APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-498/89-47
50-499/89-47

Operating License: NPF-76
NPF-80

Dockets: 50-498
50-499

Licensee: Houston Lighting & Power Company (HL&P)
P.O. Box 1700
Houston, Texas 77251

Facility Name: South Texas Project (STP), Units 1 and 2

Inspection At: STP, Matagorda County, Texas

Inspection Conducted: December 1-31, 1989

Inspectors: J. I. Tapia, Senior Resident Inspector, Project Section D
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Approved: _____ 1/22/90
E. J. Holler, Chief, Project Section D — Date
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Inspection Summary

Inspection Conducted December 1-31, 1989 (Report 50-498/89-47; 50-499/89-47)

Areas Inspected: Routine, unannounced inspection included plant status, onsite followup of events at operating power reactors, the licensee's actions taken to implement unresolved safety issue A-26 (Unit 2), engineered safety feature system walkdown (Unit 2), operational safety verification, monthly maintenance observations, monthly surveillance observations, cold weather preparations, and observation of initial licensee fitness-for-duty training.

Results: Within the areas inspected one violation was identified regarding the failure to establish procedures to verify the calibration accuracy of heat trace control circuits needed to accomplish the surveillance of boric acid flow patterns (paragraph 9). One noncited violation was identified regarding a

delay in performing required sampling of a safety injection accumulator after a water addition (paragraph 3). The licensee's actions in dispositioning a number of problems associated with the restart of Unit 1 were appropriate and conservative regarding safety. Implementation of Unresolved Safety Issue A-26 (reactor vessel pressure transient protection) appeared to establish an effective mitigation system for low-temperature overpressure conditions (paragraph 4). A number of procedure discrepancies were identified to the licensee for implementation into the licensee's procedure upgrade program (paragraphs 5 and 9). An inspection by the inspector and review of a licensee self-initiated safety systems functional inspection (SSFI) of the essential cooling water system indicated that some nonsafety significant items required attention, but that the system was capable of performing its safety functions (paragraph 5). Cold weather preparations, especially regarding nonsafety-related parts of the plant, indicated a lack of attention to detail (paragraph 9). The licensee's initial fitness-for-duty training appeared to meet the requirements of 10 CFR Part 26 (paragraph 10).

DETAILS

1. Persons Contacted

*A. C. McIntyre, Manager, Support Engineering
*T. J. Jordan, Manager, Plant Engineering
*J. R. Lovell, Technical Services Manager
*W. H. Kinsey, Plant Manager
*M. R. Wisenberg, Chairman, Nuclear Safety Review Board
*W. L. Mutz, Manager, Operations Strategic Planning
*A. K. Khosla, Senior Licensing Engineer
*D. P. Sanchez, Manager, Maintenance Planning
*J. E. Geiger, General Manager, Nuclear Assurance
*A. W. Harrison, Supervisor, Licensing Engineering
*W. A. Randlett, Manager, Nuclear Security
*J. H. Brady, Manager, Emergency Preparedness
*R. W. Chewning, Vice President, Nuclear Assurance

In addition to the above, the inspectors also held discussions with various licensee, architect engineer (AE), maintenance, and other contractor personnel during this inspection.

*Denotes those individuals attending the exit interview conducted on January 3, 1990.

2. Plant Status

Unit 1 began the inspection period at 100 percent reactor thermal power. The unit was maintained at this power level until December 17, 1989, when unit shutdown was required because of Technical Specification (TS) 3.8.1.1.D, when Diesel Generator (DG) No. 11 and Essential Chiller 12C were declared inoperable. Unit 1 remained in Mode 3 (hot standby mode of operation) until December 25, 1989, when the unit began a cooldown to Mode 5 (cold shutdown) following all three trains of the essential cooling water (ECW) system being declared inoperable because of freezing lines associated with the ECW screen wash system. On December 26, 1989, all three trains of the ECW system were returned to service and Unit 1 entered Mode 3 operation. Unit 1 returned to power operation on December 27, 1989, and increased power level to 100 percent reactor thermal power on December 30, 1989. Unit 1 remained at 100 percent reactor thermal power through the end of the inspection period.

Unit 2 began the inspection period in Mode 5 and remained in Mode 5 throughout the inspection period because of an inoperable No. 22 DG which failed on November 28, 1989. See NRC Inspection Reports 50-498/89-42; 50-499/89-42 and 50-499/89-46. The major Unit 2 activity during the inspection period involved the repair and testing of DG No. 22. During this inspection period, DG No. 22 was repaired and run several times. The runs included several short duration runs and a 76-hour operability run. The inspection period ended with DG No. 22 in the 76-hour run.

3. Onsite Followup of Events at Operating Power Reactors (93702)

On December 6, 1989, at 9:30 a.m., Unit 1 declared Train C of the component cooling water (CCW) system inoperable. The unit entered a 72-hour limiting condition of operation (LCO) under TS 3.7.3. The train was declared inoperable because of incomplete postmaintenance testing on two CCW valves, 1-CC-0183 and 1-CC-0198. The valves were replaced during the last refueling outage and subsequently declared operable without an ASME certified inspector witnessing the performance of the required ASME Section XI postmaintenance inservice leakage tests. The required testing was completed December 6, 1989, at 2:57 p.m. with satisfactory results.

