ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket Nos.:	50-498 50-499
License Nos.:	NPF-76 NPF-80
Report No.:	50-498/99-13 50-499/99-13
Licensee:	STP Nuclear Operating Company
Facility:	South Texas Project Electric Generating Station, Units 1 and 2
Location:	FM 521 - 8 miles west of Wadsworth Wadsworth, Texas 77483
Dates:	May 16 through June 26, 1999
Inspectors:	Neil F. O'Keefe, Senior Resident Inspector Wayne C. Sifre, Resident Inspector Gilbert L. Guerra, Resident Inspector
Approved By:	Joseph I. Tapia, Chief, Project Branch A

ATTACHMENT: Supplemental Information

9907260005 990721
PDR ADOCK 05000498
Q PDR

EXECUTIVE SUMMARY

South Texas Project Electric Generating Station, Units 1 and 2
NRC Inspection Report No. 50-498/99-13; 50-499/99-13

Operations

- Inspectors identified a noncited violation for failure to follow procedures by a shift supervisor when he authorized deviation from a procedure used to vacuum-fill the residual heat removal system. When the specified vacuum could not be attained, the shift supervisor erroneously believed that he could authorize continuing with the vacuum that could be attained, contrary to station procedures. This issue was entered into the licensee's corrective action program as Condition Report 99-8977. The inspectors also observed a poor work practice when an operator hit a system vent valve with a wrench to stop a minor seat leak (Section O1.1).

- Unit 1 operators responded well to a plant trip on loss of power to one of the reactor coolant pumps. All control rods inserted and plant systems responded as expected. Operators properly implemented plant emergency procedures and quickly stabilized the plant in Mode 3 (Section O1.2).

- Walkdowns of plant equipment disclosed that operability and material condition were acceptable in all cases (Section O2.1).

- Operators failed to follow the plant startup procedure and caused a steam generator overpressure condition that was mitigated when a steam generator power-operated relief valve lifted. Operators made several reactivity manipulations without properly determining the expected plant response or properly monitoring all affected plant parameters. The inspectors concluded that the licensee's reactivity control program did not provide specific guidance or limits on reactivity manipulations using the chemical control system. Operators focused on power changes and failed to recognize that temperature was out of limits. A noncited violation was identified for failure to follow the plant startup procedure while controlling coolant temperature, which was entered in the licensee's corrective action program under Condition Report 99-3690 (Section O4.1).

Maintenance

- Work performed during maintenance and surveillance activities was well conducted and thorough. The licensee demonstrated safe and conservative action during maintenance activities. Technicians were experienced and knowledgeable of their assigned tasks, equipment performance, and the significance of the systems being worked (Section M1.1).

Engineering

- The inspectors noted that there were no reactor engineers available after attaining criticality to provide support to operators during power ascension shortly after a plant trip. Operations did not request support when the duty reactor engineer departed. Reactor engineering personnel contributed to the steam generator overpressure event by providing incorrect guidance with regard to reactivity manipulations for controlling reactor power distribution (Section O4.1).

Plant Support

- Security activities including plant access and support to plant operations and maintenance were well performed (Section S1.1).

Report Details

Summary of Plant Status

Unit 1 began the inspection period at 100 percent power. On May 16, 1999, Unit 1 tripped due to indications of low flow in the reactor coolant system. The unit was returned to power operations on May 17, 1999, and subsequently returned to 100 percent power where it remained for the remainder of the inspection period.

Unit 2 began the inspection period at 100 percent power and remained at full power throughout the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

The inspectors used Inspection Procedure 71707 to conduct frequent reviews of ongoing plant operations. Operational activities were well conducted. Specific comments and noteworthy events are discussed below.

