TMs would require the recommendations to be formalized.

The inspectors developed a concern regarding the potential adverse impact of a recent temporary modification. On October 1, 1990, during a tagout of "11" auxiliary feedwater pump governor, the inspectors noted that the tagout process failed to recognize an unisolable suction source from the condensate storage tank (CST). A relief valve in the auxiliary feedwater system recirculation line was expected to provide isolation for the planned work. The taggers were unaware however, that a recent TM (TM-1-90-134) had removed the internals of the relief valve creating an unisolable path from the CST to the pump suction. The licensee generated a Problem Report and a Non-Conformance Report (NCR) to document and address the issue. The General Supervisor-Operations Support stated that there is no immediate safety impact based on his staff's review of the active TMs. The inspectors concluded that the safety significance of this issue was minimal. However, the inspectors determined that this represented weakness in the licensee's ability to assess the impact of TMs on system isolation.

2.5 Unit 1 Startup

The inspectors monitored the preparations and return to power of unit 1 that occurred during this inspection period. This expanded coverage included attendance at many of the key POSRC and site management meetings, as well as extensive around-the-clock inspections during the power ascension. The following items were specifically reviewed during this effort.

a. Startup Checklist

Operations uses procedure OP-6, "Pre-Startup Checklist", to verify that essential prerequisites have been accomplished prior to entry into the next startup mode. This procedure was maintained in the shift supervisor's office and was reviewed by the licensee management on a regular basis. The inspectors reviewed this procedure during the startup and concluded the following:

- The procedure was comprehensive in that it required the various site organizations to verify that their respective actions were completed to support startup. One exception was noted, however, that the licensing staff was not included in the checklist. This could be a problem if a licensing issue needed to be resolved prior to restart.
- The use of exceptions was confusing and inconsistent. Station management urged the various site organizations to sign their respective blocks in the checklist early and list the outstanding items as exceptions. This philosophy created numerous exceptions that had to be cleared or evaluated prior to restart. As a result, this startup checklist was used to actually manage the end of the outage, in lieu of verifying readiness for restart.

The station management stated that they had reached similar conclusions. No additional concerns or questions were identified.

b. **Valve Lineups**

A complete walkdown was performed on the accessible portions of the following Unit 1 Engineering Safety Features Systems:

- Salt Water Cooling System
- Component Cooling System
- 4.16 Kv Safety Electrical Distribution System
- Auxiliary Feedwater System

The inspectors verified system operability through reviews of valve lineups, equipment and space conditions, plant drawings, instrument calibrations, maintenance backlogs and system labeling. The above systems were found to be in proper alignment and in generally good condition. During the course of this inspection, however, problems were noted in the secondary plant with regards to labeling, missing supports, broken handwheels, and balance of plant drawings. Although these problems were limited to systems that support the main condenser, a failure in this area could result in more complicated plant operations. No other concerns were identified.

c. **Estimated Critical Condition**

The estimated critical condition calculations were reviewed. The procedure allows either a computer generated calculation or a manual calculation. A computer generated calculation was performed for this startup. The inspector verified that approvals were properly made and that no discrepancies existed. Requirements to achieve criticality within four hours of the calculation were met. Actual critical conditions were within the accuracy of the calculation. No unacceptable conditions were noted.

d. **Extended Control Room Observation**

During the startup control room activities were extensively monitored. The inspectors observed that the operators were responsive to alarms and indications. Communications were generally good and were reinforced by management. Procedures were in use for activities observed. The inspectors verified that the operators understood the reasons for the various annunciators that were in the alarm condition. The conduct of operations was determined to be professional during the startup.

3. **Radiological Controls**

During routine tours of the accessible plant areas, the inspectors observed the implementation of selected portions of the licensee's Radiological Controls Program. The utilization and compliance with special work permits (SWPs) were reviewed to ensure detailed descriptions of radiological conditions were provided and that personnel adhered to SWP requirements. The inspectors observed controls of access to various radiologically controlled areas and use of personnel monitors and frisking methods upon exit from these areas. Posting and control of radiation areas, contaminated areas and hot spots, and labelling and control of containers holding radioactive materials were verified to be in accordance with licensee procedures. Health Physics technician control and monitoring of these activities were determined to be adequate. The following areas were reviewed during this period:

- Controls for containment access and areas inside containment
- Controls for auxiliary building access and areas within the auxiliary building

No unacceptable conditions were identified.