On December 6, 1989, at 10:15 a.m., Radiation Monitor RT-8034 was inadvertently deenergized by a technician during performance of maintenance on RT-8033. Radiation Monitor RT-8034 was the redundant control room ventilation intake air radiation monitor while RT-8033 was out of service. Deenergizing RT-8034 initiated an engineered safety feature (ESF) actuation signal which caused a control room envelope heating, ventilation, and air conditioning (HVAC) actuation. Power to Radiation Monitor RT-8034 was restored and the actuation signal was cleared within minutes. The work documents regarding the maintenance were proper and the cause of the event attributed to personnel error.

At approximately 11:55 p.m. on December 16, 1989, the licensee declared an unusual event upon initiating a required shutdown for Unit 1. At 2:42 a.m. on December 16, 1989, with Unit 1 at 100 percent reactor power, the licensee discovered a problem with the No. 11 DG voltage regulator while performing a 31-day surveillance test. The licensee declared the No. 11 DG inoperable and entered the 72-hour action statement of TS 3.8.1.1. At approximately 9:55 p.m. on December 16, 1989, the licensee discovered that the Essential Chiller No. 12C electrical breaker would not trip with control room or local actuation. No. 12C essential chiller provides cooling to room coolers associated with, among other things, the No. 13 diesel generator. TS 3.8.1.1.D.1 requires that with one diesel generator inoperable, all required systems, trains, and components depending on the remaining two diesel generators and other sources of power must be operable. With the No. 12C essential chiller inoperable because of the breaker problem, the licensee entered an action statement to restore the chiller in 2 hours or be in hot standby (Mode 3) within the next 6 hours. At 11:55 p.m., with the No. 11 DG and the No. 12C chiller inoperable, the licensee began the TS required shutdown to Mode 3 and declared an unusual event as required by the Unit 1 emergency plan. State of Texas and local officials were informed of the notification of unusual event (NOUE). At 4:50 a.m. on December 17, 1989, Unit 1 completed a shutdown to Mode 3.

Subsequent to the Unit 1 shutdown, the licensee discovered a malfunctioning auxiliary relay contact associated with the No. 12C essential chiller breaker. The relay was replaced and the breaker was tested satisfactory. The No. 12C essential chiller was declared operable and the NOUE exited at 8:32 p.m. on December 17, 1989.

During the TS required shutdown, a high-high steam generator feedwater isolation signal occurred when the No. 1A steam generator reached the 87 percent level setpoint. Systems responded as expected after the actuation. The licensee initiated auxiliary feed flow to control steam generator levels and subsequently restored main feedwater flow.

Further investigation regarding the high-high steam generator level signal indicated that the high level condition occurred shortly after the main turbine was tripped. Operators were controlling steam generator water levels by using the feedwater bypass valves. After the main turbine was tripped, all four steam generator levels increased because of steam generator swell. Operators successfully controlled the level in three of the steam generators, but, because of leakage past the No. 1A steam generator feedwater regulating valve, the level in that steam generator continued to increase to the 88 percent level and actuated the high-high level setpoint at the 87 percent level. After restoring main feedwater flow, operators successfully controlled the level in all four steam generators.

At 3:06 a.m., on December 17, 1989, during the TS required shutdown, the discharge valve for the No. 11 secondary plant main circulating water pump failed. The mechanism which connects the valve disc to the motor operator misfunctioned and allowed the valve to go shut. The subsequent rapid shutting of the valve with the circulating pump still running resulted in damage to the circulating pump casing. The damage to the vertical single stage propeller pump was the direct result of the misfunctioning of the pump's 96-inch diameter butterfly discharge valve and was not associated with the TS required shutdown of the plant.

The licensee had experienced similar damage to the No. 14 circulating pump in March 1987 when the mechanism which connects the valve disc to the electric motor allowed the disc of the pump's associated discharge valve to swing shut. The discharge valve is operated by an electric motor via a vertical shaft and gear box. The licensee attributed the cause of that failure to cap screws which loosened and allowed a two-piece drive sleeve to slip. The licensee modified the mechanism with a one-piece drive sleeve and further modified the mechanism after June 1989 by adding clamps to prevent the one-piece drive sleeve from backing out. Investigation indicated that the one-piece drive sleeve modification, but not the clamp modification, was made to the Unit 1 circulating water discharge valves during the unit's last refueling outage. The licensee's independent safety engineering group is investigating why the clamp modification was not made to the Unit 1 valves.

On December 18, 1989, at 4:56 a.m., steam generator Power Operated Relief Valve (PORV) 1D (1-MS-PV-7441) was declared inoperable in Unit 1 because the valve would not operate when actuated remotely from the control room. Preliminary investigation indicated that the fault was associated with the electrical remote control circuitry rather than a mechanical failure of the valve. The remaining three power operated relief valves, which are used for decay heat removal and cooldown, continued to function normally. DG No. 11 was declared operable at 9:16 a.m. on December 19, 1989.

However, the 1D steam generator PORV remained inoperable. Although TS allow 7 days for the repair of an inoperable steam generator PROV, the TS prohibit mode changes to a higher operational mode when TS LCOs are not met and the associated action statement requires a shutdown if the LCOs are not met within a specified interval. Additionally, on December 21, 1989, at 11:44 a.m., the Unit 1 fuel handling building (FHB) exhaust air system "B" Train was declared inoperable because the 13B heaters failed to energize during surveillance testing. The inoperability of one train of FHB exhaust air required entry into another 7-day action statement.