The inspectors observed a plant operator venting the Unit 2 Train B residual heat removal system following maintenance on June 3. Operators were unable to obtain the 26 inches of water vacuum required by procedure prior to filling the system. The shift supervisor erroneously believed that he could authorize continuing with the vacuum that could be attained and verbally authorized filling with 22.8 inches of water vacuum contrary to the requirements of Plant General Procedure PGP03-ZA-0010, Revision 24, "Performing and Verifying Station Activities." This was a violation of Technical Specification 6.8.1 and Regulatory Guide 1.33; however, this nonrepetitive violation is being treated as a noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy (NCV 499/99013-01). This issue was entered in the licensee's corrective action program as Condition Report 99-8977. Following venting of the system from Valve 2-RH-0179, water continued to drip and the operator hit the valve handle with a wrench repeatedly until the drip stopped. This was brought to the attention of the shift supervisor who confirmed that this poor practice was not an appropriate valve operating technique.

O1.2 Operator Response to Unit 1 Automatic Reactor Trip (93702)

The inspectors responded to the site to observe operator response to and initial licensee investigation of an unplanned automatic reactor trip on May 16. Unit 1 tripped from 100 percent power when the reactor protection system sensed a loss of power to one of the reactor coolant pumps. All control rods inserted and plant systems responded as expected. Operators responded well and stabilized the plant in Mode 3.

Operators quickly determined that the trip was caused by a faulty fuse. The fuse supplied the reactor protection system with indication that Reactor Coolant Pump 1C

was running normally. When the indication was interrupted, a reactor protection system trip signal designed to protect the core from reduced coolant flow was initiated. This issue is discussed further in Section O8.1.

O2 Operational Status of Facilities and Equipment

O2.1 Engineered Safety Feature (ESF) System Walkdowns (71707)

The inspectors used Inspection Procedure 71707 to walk down accessible portions of the following ESF systems:

- Residual heat removal system, Train B (Unit 2)
- Auxiliary feedwater system, Train B (Units 1 and 2)
- 4160 kv ESF switchgear and vital batteries (Units 1 and 2)

Equipment operability and material condition were good in all cases. The inspectors conducted daily control board walkdowns and verified that systems were properly aligned for the existing operating mode, that instrumentation was operating correctly, and that power was available.

The inspectors identified the following items and reported them to the licensee:

- Unit 2 auxiliary feedwater system Crosstie Drain Valve 2-AF-0241 could not be operated because the handwheel was blocked by a support structure.

- The removable protective metal can over residual heat removal pump insulation was not properly secured.

The licensee documented these items in the corrective action program.

O4 Operator Knowledge and Performance

O4.1 Reactivity Manipulations During Unit 1 Startup Result in Steam Generator Overpressure Event

a. Inspection Scope (71707)

The inspectors observed the initial reactor startup conducted shortly after the plant trip discussed in Section O1.2. After the duty reactor engineer departed, operators continued with power ascension. After placing the turbine on line, licensed operators diluted reactor coolant boron concentration and inserted control rods to obtain the required axial power distribution before increasing power further. During this process, the Steam Generator 1D power-operated relief valve (PORV) opened automatically in response to an overpressure condition in the associated steam generator.

The inspectors interviewed control room operators, operations management, and reactor engineering personnel concerning the event. The licensee's event review report was reviewed and the findings were discussed with licensee management.

b. Observations and Findings

On May 16, the Unit 1 reactor was restarted approximately 17 hours after an unplanned automatic reactor trip. The restart was conducted late on a Sunday night under the guidance of the duty reactor engineer. This was considered a challenging restart due to the significant reactivity contribution of xenon after the short outage. After attaining criticality, the reactor engineer obtained shift supervisor permission to leave for the night without a relief present. Prior to departing, the reactor engineer discussed reactivity control strategy with control room personnel and indicated that control rods should be withdrawn to maintain target power distribution. A few hours later, operators placed the turbine on line and determined that it was necessary to adjust axial power distribution. This was required by Technical Specifications and involved inserting control rods. This was contrary to the direction given by the absent reactor engineer.

Normally, reactor engineering would provide a power ascension plan prediction. However, due to the short outage duration and lack of personnel during the weekend, this was not done. The prediction would provide operators with a strategy outline for controlling reactor parameters. The prediction, although not required, was a helpful tool for planning.