4. **Maintenance and Surveillance**

4.1 **Maintenance Observation**

The inspectors observed maintenance activities, interviewed personnel, and reviewed maintenance orders (MOs) and other records to verify that work was conducted in accordance with approved procedures, technical specifications, and applicable industry codes and standards. The inspectors also verified that: redundant components were operable, administrative controls were followed, tagouts were adequate, personnel were qualified, correct replacement parts were used, radiological controls were proper, fire protection was adequate, quality control hold points were adequate and observed, adequate post-maintenance testing was performed, and independent verification requirements were implemented. The inspectors independently verified that selected equipment was properly returned to service.

Outstanding work requests were reviewed to ensure that the licensee assigned appropriate priority to safety-related maintenance. The inspectors observed/reviewed portions of the following maintenance activities.

a. **Repair of No. 11 Auxiliary Feedwater Pump Governor**

The scope of the work involved a modification of the base plate support to the governor linkage to allow alignment of the linkage in accordance with MO 200-270-479A. The inspectors observed portions of the linkage disassembly. The tagout was verified to be adequate and redundant components were verified operable. The inspectors noted that the mechanical maintenance supervisor and a quality control inspector were at the worksite. The inspectors assessed that the work was performed effectively and in accordance with the controlled work package.

b. **No. 12 Steam Generator Wide Range Level Indication Calibration**

The inspectors observed portions of the calibration of the No. 12 Steam Generator wide range level indication in accordance with MO 200-269-435A. Controls for bypassing and restoring the Auxiliary Feedwater Actuation System trip logic were observed. Quality control hold points were observed. The work was performed efficiently and professionally.

c. **Troubleshooting of No. 12 Main Steam Isolation Valve (MSIV)**

The inspectors observed portions of the licensee's activities to address intermittent partial closure signals received on No. 12 MSIV. The licensee, after no success in detecting and isolating the cause of the closure signal, suspected that the cause was an intermittent ground in the test solenoid. The licensee analyzed that any postulated failure in the circuit would not result in the inoperability of the MSIV. The inspectors reviewed licensee activities and attended licensee discussions on this matter and found them to be conservative and appropriate.

d. **Implementation of Quarterly System Scheduling**

The inspectors reviewed the implementation of the site quarterly system scheduling (QSS) process that occurred during this inspection period. This system is designed to schedule system and train outages for both corrective and preventive maintenance on a schedule that is driven by the surveillance test interval. The licensee is developing this planning method to reduce the large corrective maintenance backlog while minimizing the unavailability of equipment. This program is designed to function while a unit is at power.

The inspectors concluded that this program appears ambitious but achievable. Although it will take several years to fully implement this concept of scheduling work and performing tests, the potential benefits appear substantial.

4.2 Surveillance Observation

The inspectors witnessed selected surveillance tests to determine whether properly approved surveillance test procedures (STP) were in use, technical specification frequency and action statement requirements were satisfied, necessary equipment tagging was performed, test instrumentation was in calibration and properly used, testing was performed by qualified personnel, and test results satisfied acceptance criteria or were properly dispositioned. Portions of the following activities were reviewed.

a. STP-O-9A-1, AFW System Refueling Test

This STP was performed on several occasions between September 29 and October 2, 1990, as post-maintenance operability tests for No. 11 AFW pump erratic speed control problems. The problems were evidenced by cyclic stroking of the turbine governor when operators attempted to start the pump from cold conditions. The licensee successfully performed the STP after they replaced the governor and corrected binding problems in the governor linkage. The inspectors attended the pre-evolution brief and observed a thorough review of the procedure and general precautions by operators and maintenance. The inspectors observed good communication and effective coordination of the evolution by control room operators. The inspectors also noted appropriate quality verification and management attention during the test.

b. STP-M-3-1, Main Steam Safety Valve Tests

On September 26, 1990, the inspectors reviewed selected portions of the licensee's tests of main steam safety valves in preparation for unit 1 startup. The inspectors reviewed the licensee's procedure and observed the performance of tests locally in the MSIV room. The inspectors noted that the test was adequately supervised and controlled and was observed by a quality control inspector. At the completion of the test, four valves were weeping. Attempts to reseal the valves were unsuccessful for three of four valves. The licensee evaluated the situation and was satisfied that no safety concerns exist. The inspectors determined that the test conduct and post test actions were adequate.

c. **Engineering Test Procedure (ETP) 90-44, FCR 90-64 Low Pressure Post Modification**