Because of inclement state-wide weather conditions present (record setting cold front) and because numerous power generating facilities were out of service (including both STP units), the licensee proposed starting up Unit 1 notwithstanding that the 1D steam generator PORV and one train of FHB exhaust air were in 7-day action statements. The licensee stated that unavailability of one steam generator PORV did not affect the ability of the plant to be safely shutdown or mitigate the effects of an accident, and that the three remaining steam generator PORVs are adequate for decay heat removal considering single failure. The licensee also stated that previous analysis submitted to the NRC showed minimal impact on offsite doses in the event of an accident with inoperable FHB exhaust air system charcoal adsorber heaters. Additionally, continuing reactor startup while actions to exit the 7-day action statements were ongoing would be responsive to the state-wide energy emergency occasioned by the severe cold weather conditions experienced in Texas. Region IV, after consulting with the Office of Nuclear Reactor Regulation, agreed with the licensee's proposal.

At 8:03 p.m. on December 22, 1989, the licensee noticed that the CCW expansion tank level switches were out of tolerance on the low side because of instrument drift due to low temperature. The switches had caused valves to isolate nonsafety-related systems to trains "A" and "B" CCW. Because it affected 2 trains of CCW, TS 3.0.3 was entered and a plant cooldown started at 10:30 p.m. Both level switches were calibrated and declared operable and the plant exited TS 3.0.3 at 12:15 a.m. on December 23, 1989. A cooldown of approximately 50°F occurred during the event.

On December 24, 1989, at 2:55 a.m. (with Unit 1 still in Mode 3), all three trains of Unit 1 essential cooling water (ECW) system were declared out of service when the licensee discovered that the screen wash system for the ECW system was inoperable because of freezing within the piping and screen wash booster pumps. The "C" train screen wash booster pump tripped during an attempted start for a routine rotation of the ECW screens. The other two trains were inspected and also found to be frozen. The ECW system remained functional and the licensee continued to run the ECW pumps to provide freeze protection for the major portion of the system. However, because the screen wash booster pumps are designed to automatically start on high screen differential pressure or a safety injection signal, the licensee declared the three trains of ECW inoperable and began a plant cooldown at 3:55 a.m. Unit 1 entered Mode 4 operation

at 9:48 a.m. On December 25, 1989, at 9:20 a.m., ECW Trains A and C were returned to service. Train B was returned to service at 4 p.m. on the same day after replacement of some fuses that had opened on a high current condition. The licensee found no visible damage to the screen wash system because of the ice.

On December 26, 1989, Safety Injection (SI) Accumulator 1C was filled at 6:05 a.m. Because the volume change was greater than 1 percent, TS required a boron concentration surveillance within 6 hours. At 6:38 p.m., the licensee discovered, during shift turnover, that the sample had not been taken. The plant changed modes from Mode 3 to Mode 2 during this time frame. A sample was taken at 7 p.m. and the boron concentration was determined to be within the required range. This licensee identified violation of TS (498/8947-02) is not cited because it meets the criteria in Section V.G.1 of the General Statement of Policy and Procedure for NRC Enforcement Actions. The licensee will submit a Unit 1 licensee event report (LER 89-24) regarding the event and the inspector will perform a followup inspection on corrective actions taken by the licensee. No written response to this violation is required. This noncited violation is closed.

On December 27, 1989, Unit 1 entered Mode 1 operation at 2:53 a.m. FHB exhaust air system B Train was returned to service at 4:46 a.m. and steam generator PORV 1D was successfully tested and declared operable at 2:17 p.m.

On December 28, 1989, during the performance of a surveillance test on the solid state protection system (SSPS) "B" Train Slave Relay K-938 (generator trip relay) would not reset. The relay was sealed in the test position. Because the relay would not reset, the SSPS actuation "B" Train would not reset. The problem was identified at 2:04 a.m., and a NOUE was declared at 2:38 a.m because of the TS required shutdown due to one train of SSPS being inoperable. The licensee subsequently identified that the generator trip relay will not reset when the "main turbine not running" interlock is present concurrent with the steam dump arming interlock (C8). The turbine throttle valves were then opened, the turbine trip bistables cleared, the generator trip relay reset, and SSPS actuation Train B reset. The NOUE was exited at 2:55 a.m. when the SSPS Train B was reset. A review by the licensee determined that the problem previously had been identified and that a change was made to the Train A procedure to avoid the problem. The licensee determined the change had not been incorporated in the Train B procedure at the time of the test.

On December 28, 1989, at 11:08 a.m., Unit 1 turbine generator was synchronized to the electrical grid. The licensee increased power and Unit 1 reached 100 reactor thermal power on December 30, 1989. Unit 1 remained at 100 percent reactor thermal power through the end of the inspection period.

The licensee's restart of Unit 1 after the December 17, 1989, TS required shutdown was marked with delays caused by equipment failures and unusually cold weather. With the exception of the delay in sampling SI accumulator 1C for boron concentration after filling, the licensee's actions in dispositioning the problems were appropriate and conservative regarding safety.