The shift supervisor telephoned the reactor engineering supervisor and obtained his concurrence on inserting control rods to adjust axial power. The insertion of the control rods, in turn, required diluting boron concentration in the reactor coolant to compensate for the negative reactivity of the rods. Both operations affected reactor power and average coolant temperature (Tave).

The shift supervisor had anticipated the need to increase turbine load and the resultant drop in average coolant temperature. Therefore, he directed operators to maintain temperature in the upper portion of the band, without defining what this meant. Operators attempted to control temperature about 3°F above the programmed value, which caused a temperature deviation alarm. Operators failed to note that Plant Operating Procedure 0POP03-ZG-0004, "Reactor Startup," required maintaining Tave within 1.5°F of the program value. Failure to follow Procedure 0POP03-ZG-0004 was a violation of Technical Specification 6.8.1 and Regulatory Guide 1.33. However, this nonrepetitive, licensee-identified and corrected violation is being treated as a noncited violation, consistent with Section VII.B.1 of the NRC Enforcement Policy (NCV 498/99013-02). This issue was entered in the licensee's corrective action program as Condition Report 99-7786.

Operators performed three consecutive 1000 gallon dilutions with compensating control rod insertions. The operators initiated the positive reactivity additions without calculating the expected effect. These actions successfully brought axial power within limits. Turbine power was then increased. Even though Tave was more than 3°F high, operators performed a fourth 1000 gallon dilution with the intent of keeping temperature

high during the turbine power increase. Without any compensating control rod motion and with a xenon burnout in progress, this positive reactivity addition caused a rapid temperature rise of several degrees. This caused steam pressure to increase to 1220 psig, at which time Steam Generator 1D PORV lifted to relieve pressure. Even though the reactivity addition from the dilution had not yet been fully effective, this was sufficient to stop the temperature increase. Operators recognized that the temperature was excessive and took action to reduce it. The PORV reclosed after approximately 10 minutes.

The licensee's investigation determined that this event was caused by the inappropriate and vague direction by the shift supervisor to control coolant temperature higher than normal in violation of the startup procedure. As a result, coolant temperature was not well controlled and the impact on steam pressure was neither recognized nor monitored by operators.

Operations management and reactor engineering supervision stated that their expectations were that significant changes to boron concentration would be made in smaller increments and that the expected effect would be calculated before making the change. However, the inspectors pointed out that the licensee's reactivity control program contained no such guidance; it focused on reactivity changes made by control rod movement rather than by changes in soluble boron concentration.

Although the operators involved had a good understanding of the effect of temperature on reactivity, they were overly focused on power indications. Operators were not aware that the temperature deviation alarm was locked in due to operating above the procedural limit, nor of the significance of the alarm.

c. Conclusions

Operators failed to follow the plant startup procedure and caused a steam generator overpressure condition that was mitigated when a steam generator PORV lifted. Operations personnel did not have reactor engineering support during power ascension after criticality was reached. No written policy existed which defined those evolutions when a reactor engineer was required to be present in the control room. Reactor engineering personnel contributed to the steam generator overpressure event by providing incorrect guidance in regard to reactivity manipulations for controlling reactor power distribution. Operators made several reactivity manipulations without properly determining the expected plant response or properly monitoring all affected plant parameters. The licensee's reactivity control program did not provide specific guidance or limits on reactivity manipulations using the chemical control system. Operators focused on power changes and failed to recognize that the temperature was out of limits. A noncited violation was identified for failure to follow the plant startup procedure while controlling coolant temperature. This was entered in the licensee's corrective action program as Condition Report 99-3690.