This ETP was performed to test the auxiliary feedwater system (AFW) modifications to the positioners for CV-4070 and CV-4071, the steam admission valves. The pretest brief was thorough. The inspectors observed the initial test of CV-4071 and noted that it was conducted in a professional and controlled manner. Good coordination was noted between the test director and the operators performing the test. The test was unsatisfactory because the time to reach the required flow was longer than allowable. This problem was corrected by adjusting the time delay in the positioner logic. Another problem occurred when the operator placed the CV-4071 control panel switch to "open" to match actual valve position. The valve moved to mid-position and then reopened. The licensee determined that this response was due to the "break before make" characteristic of the handswitch, which reset the valve open logic and caused the valve to move. A problem report was written to address the issue and a label was placed next to the handswitches for the steam supply valves to instruct operators to not match switch positions after an automatic actuation. Final resolution of the problem report will evaluate the need to modify the circuit. The inspectors found that licensee performance of the ETP and actions taken in response to the problems observed were appropriate.

d. **Portions of the Following Additional Activities were Observed:**

- STP-O-65-1, Quarterly Valve Operability Verification
- STP-O-9-1, Auxiliary Feedwater Actuation (AFW) System Monthly Logic Test
- STP-O-5-1, Auxiliary Feedwater System Test
- STP-O-6-1, RPS Startup Test
- P-STP-13-1, Rod Drop and Group Rod Speed Test
- STP-O-29-1, Partial CEA Movement Test
- STP-O-47-1, MSIV Partial Stroke Test
- STP-M-213-1, Calibration of Power Range Nuclear Instruments by Comparison with Incore Nuclear Instruments

No noteworthy deficiencies were identified.

5. **Emergency Preparedness**

The inspectors routinely toured the onsite emergency response facilities and discussed program implementation with the applicable personnel. The resident inspectors had no noteworthy findings during this inspection period.

6. **Security**

During routine inspection tours, the inspectors observed implementation of portions of the security plan. Areas observed included access point search equipment operation, condition of physical barriers, site access control, security force staffing, and response to system alarms and degraded conditions. These areas of program implementation were determined to be adequate. No unacceptable conditions were identified.

On October 1, 1990, the inspectors were informed of a security event that involved the opening of an equipment hatch in a vital area without proper security coverage. The licensee made appropriate notifications regarding the event. Licensee investigation determined that the event was caused by a personnel safety concern and the need to quickly ventilate the area of acid fumes produced from work in the area. The licensee determined that compensatory security measures were in place within 10 minutes and later took action to reinforce worker awareness of security requirements. The inspector had no further questions.

7. **Engineering and Technical Support**

The inspector reviewed selected design changes and modifications made to the facility which the licensee determined were not unreviewed safety questions and did not require prior NRC approval as described by 10 CFR 50.59. Particular attention was given to safety evaluations, Plant Operations and Safety Review Committee (POSRC) approval, procedural controls, post-modification testing, procedure changes resulting from this modification, operator training, and Updated Final Safety Analysis Report (UFSAR) and drawing revisions. The following activities were reviewed:

7.1 **Auxiliary Feedwater System Design and Procedural Controls**

The inspectors reviewed licensee activities to resolve concerns regarding the clarity of their commitments for the auxiliary feedwater (AFW) system. Several safety significant technical concerns involving high energy line break (HELB) criteria and pipe breaks in the AFW discharge piping were raised from the licensee's review.

When reviewing the adequacy and licensing basis of the AFW system, the licensee examined their March 9, 1981, letter to the NRC which addressed the ability of the AFW system to ensure the capability to supply required flow to the steam generators assuming various pipe breaks and component failures. The licensee critically examined their HELB commitments and their designed ability to respond to pipe breaks in the AFW discharge piping. They concluded that the current design of the AFW system is appropriate, redundant, reliable and meets licensing requirements. They also reviewed procedural controls to ensure that cross-connected AFW pumps were appropriately considered in maintenance planning and plant status reviews.

The inspectors reviewed licensee documentation and attended various licensee meetings to resolve the concerns. Licensee activities were thorough, well-documented and effectively resolved the identified concerns. No unacceptable conditions were identified.

7.2 Service Water Heat Exchanger Fouling

The inspectors reviewed the licensee actions regarding the fouling of the service water heat exchangers. These heat exchangers function during normal and accident conditions to transfer heat from equipment important to safety to the ultimate heat sink.