One noncited violation was identified in this area of the inspection.

4. Inspection of Licensee's Actions Taken to Implement Unresolved Safety Issue (USI) A-26: Reactor Vessel Pressure Transient Protection for Pressurized Water Reactors (Unit 2) (Temporary Instruction TI 2500/19)

The purpose of this inspection was to verify that the licensee had an effective mitigation system for low-temperature overpressure transient conditions for Unit 2. This inspection also was conducted to determine whether the licensee has implemented the commitments reported in the safety evaluation report (SER).

The inspector verified that the licensee has developed procedures to mitigate postulated low-temperature overpressure conditions for Unit 2. The inspector reviewed the procedure and administrative controls which are in place to aid the operator in controlling the reactor coolant system pressure during low-temperature operation.

The inspection revealed that an overpressure protection system at Unit 2 has been designed and installed to prevent exceeding the applicable TS and 10 CFR Part 50, Appendix G, limits for reactor pressure during plant cooldown and startup. Redundant protection against a low-temperature overpressure event is provided through the use of pressurizer PORVS to mitigate potential pressure transients. The pressurizer PORVS at Unit 2 are safety-related and Class IE powered. The inspector also reviewed the documentation which indicates that the licensee has incorporated cold overpressure mitigation training into the licensed operator training program. All the licensed operators at Unit 2 have received training concerning the RCS low-temperature overpressure event and the consequences of inadvertent actuation. The documents reviewed during this portion of the inspection included:

- 2PSP02-RC-0403, "Reactor Coolant System Cold Overpressure Mitigation System," Revision 3
- 2POP03-ZG-0007, "Plant Cool Down," Revision 2
- 2POP03-ZG-0001, "Plant Heatup," Revision 11
- 2POP03-RC-0010, "Pressurizer Power Operated Relief Valve Operability Test," Revision 1
- IP-8-80, "Licensed Operator Training Program," Revision 2

- IP-8-90, "Licensed Operator Requalification," Revision 2
- Piping and Instrumentation Diagram No. 5R149F05003, "RCS Pressurizer," Revision 8
- "Reactor Coolant Pressurizer Power Relief Valves Logic Diagram," No. 5R-14-9-Z-42160, Revision 8

The actions and commitments established by the licensee in response to USI A-26, "Reactor Vessel Transient Protection for Pressurized Water Reactors," ensured that an effective mitigation system has been established for low-temperature overpressure conditions.

No violations or deviations were identified in this area of the inspection.

5. Engineered Safety Feature (ESF) System Walkdown (Unit 2) (71710)

A complete walkdown of the ECW system for Unit 2 was performed to verify, independently, the status of the ESF system and to ascertain whether the ECW system was returned to service in accordance with approved procedures. The system lineup had been ed during the Unit 2 maintenance outage. The inspection consisted of operating procedure review, comparison of the operating procedure to drawings, and a walkdown of the system to verify whether the syste in a position to support plant operation. Specific items inspected plant included determinations regarding valve, switch, and bre sitions, housekeeping, and support systems.

The inspector reviewed operating Procedure 2POP02-EW-0001, "Essential Cooling Water Operation," Revision 3. The procedure lineups (valve, switch, electrical power supply positions) were compared to system piping and instrument diagrams (P&IDs). Observations made during this procedure review included:

- Drawing 6Q069F20005 #2, "Non-Radioactive Drains," Revision 12 includes the ECW sump pumps, valves, and piping. Operation of this subsystem is described in Procedure 2POP02-EW-0001, but the procedure does not include this P&ID in the reference section of the procedure. Additionally, the references section failed to include the reference drawing (Drawing 9VFAC-01 #2) for Distribution Panel DPB335 circuit breaker lineup.
- Step 6.1.2.2 instructed the operator to verify that an ECW pump discharge pressure of 50 psig existed following a remote pump start. Step 7.1.3.2 instructed the operator to verify that an ECW pump discharge pressure of 38 psig existed following a local pump start. The discharge pressure should have been the same value (50 psig) in each step.

- Errors were identified on the system P&IDs. On P&ID 5R289F05039 #2, "Essential Cooling Water System," Revision 10, Vent Valves 2-EW-406, 2-EW-407, and 2-EW-408 were shown as normally open valves but are actually normally shut valves. Errors identified on P&ID 5R289F05038 #2, "Essential Cooling Water System," Revision 11, included: (1) Pump Lubricating Water Inlet Isolation Valves 2-EW-0117, -133, and -148 were identified as locked closed valves but are actually normally open valves; (2) Pump Supplementary Lubricating Water Isolation Valves 2-EW-0369A, 0369B and 0369C were not shown on the P&ID but are listed in the operating procedure and installed in the plant; (3) Drain Valves 2-EW-0367, 377, and 378 were not identified as drain valves (by use of letter designation "D" in the vicinity of the valves) on the P&ID; (4) 12 essential chiller vent valves were shown on the P&ID but were not listed in the procedure and are not located in the plant; and (5) six throttle valves were found locked in place (locked in a throttled position) but were required to be locked full open by the P&ID. A review of plant documentation did not reveal any outstanding approved design change requests regarding the P&IDs.