O8 Miscellaneous Operations Issues

O8.1 (Closed) Licensee Event Report 498/99004-00: Automatic reactor trip due to reactor coolant pump trip. Reactor Coolant Pump 1C tripped on the false indication of a bus undervoltage condition caused by a degraded fuse. Protective relaying sensed degraded voltage and deenergized equipment on 13.8 kV Bus 1H, including the reactor coolant pump. Control rods fully inserted, and plant equipment functioned normally. The licensee determined that the fuse was original plant equipment, had failed due to age, and degraded terminal connections. The fuse was replaced and normal indications were restored. The licensee planned to replace other fuses in the 13.8 kV auxiliary bus potential transformer during the next outage in each unit. The licensee planned to implement preventive maintenance to periodically replace similar fuses and was considering system modifications to eliminate plant trips due to single fuse failures. While this failure challenged safety equipment and operators, there was no safety significance to the event. No violations of NRC requirements were identified. This item is closed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Maintenance and Surveillance Observations

a. Inspection Scope (62707, 61726)

The inspectors observed all or portions of the following maintenance and surveillance activities. For surveillances, the test procedures were reviewed and compared to the Technical Specification surveillance requirements and bases to ensure the procedures satisfied the requirements. Maintenance work was reviewed to ensure that adequate work instructions were provided, that the work performed was within the scope of the authorized work, and that the work performed was adequately documented. In all cases, the impact on equipment operability and applicability of Technical Specifications actions were independently verified.

Maintenance:

- Auxiliary Feedwater Pump 12 regulating valve motor-operated valve diagnostic preventive maintenance
- Extended allowed outage time for Standby Diesel Generators 11 and 12
- Repairs to Unit 2 reactor trip bypass breaker
- Nuclear Instrumentation 41 gain potentiometer replacement

Surveillance:

- 0PSP03-DG-0001, "Standby Diesel Generator 11(21) Operability Test," Revision 11
- 0PSP03-SP-0006S, "Reactor Trip Breaker Trip Actuating Device Operational Test," Revision 10
- 0PSP02-NI-0041, "Power Range Neutron Flux Channel I Analog Channel Operational Test (N-0041)," Revision 4
- 0PSP03-NI-0001, "Power Range Nuclear Instrumentation Channel Calibration," Revision 9
- 0PSP15-AF-0001, "Auxiliary Feedwater System Functional Pressure Test," Revision 3

b. Observations and Findings

The work performed during these activities was thorough and well performed. Technicians were experienced and knowledgeable of their assigned tasks and equipment performance. Good prejob briefings were conducted, lessons were learned, and notes from previous maintenance and/or surveillance activities were reviewed. Good command and control was noted during the surveillance tests. Supervisors and system engineers frequently monitored job and equipment performance. Specific comments follow.

Operators discussed the changes to the surveillance procedure for Standby Diesel Generator 11 resulting from the idle, or slow start, modification installed during the last outage. The inspectors reviewed the controls for assuring that the start mode switch position for the diesel generator was left in the correct position after the surveillance. Leaving the start mode switch in the idle position would make the diesel generator inoperable because it would not meet the Technical Specification required speed within the specified time limits. The inspectors verified that the licensee implemented appropriate controls to ensure that the start mode switch would be returned to the rated (fast start) position after the surveillance.

During postmaintenance testing of the reactor trip bypass breaker in Unit 2, operators and electricians found that the breaker cover did not have adequate clearance and was interfering with breaker rack-in. Although this did not impede the operation of the breaker, the shift supervisor conservatively stopped the surveillance and allowed maintenance personnel to adjust the breaker cover. After the adjustment, all personnel involved in the activity held another brief and completely reperformed the postmaintenance surveillance.

The licensee had previously observed occasional electrical noise spikes while performing calibrations on nuclear instrumentation. The licensee determined that the spikes were related to the gain potentiometers on the nuclear instrumentation and

elected to replace them. The inspectors noted that the licensee took proper precautions when installing new potentiometers. The new potentiometers were tested or burned in prior to installation on the spare nuclear instrumentation drawers to verify that they did not exhibit the spiking problems.