The inspectors determined that the licensee's program to monitor heat exchanger fouling and assess operability, as discussed in NRC Inspection Report 50-317/90-23, did not provide meaningful data during the restart of Unit 1. As a consequence, the licensee was forced to revise their monitoring program to use salt water flow as the key parameter. Although this method can detect an increase in macrofouling (i.e., tubesheet blockage), it is unable to detect problems with shell side microfouling. The previous program used a change in temperature across the heat exchanger to calculate a heat balance and derive a fouling factor. The licensee concluded that lowering bay temperatures would provide an adequate safety margin to proceed without an established method for quantifying macrofouling (i.e., fouling factor) or monitoring microfouling.

The inspectors observed the engineering staff activities to resolve this issue and attended a presentation of their findings to station management. The inability of the licensee to implement a comprehensive and quantifiable service water heat exchanger monitoring program prior to unit 1 startup was noted with concern. Although it appears that adequate margin exists to ensure operability with current bay temperatures, it is also apparent that operability cannot be assured with significantly higher bay temperatures. The licensee established an engineering open item to develop and implement an improved heat exchanger monitoring program before bay temperatures begin to rise significantly next summer. No additional concerns were identified.

7.3 Auxiliary Feedwater Pump Minimum Recirculation Flow

The inspectors reviewed the licensee actions involved in changing the required minimum recirculation flow for auxiliary feedwater (AFW) pumps. The licensee engineering staff proposed a change in acceptance criteria of the STP-O-5-1, "Auxiliary Feedwater System Test," to lower the minimum recirculation flow from 80 gallons per minute (gpm) to 50 gpm, following failure of the '11' AFW pump to meet the required minimum recirculation flow by 13 gpm on September 24, 1990. The engineering justification for the change concluded that the 50 gpm recirculation flow was adequate to carry away pump heat. The licensee's POSRC approved the proposed change.

The licensee system engineers attributed the decrease in the measured flow-rate to a recently implemented temporary modification (TM-1-90-134) which removed the internals of a relief valve in the AFW recirculation line. As a result, the relief valve provided an unmeasurable flowpath to the pump suction which bypassed the measured recirculation flowpath.

The inspectors reviewed the minimum recirculation flow engineering calculations, including the assumptions involved, and found no discrepancies. The inspectors also verified that the pump satisfied TS surveillance requirements. No additional concerns were identified.

8. Safety Assessment and Quality Verification

8.1 Plant Operations and Safety Review Committee

The inspectors attended several Plant Operations and Safety Review Committee (POSRC) meetings. TS 6.5 requirements for member attendance were verified. The meeting agendas included procedural changes, proposed changes to the TS, Facility Change Requests, and minutes from previous meetings. Items for which adequate review time was not available were postponed to allow committee members time for further review and comment. Overall, the level of review and member participation was adequate in fulfilling the POSRC responsibilities. No unacceptable conditions were identified.

8.2 Review of Written Reports

Periodic and Special Reports, Licensee Event Reports (LERs), and Safeguards Event Reports (SERs) were reviewed for clarity, validity, accuracy of the root cause evaluation and safety significance description, and adequacy of corrective action. The inspectors determined whether further information was required. The inspectors also verified that the reporting requirements of 10 CFR 50.73, 10 CFR 73.71, Station Administrative and Operating, and Security Procedures, and Technical Specification 6.9 had been met. The following reports were reviewed:

LER 90-24	Failure to Test Fire Detection Circuit Supervision Due to Inadequate Controls
Special Report	Inoperable Meteorological Monitoring Instrumentation Channels (Dated 8/28/90)

No unacceptable conditions were identified.

8.3 **Startup Review Board**

The inspectors attended the licensee Startup Review Board (SURB) conducted on October 8, 1990. The purpose of this meeting was to assess plant readiness for entry into mode 1.

The SURB committee recommended to the plant manager that restart should proceed pending resolution of previously identified concerns. The inspectors noted comprehensive and safety conscious discussions between management and SURB committee members which created an effective medium for communication and problem resolution. No concerns were identified.

9. **Followup of Previous Inspection Findings**

Licensee actions taken in response to open items and findings from previous inspections were reviewed. The inspectors determined if corrective actions were appropriate and thorough and previous concerns were resolved. Items were closed where the inspectors determined that corrective actions would prevent recurrence. Those items for which additional licensee action was warranted remained open. The following items were reviewed.

9.1 **(Closed) UNR 50-317/88-15-01 and 50-318/88-15-01**

Administrative procedures involved in processing facility change requests (FCRs) were not up-to-date. The inspectors' review confirms that the licensee has satisfactorily updated the procedures in question including a complete rewrite of CCI 126J, "Administrative Control of Facility Change Request". This item is closed.