- Typographical errors were observed in Procedure 2POP02-EW-0001 which included: (1) Step 6.1.2.3 incorrectly identified Flow Indicator 2-EW-FI-6947 as FL-6947; (2) in the procedure Train A Checklist at Device No. 2-EW-0004, Pressure Transmitter 2-EW-PT-6881 was incorrectly identified as Pressure Indicator PI-6881; (3) in the procedure, Train C Checklist at Device No. 2-EW-0373C and -0374C, Flow Element 2-EW-FE-6959 was incorrectly identified as FE-6958; (4) on page 62, Checklist 4 was called the Essential Cooling Pond Makeup Pumps Checklist, but was actually a checklist for the ECW blowdown sump pumps; and (5) in procedure Checklist 4 at Device 2-EP-0008, ECW blowdown Sump Pump B discharge valve was incorrectly identified as the Sump Pump 13 discharge valve.

Observations made during a plant walkdown of the system and the operating procedure included:

- Six ECW valves were locked open as part of a temporary modification made to the system. The temporary modification numbers were listed in three places of the procedure (Train A, B, and C Checklists). The temporary modification numbers listed in the procedure (T2-EW-88-004, -005, and -006) were out of date and should have been revised to the current numbers (T2-EW-89-041, -042, and -043).

- Several components were found to be missing from the procedure checklists but were in the correct position to support system operation: Breakers No. 1 on Distribution Panels DPA-335, DPB-335, and DPC-335, ECW Pump Discharge Valve Space Heaters; Breakers No. 5 on DPA-335, DPB-335, and DPC-335, ECW HVAC Dampers; nonsafety-related area space heater power supplies at local 480 VAC power panels; and Cubicles C5 at Motor Control Centers (MCC) E2A3, E2B3, and E2C3, ECW Pump Discharge Valve Space Heaters (each motor operated valve had two power supply breakers to each space heater).

- Valves 2-EW-0299 and -300 (Flow Transmitter FT-6874 downstream and upstream isolation valves, respectively) were observed to be tagged in reverse in the plant, and the valve names were reversed in the procedure Train C Checklist.

- Blowdown Sump Pump B Discharge Valve 2-EP-0009 was incorrectly tagged as 2-EP-0008 in the plant and was incorrectly labelled 2-EP-0008 in operating procedure Checklist 4.

All items were discussed with the licensee for appropriate action. The observations made were not considered safety significant and none would have prevented the system from performing its intended function. The licensee stated that these observations, and observations made during a licensee walkdown and review of the system, would be incorporated into the next revision of the procedure.

On December 1, 1989, the inspector attended the exit meeting for the licensee's self-initiated Safety System Functional Inspection (SSFI) of the ECW system conducted by licensee staff members and consultants from ERC Engineering and Energy Services. The basic concept for the SSFI evolved from the NRC and is, in effect, a vertical slice review concentrating on a single safety system. The inspection occupied ten people for 5 weeks. The team did not identify any operability issues and declared the ECW system capable of performing all of the safety functions required of it by its design basis and safety analysis.

The licensee identified three areas of concern which the licensee plans to address in the response to the SSFI report. The inspector will review the licensee's actions.

No violations or deviations were identified in this area of the inspection.

6. Operational Safety Verification (71707)

The purpose of this inspection was to ensure that the facility was being operated safely and in conformance with license and regulatory requirements. This inspection also included verifying that selected activities of the licensee's radiological protection program were being implemented in conformance with requirements and procedures, and that the licensee was in compliance with its approved physical security plan.

The inspectors visited the control rooms on a routine basis when onsite and verified that control room staffing, operator decorum, shift turnover, adherence to TS LCOs, and overall control room decorum were in accordance with requirements. The inspectors conducted tours in various locations of the plant to observe work and operations and to ensure that the facility was being operated safely and in conformance with license and regulatory requirements.

As part of the operational safety verification portion of the inspection, a review of Mode 5 (reactor in cold shutdown) TS requirements was performed. The inspection was performed to ensure that Unit 2 was in compliance with the TS requirements while the unit was in Mode 5 operation. Unit 2 items verified in compliance with TS included (TS section in parenthesis):

- At least one operable boron injection flow path available (TS 3.1.2.1)
- One operable charging pump in a boration injection flow path with all other charging pumps inoperable (TS 3.1.2.3)
- At least one operable borated water source (TS 3.1.2.5)
- At least one residual heat removal (RHR) loop with Valve 2-CV-0198 locked in position and either one additional RHR loop operable or the secondary side water level of at least two steam generators greater than 10 percent (TS 3.4.1.4.1)
- At least one pressurizer code safety valve operable (TS 3.4.2.1)
- Specific activity of reactor coolant less than or equal to 1 microcurie per gram dose equivalent Iodine-131 (TS 3.4.8.a)
- At least one overpressure protection system operable (TS 3.4.9.3)
- All high head safety injection pumps inoperable (TS 3.5.3.2)
- Two operable standby diesel generators (TS 3.8.1.2.b), and
- Gaseous Waste Processing system inlet oxygen concentration less than 3 percent by volume (TS 3.11.2.5)

All TS requirements inspected on Unit 2 were found to be within the established limits for Mode 5 operation. Other items identified during routine plant tours and discussed with the licensee for appropriate action included:

- The public address (PA) speaker in Room 1A of the ECW intake structure was observed to be taped shut, apparently to muffle the loudness of the speaker. A small bag of cleaning rags was found in the corner of Room 013 in the Unit 2 electrical auxiliary building (near control room air handling Unit A fan motor).
- A "Caution-Radioactive Materials Storage Area" sign was found upside-down in a decontamination dumpster inside the Unit 1 mechanical auxiliary building. No radioactive materials appeared to be in the dumpster. This condition was reported to the on-shift health physics technicians for appropriate action.

- An "Emergency Use Only" storage box inside the Unit 2 electrical auxiliary building, 35-foot elevation switchgear room, was observed to be unlocked. An inspection of the storage box disclosed: (1) the lock had been cut and the remains of the lock were found inside the box, and (2) a key ring consisting of two keys was inside the box. The keys resembled electrical relay panel lock keys. This matter was promptly reported to the Unit 2 shift supervisor for appropriate action.

No violations or deviations were identified in this area of the inspection.

7. Monthly Maintenance Observations (62703)

The inspector observed selected maintenance activities to verify whether the activities were being conducted in accordance with approved procedures. The activities observed included:

- Preventive Maintenance (PM) IC-O-DW-86614390, Freshwater Supply to Softener No. 1 Cleaning/Inspection Activity
- PM IC-O-DW-86014391, Demineralizer Water Softener Flow Indicator

The inspector verified that the activities were conducted in accordance with approved work instructions and procedures, test equipment was within the current calibration cycles, and housekeeping was being maintained in an acceptable manner.

No violations or deviations were identified in this area of the inspection.

8. Monthly Surveillance Observations (61726)

The inspector observed selected surveillance activities to ascertain whether the surveillance of safety significant systems and components were being conducted in accordance with TS and other requirements. The following surveillance tests were observed and the documents reviewed:

- 1PSP02-FW-0518, Revision 1, "Steam Generator 1A Narrow Range Level"
- 1PSP02-FW-0528, Revision 1, "Steam Generator 1B Narrow Range Level"
- 1PSP02-FW-0538, Revision 1, "Steam Generator 1C Narrow Range Level"
- 1PSP02-FW-0548, Revision 1, "Steam Generator 1D Narrow Range Level"
- 1PSP02-HC-0934, Revision 1, "Containment Pressure Set 4"

Specific items inspected included verifying that as-left data was within acceptance criteria limits, the acceptance criteria as listed in the procedures agreed with values listed in the design documents or instrument

setpoint indexes, and the test equipment used was within its current calibration cycle. Following observation by the inspector of the surveillance activities, the procedures were reviewed for technical accuracy and for conformance to TS requirements.

The above stated procedures were performed by the instrumentation and control (I&C) technicians. The I&C technicians performed the surveillance tests in an appropriate manner. No problems with the procedures were identified that impacted plant safety or conformance with Technical Specifications.

No violations or deviations were identified in this area of the inspection.

9. Cold Weather Preparations (71714)

An inspection was conducted on both units to ensure that adequate protective measures had been taken by the licensee to assure that process, instrument, and sampling lines would not freeze during cold weather. The inspectors examined licensee actions regarding systems susceptible to freezing to ensure the presence of heat tracing, space heaters, and insulation; the proper setting of thermostats; and the energizing of required heating circuits.

The inspection included a review and walkdown of three procedures:

- 1POP02-NK-0001, "Freeze Protection/Heat Trace Operations," Revision 1
- 2POP02-NK-0001, "Freeze Protection/Heat Trace Operations," Revision 1
- OPCP11-NK-0001, "Chemical Operations Freeze Protection and Heat Trace Operations," Revision 1

The following items were observed during a review of the freeze protection (NK) procedures:

- In Procedure 1POP02-NK-0001: (1) Step 6.4.1 (and all procedure panel lineups) instructed the operator to place circuit breakers in the OPEN and CLOSED positions, but the breaker positions were actually marked OFF and ON; (2) detailed instructions from the vendor manual were provided in the procedure, but the vendor manual was not listed in the reference section of the procedure (this comment applied to other NK procedures); (3) instructions on manual operation of the freeze protection panel circuits were provided in the procedure, but instructions on manual operation of the heat trace panel circuits were not provided (this comment applied to other NK procedures); and (4) the electrical lineup for Panel OERR0023 did not include Circuit Breakers MB1 and CB.

- In Procedure OPCP11-NK-0001: (1) Procedure OPCP11-NK-0001 included lineup instructions for panels under the jurisdiction of chemical operations personnel; nine panels that were listed in OPCP11-NK-0001 were also listed in 2POP02-NK-0001, indicating a duplication of effort between chemical and plant operations personnel; and (2) a NOTE applicable to Step 5.1.2 appeared before rather than after Step 5.1.1.

The following items were noted during a walkdown of the NK system:

- Nameplate errors were observed on freeze protection/heat trace panels located in the plant: (1) Panel 0ERR0002 had a nameplate that listed MCC 12G3, Cubicle K3, as the power source, but the actual power source was MCC 12G4, Cubicle L3 (this was previously identified to the licensee); (2) Panel 0ERR0004 had a nameplate that listed MCC 12J3, Cubicle A2, as the power source, but the actual power source was MCC 12K1, Cubicle D3 (this was previously identified to the licensee); (3) Panel 1ERR0031 had a nameplate that listed MCC 1L3 as the power source, but the actual power source was MCC 1K3; (4) Panel 1ERR0033 had a nameplate that listed MCC 1K3 as the power source, but the actual power source was MCC 1L3; and (5) a circuit (No. 12) was added to Panel 0ERR0011, but the nameplate on the panel identified the circuit as SPARE.

- A high number of circuit failure alarms were observed on freeze protection panels throughout the plant without maintenance work request tags attached. Alarm lights for each circuit energize when the heat trace wiring experiences a short-to-ground, loss of continuity, or short-to-neutral or third-wire condition.

- A high number of overtemperature, undertemperature, and circuit failure alarms were observed on heat trace panels throughout the plant. Most of these alarmed conditions did not have MWR tags attached. One panel, 2ERR0022, had overtemperature alarms on circuits that were turned ON which prevented the circuitry from automatically turning off in the AUTO mode.

- Other items observed during the plant walkdown and procedure review included: (1) an operating and maintenance instruction manual for freeze protection panel equipment could not be located and apparently did not exist (a manual did exist for the heat trace panels); (2) Unit 2 panels did not have nameplates (this item was previously identified to the licensee); (3) on each of the freeze protection panels, the OFF-AUTO-HAND switch labels were noted to be on the opposite side of the switches on the panels; the switches pointed up but the labels for the switches were located below the switches; and (4) on Panel 2ERR0025, Heat Trace Circuits 20 and 21 had been spared, the associated breakers were OFF, but the associated control cards were still energized.

To verify proper setting of nonsafety-related space heater thermostats, a random inspection of yard buildings was performed. The thermostats of space heaters were inspected in such places as the ECW intake structure, fire pump house, and several electrical load center buildings. The required thermostat setpoints, provided in the Instrument Setpoint Index, varied between 50°F and 60°F by building. Of the 38 thermostats inspected, none were correctly set. The as-found setpoints varied from 1°F to 35°F from required setpoint. Most setpoints were higher, but some, primarily in the Unit 2 ECW intake structure, were lower than the required setpoints. Other observations made during the thermostat setpoint review included: (1) Instrument OTISL-9782 was incorrectly labelled as OTISH-9782, (2) Instrument OTISL-9208 was damaged but no MWR tag was attached, (3) labels were missing from five instruments located in the Unit 2 ECW intake structure, and (4) the ventilation system in two electrical load center buildings (12M and 12K) was not operating.

A review of maintenance procedures on the freeze protection and heat trace circuitry was performed. This review included Procedure OPMP05-NK-0002, "Heat Tracing/Freeze Protection Panel Tests," Revision 0. Section 1.0, purpose and scope section, stated, "This procedure provides instructions to inspect and test the components of the heat tracing and freeze protection equipment." A review of this procedure revealed that the procedure provided instructions only for freeze protection panels, but not heat trace panels.

A review of PM instructions for heat trace panels was also performed. A sample PM reviewed was EM-1-NK-86014563, Revision 3. This PM was to be performed by electrical maintenance personnel on the panels. The work instructions consisted of panel cleaning, inspection for corrosion and damage, wiring check for loose connections, panel fan and space heater operation check, and replacement of air filter. The PM did not verify the accuracies or calibration of the control cards. Step 3.05 of the PM instructed the technician to "check ventilation fan and space heater for proper operation." The heat trace panels which are located indoors, are supplied with variable temperature thermostats that control fan and space heater operation between 50°F and 90°F. The PM did not provide instructions regarding thermostat setpoint. The setpoints of these thermostats were noted to vary in value from panel to panel.

Although the NK system is nonsafety-related, certain panels provide heat to safety-related piping. Final Safety Analysis Report (FSAR) Section 9.3.4.1.3.6, "Heat Tracing," states that heat tracing is provided on the tanks and piping handling 4 percent (by weight) boric acid and is capable of maintaining a temperature in the boric acid tanks and piping of at least 65°F (or higher), whenever needed. TS Sections 3.1.2.1 (applicable to Modes 4, 5, and 6) and 3.1.2.2 (applicable to Modes 1, 2, and 3) require boron injection flow paths to be operable from the boric acid storage system and/or from

refueling water storage tank. The surveillance requirements (4.1.2.1.a and 4.1.2.2.a) for these flow paths include the requirement to verify that the temperature of the heat traced portion of the flow path is greater than or equal to 65°F at least once per 7 days when a flow path from the the boric acid tanks is used.

Surveillance Requirements 4.1.2.1.a and 4.1.2.2.a were verified daily by operations personnel. This was accomplished by use of the MEAB Logsheet Forms 1PSP03-ZQ-0002-2, Revision 9 (for Modes 1 through 4), and 1PSP03-ZQ-0003-2, Revision 6 (for Modes 5 and 6). Operations personnel would verify that no lamps (overtemperature, undertemperature, circuit failure) were lit on the control cards of Primary Panels ERR0030 and ERR0031 in both units. If any of the alarm lights were lit, the circuit temperature was to be recorded and verified greater than or equal to 65°F, and readings were to be taken off Secondary Panels ERR0032 and ERR0033.

The heat trace panel control cards were connected to instrumentation control circuits that maintained process piping at desired setpoints. The overtemperature and undertemperature alarm setpoints, as well as the process piping setpoint, were adjustable. The setpoints were established by instrument analog scaling data sheets (approved instrument calibration loops with setpoints and allowed tolerances). Procedure OPGP03-ZM-0016, "Installed Plant Instrumentation Calibration Verification Program," Revision 2, outlined programmatic controls necessary for calibration and status verification/notification of installed permanent plant instrumentation. This procedure was applicable to instruments not in the surveillance program which were used to satisfy TS or used by plant operations personnel for indication and control. Addendum 3 of this procedure listed all display instruments used in routine operating procedures or surveillances. The NK instruments were not identified in either the surveillance program procedures or OPGP03-ZM-0016, Addendum 3. In brief, the verification of the accuracy of the NK instruments was not being performed for either unit and was not scoped into the PM program.

TS 6.8.1 states that written procedures shall be established, implemented, and maintained covering certain activities, including the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," Revision 2. Section 8 of Appendix A, "Typical Procedures for Pressurized Water Reactors and Boiling Water Reactors," includes procedures for control of measuring and test equipment and for surveillance tests, procedures, and calibrations. Section 8 states that procedures of a type appropriate to the circumstances should be provided to ensure that tools, gauges, instruments, controls, and other measuring and testing devices are properly controlled, calibrated, and adjusted at specific periods to maintain accuracy. Specific examples of such equipment to be calibrated and tested are readout instruments, interlock permissive and prohibit circuits,

alarm devices, sensors signal conditioners, controls, protective circuits, and laboratory equipment. The failure to have written procedures established, implemented, and maintained for heat trace panel circuit calibrations required to support operations activities and TS surveillance requirements is an apparent violation of TS 6.8.1 (498/8947-01; 499/8947-01).

When informed of the situation, the licensee took prompt corrective actions, including: (1) work requests were written to check the control card accuracies and setpoints of TS related circuits, (2) a review of OPGP03-ZM-0016 was initiated to add the NK instruments to the procedure, (3) action was initiated to develop PM instructions to perform the work requests and to initiate future circuit checks, (4) commitments were made to review all TS related instrumentation to ensure that all instruments that operations personnel use to meet TS requirements are covered under the PM or surveillance program, and (5) a problem report was written to investigate the cause of the missing calibration procedures.

During the period December 22-26, 1989, a record cold wave passed through the state of Texas. An all time record low of 9°F was recorded at the site, 2°F lower than the previous record. The design basis temperature (low) was based on ECW pond temperature, which was not exceeded during the cold spell. The extremely cold weather caused many problems for both units. Major examples included:

- Failure of all three trains of the Unit 1 ECW screen wash systems.
- Failure of two trains of Unit 1 CCW systems due to freezing of CCW surge tank level instrumentation.
- Frozen seal water supply lines to the steam generator feed pumps and feedwater booster pumps.
- Failure to maintain Diesel Generator 11 jacket water and lube oil temperature.
- Rupture of HVAC cooling coils.
- Loss of demineralized water makeup capability.

Many of the Unit 1 problems were not experienced in Unit 2 because most of the Unit 2 secondary side systems were drained for the Unit 2 maintenance outage.

A cold weather task force was assembled by the licensee prior to the freeze to prepare for the cold weather. Actions taken included installation of temporary heat tracing, using portable heaters, establishing trickle flow at critical locations (eye wash stations, toilets), and draining down unnecessary components (auxiliary boiler, cooling coils).

After the freeze, a problem report was written to document the many items frozen. The cold weather task force then established short- and long-term goals needed to avoid future problems during extremely cold conditions. Examples of the action items included: placement of fan control switches in pull to lock (out of service) positions, use of antifreeze in some lines, temporary or permanent structures over outdoor equipment, permanently heat tracing lines not previously heat traced, evaluating repair priorities, and providing freeze protection response plans. An engineering analysis was to be performed to determine the impact of a sustained low ambient temperature on plant systems.

One apparent violation and no deviations were identified in this area of the inspection.

10. Observation of Initial Licensee Fitness-for-Duty Training (TI 2515/104)

The inspector attended the licensee's fitness-for-duty (FFD) policy awareness training for general employees and escorts to determine acceptability of the training program implementation. On June 7, 1989, the NRC published the final rule and statement of policy on FFD programs for commercial nuclear power reactors (10 CFR Part 26), with an effective date for program implementation of January 3, 1990. Appropriate FFD awareness training for employees and training for supervisors and escorts is required by the rule. The licensee's training generally addressed the following areas:

- The roles and responsibilities of employees and escorts in implementing the program.
- The roles and responsibilities of others, such as the personnel, medical, and employee assistance program staffs.
- Techniques for recognizing drugs and indications of the use, sale, or possession of drugs.
- Behavioral observation techniques for detecting degradation in performance, impairment, or changes in employee behavior.
- The procedures for reporting problems to supervisory or security personnel.

The training was conducted utilizing both lecture and video presentation and appeared to adequately meet the requirements of 10 CFR Part 26.

No violations or deviations were identified.

11. Exit Interview

The inspectors met with licensee representatives (denoted in paragraph 1) on January 3, 1990. The inspectors summarized the scope and findings of the inspection. The licensee did not identify as proprietary any of the information provided to, or reviewed by, the inspectors.