The licensee entered two extended allowed outages for Standby Diesel Generators 11 and 12 during the inspection period. The outages were needed to perform the required 18-month inspections and preventive maintenance. System engineers were frequently seen inspecting their assigned plant equipment. The licensee successfully completed the extended allowed outages for Standby Diesel Generators 11 and 12 before schedule, despite having started late on Diesel 11 due to inclement weather.

c. Conclusions

Work performed during maintenance and surveillance activities was thorough and well performed. The licensee demonstrated safe and conservative action during maintenance activities. Technicians were experienced and knowledgeable of their assigned tasks and equipment performance.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Year 2000 (Y2K) Review Results (TI2515/141)

The staff conducted an abbreviated review of Y2K activities and documentation using Temporary Instruction (TI) 2515/141, "Review of Year 2000 (Y2K) Readiness of Computer Systems at Nuclear Power Plants." The review addressed aspects of Y2K management planning, documentation, implementation planning, initial assessment, detailed assessment, remediation activities, Y2K testing and validation, notification activities, and contingency planning. The reviewers used NEI/NUSMG 97-07, "Nuclear Utility Year 2000 Readiness," and NEI/NUSMG 98-07, "Nuclear Utility Year 2000 Readiness Contingency Planning," as the basis for this review.

The results of this review will be combined with the results of other reviews in a summary report to be issued by July 31, 1999.

IV. Plant Support

S1 Conduct of Security and Safeguards Activities

S1.1 Plant Security Activities

a. Inspection Scope (71750)

The inspectors observed routine security activities during the inspection period.

b. Observations and Findings

Plant access was properly controlled. During this inspection, the licensee upgraded the metal detectors used for personnel access control. The security staff was attentive and properly conducted personnel frisking in response to access control equipment alarms. Security staffing was appropriate during peak demand times. Temporary posts were properly utilized when required in response to vital door trouble alarms or problems. Vital areas were properly devitalized in support of plant operations and maintenance activities and properly secured afterward.

c. Conclusions

Security activities, including plant access and support to operations and maintenance, were well performed.

VI. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management on June 29, 1999. Management personnel acknowledged the findings presented. The inspector asked whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

W. Bullard, Supervisor, Health Physics
J. Burack, Supervisor, Design Engineering Department
T. Cloninger, Vice President and Assistant to the President and CEO
W. Cottle, President and CEO
B. Dowdy, Acting Plant Manager, Unit 2
E. Harper, Supervisor/Temporary, Design Engineering Department
S. Head, Licensing Supervisor
J. Johnson, Manager, Engineering Quality
T. Jordon, Manager, Systems Engineering
M. Kanavos, Manager, Mechanical-Civil
D. Leazar, Manager, Nuclear Fuel and Analysis Department
B. Mackenzie, Manager, Operating Experience Group
M. McBurnett, Director, Quality and Licensing
R. Morales, Supervisor, Engineering Specialist
G. Parkey, Plant Manager, Unit 1
J. Phelps, Manager, Unit 1 Operations
D. Rencurrel, Manager, Electrical/Instrumentation and Controls
B. Russell, Supervisor, Operations Support
G. Sandlin, Engineer Supervising
A. Schildkraut, Supervisor, Electrical, Design Engineering Department
J. Sheppard, Vice President, Engineering and Technical Services
W. Sotos, Supervisor/Temporary, Design Engineering Department
D. Stark, Manager, Technical Support, Design Engineering Department
S. Thomas, Manager, Design Engineering Department

INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering
IP 61726: Surveillance Observations
IP 62703: Maintenance Observations
IP 71707: Plant Operations
IP 71750: Plant Support Activities
IP 92901: Followup - Operations
IP 92902: Followup - Maintenance
IP 93702: Prompt Onsite Response to Events at Operating Power Reactors
TI 2515/141: Review of Year 2000 (Y2K) Readiness of Computer Systems at Nuclear Power Plants

Items Opened and Closed

Opened

50-499/99013-01	NCV	Failure to follow plant procedures during vent and fill of Unit 2 Train B residual heat removal system following maintenance (O1.1)
50-498/99013-02	NCV	Failure to follow plant procedures during Unit 1 reactor startup (O4.1)

Closed

50-498/99004-00	LER	Automatic reactor trip due to reactor coolant pump trip (O8.1)
50-499/99013-01	NCV	Failure to follow plant procedures during vent and fill of Unit 2 Train B residual heat removal system following maintenance (O1.1)
50-498/99013-02	NCV	Failure to follow plant procedures during Unit 1 reactor startup (O4.1)