9.2 **(Closed) UNR 50-317/89-200-09 and 50-318/89-200-09**
(Closed) NV3 50-317/89-15-06 and 50-318/89-16-06

These issues concern findings, by the Special Team Inspection and a followup inspection, that the licensee had failed to establish instructions, procedures, and plans for quality assurance inspection of safety related activities. These issues were identified and tracked by the licensee as STI-29. Actions to correct STI-29 were reviewed and closed in NRC inspection report 50-317/90-02 and 50-318/90-02. The inspectors determined that additional inspection of these items was not required. These items are considered closed.

9.3 **(Closed) UNR 50-318/89-200-01**

This issue concerns findings, by the Special Team Inspection, regarding the lack of procedural control for the calibration of certain M&TE prior to installation for testing, for receipt of returned M&TE, for recall of M&TE for recalibration, and for the reliability of the test data. These issues were identified and tracked by the licensee as STI-1. Actions to correct STI-1 and unresolved item 50-317/89-200-01 were reviewed and closed in NRC inspection report 50-317/90-02 and 50-318/90-02. The inspectors determined that additional inspection of this item was not required. This issue is considered closed.

10. **Management Meeting**

During this inspection, periodic meetings were held with station management to discuss inspection observations and findings. At the close of the inspection period, an exit meeting was held to summarize the conclusions of the inspection. No written material was given to the licensee and no proprietary information related to this inspection was identified.

10.1 **Preliminary Inspection Findings**

A non-cited violation was identified in which the licensee exceeded technical specification 3.0.5 limiting condition for operation. An unresolved item was identified regarding licensee review and correction of observed weaknesses in operations. An unresolved item was identified regarding completion of licensee evaluation to determine the root cause and retrospective safety significance of previous operations with tilted ex-core nuclear instrument detectors.

10.2 Attendance at Management Meetings Conducted by Region Based Inspectors

<u>Date</u>	<u>Subject</u>	<u>Inspection Report No.</u>	<u>Reporting Inspector</u>
10/5/90	Effluents	50-317/90-27 50-318/90-27	J. Jang
10/11/90	Security	50-317/90-28 50-318/90-28	G. Smith

OUTSTANDING ITEMS FILE
SINGLE DOCKET ENTRY FORM

REPORT HOURS

1. Operations <u>XX</u>	7. Engineering / <u>XX</u>	Docket No. 50-317
2. Rad-Con <u>XX</u>	Tech Support	50-318
3. Maintenance <u>X</u>	8. Safety Assess/ <u>XX</u>	Originator: <u>Nicholson</u>
4. Surveillance <u>XX</u>	Qual. Ver.	
5. Emerg. Prep. <u>-</u>		Reviewing
6. Sec/Safegrds <u>XX</u>		Supervisor: <u>Cowgill</u>

Item Number	Type	SALP Area	Area Resp	Action	Due Date	Updt/Close/Rpt Date	Open
317/90-25-01	UNR		PIA			10-20-90	
318/90-25-01	UNR						

Originator	Modifier/Closer
Nicholson	

Description: Review the licensee's root cause evaluation and corrective actions regarding operational weaknesses that resulted in a series of operational events.

Item Number	Type	SALP Area	Area Resp	Action	Due Date	Updt/Close/Rpt Date	Open
317/90-25-01	UNR		PIA			10-20-90	
318/90-25-01	UNR						

Originator	Modifier/Closer
Kim	

Description: Review the licensee's root cause evaluation and determination of the retrospective safety significance of previous operations with tilted ex-core nuclear instrument detectors.

Item Number Type SALP Area Area Resp Action Due Date Close/Rpt Date Close
317/88-15-01 90-25 10-20-90
318/88-15-01

Originator Closer
OLIVEIRA

Description:

Item Number Type SALP Area Area Resp Action Due Date Close/Rpt Date Close
317/89-200-09 90-25 10-20-90
318/89-200-09
Originator Closer
HOWE

Description:

Item Number Type SALP Area Area Resp Action Due Date Close/Rpt Date Close
317/89-15-06 90-25 10-13-90
318/89-16-06
Originator Closer
HOWE

Description:

Item Number Type SALP Area Area Resp Action Due Date Close/Rpt Date Close
318/89-200-01 90-25 10-13-90
Originator Closer
HOWE

Description:
