



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-8064**

January 24, 2002

EA-02-007

William T. Cottle, President and  
Chief Executive Officer  
STP Nuclear Operating Company  
P.O. Box 289  
Wadsworth, Texas 77483

**SUBJECT: SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION -  
NRC INSPECTION REPORT 50-498/01-06; 50-499/01-06**

Dear Mr. Cottle:

On December 29, 2001, the NRC completed an inspection at your South Texas Project Electric Generating Station, Units 1 and 2, facility. The enclosed report documents the inspection findings which were discussed on January 7, 2002, with you and other members of your staff.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

Based on the results of this inspection, the NRC identified two issues that were determined to be violations. One issue was evaluated and determined to be a No Color violation, and is being treated as the second example of a previous noncited violation (NCV), consistent with Section VI.A of the Enforcement Policy. The second violation is still under review for significance, and will be unresolved until the significance determination is completed. These violations are described in the subject inspection report. If you contest the NCV or the significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the South Texas Project Electric Generating Station, Units 1 and 2, facility.

Immediately following the terrorist attacks on the World Trade Center and the Pentagon, the NRC issued an advisory recommending that nuclear power plant licensees go to the highest level of security, and all promptly did so. With continued uncertainty about the possibility of additional terrorist activities, the Nation's nuclear power plants remain at the highest level of security and the NRC continues to monitor the situation. This advisory was followed by additional advisories and, although the specific actions are not releasable to the public, they

generally include increased patrols, augmented security forces and capabilities, additional security posts, heightened coordination with law enforcement and military authorities, and more limited access of personnel and vehicles to the sites. The NRC has conducted various audits of your responses to these advisories and your ability to respond to terrorist attacks with the capabilities of the current design basis threat. From these audits, the NRC has concluded that your security program is adequate at this time.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/ADAMS.html> (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

*/RA/*

David N. Graves, Chief  
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Division of Reactor Projects

Dockets: 50-498  
50-499  
Licenses: NPF-76  
NPF-80

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NRC Inspection Report  
50-498/01-06; 50-499/01-06

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STP Nuclear Operating Company

-4-

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**ENCLOSURE**

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Dockets: 50-498  
50-499

Licenses: NPF-76  
NPF-80

Report Nos: 50-498/01-06  
50-499/01-06

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: September 23 through December 29, 2001

Inspectors: N. F. O'Keefe, Senior Resident Inspector  
G. L. Guerra, Resident Inspector  
J. B. Nicholas, Ph.D., Senior Health Physicist  
P. J. Elkmann, Emergency Preparedness Inspector

Approved By: D. N. Graves, Chief, Project Branch A, Division of Reactor Projects

Attachment: Supplemental Information

## SUMMARY OF FINDINGS

South Texas Project Electric Generating Station, Units 1 and 2  
NRC Inspection Report 50-498/01-06; 50-499/01-06

IR 05000498-01-06; IR 05000499-01-06; on 09/23-12/29/2001; STP Nuclear Operating Company; South Texas Project Electric Generating Station; Units 1 & 2. Integrated Res/Reg Rpt; Event fwp, emergency action level and plan changes, & access control to radiologically significant areas.

The inspection was conducted by resident inspectors, and region based plant support, and emergency preparedness inspectors. The inspection identified one Green issue, one noncited violation, and an unresolved item. The significance of issues is indicated by their color (Green, White, Yellow, or Red) and was determined by the Significance Determination Process (SDP) in Inspection Manual Chapter 0609. Findings for which the SDP does not apply are indicated by No Color or by the severity level of the applicable violation. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.

### A. Inspector Identified Findings

TBD. The Train 1C essential cooling water (ECW) pump failed during a postmaintenance test following maintenance on the pump. Bearing lubricating water channels were found to be blocked by foreign material introduced during the maintenance work. Additionally, operators failed to recognize the inadequate lubricating water flow and continued to run the pump for 10 minutes before it failed. The inspectors concluded that the operating and maintenance procedures were inappropriate to the circumstances. The maintenance procedures for rebuilding the pump did not adequately ensure that the appropriate cleanliness requirements were implemented during the work, and the portion of the operating procedure used to fill and vent the system following maintenance did not correctly incorporate vendor manual information to ensure timely verification of adequate cooling water flow. This was determined to be an apparent violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings."

Preliminary assessments indicated that this issue potentially had safety significance of greater than very low significance (Green), but additional information from the licensee was needed to complete a final significance categorization. Therefore, this will be treated as an unresolved item pending NRC assessment of the risk significance of this issue (Section 4OA3.1).

- No Color. Operators failed to recognize that two routine evolutions using the fuel oil storage and transfer system conflicted because they did not properly verify that the prerequisites were satisfied. When an attempt was made to add fuel oil to the technical support center diesel day tank, the fuel oil storage tank (FOST) for standby diesel generator (SDG) 12 was filled instead. Failure to satisfy prerequisites for OPOP02-FO-0001 was a violation of Technical Specification 6.8.1 and Regulatory Guide 1.33. This violation constitutes an additional example of a previously identified violation (NCV 499/2001005-02) and is not being cited individually.

This event had no direct safety significance. The licensee would normally have sampled oil being used to fill a SDG FOST to verify that Technical Specification purity requirements were satisfied prior to filling. However, samples of SDG 12 FOST obtained after filling demonstrated that Technical Specification requirements were not violated. However, as with the earlier event, this issue was determined to be more than minor because the violation suggested a programmatic problem in procedure adherence that could have a realistic potential safety or regulatory impact. If left uncorrected, this violation would become a more significant safety and regulatory concern. Understanding and properly adhering to approved procedures is a key element of human performance necessary to support reactor safety (Section 4OA3.2).

B. Licensee Identified Violations

Violations of very low safety significance which were identified by the licensee have been reviewed by the inspectors. Corrective actions taken or planned by the licensee appear reasonable. These violations are listed in Section 4OA7 of this report.



## Report Details

### Plant Status

Unit 1 began this inspection period in coastdown operations at approximately 94 percent power. A refueling outage was entered on October 3, 2001. The reactor was restarted on October 23, and full power was achieved on October 27. The plant remained at or near full power for the balance of the inspection period.

Unit 2 began this inspection at full power. On October 4, 2001, the unit was shutdown to repair a packing leak on Feedwater Isolation Valve 2C. The unit was restarted on October 10, and returned to full power on October 11. Power was reduced to 70 percent on October 13 to facilitate bearing replacement on Steam Generator Feed Pump 21. The plant returned to full power on October 15. The plant remained at or near full power for the balance of the inspection period.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness

#### 1R01 Adverse Weather Protection (71111.01)

##### a. Inspection Scope

The inspectors reviewed the licensee's program for preparing for severe cold weather. Limited walkdowns were performed to assess the material condition of cold weather protection devices, such as room heaters, piping insulation and heat tracing. Discussions were held with the cold weather coordinator for system engineering to determine the actions taken prior to the onset of winter, training provided to station personnel prior to walkdowns, and historical problems the site had encountered. The inspectors discussed the list of work items coded as related to cold weather protection with a work scheduler to assess the significance of the outstanding deficiencies and the relative priority assigned to promptly correcting them. The inspectors observed the licensee's implementation of cold weather response procedures. The following procedures were used during this inspection:

- 0POP01-ZO-0004, "Extreme Cold Weather Guidelines," Revision 12
- 0PGP03-ZV-0001, "Severe Weather Plan," Revision 6
- 0POP02-CH-0005, "Essential Chiller Operation, Revision 14
- 0PSP03-ZQ-0028, "Operator Logs," Revision 66

##### b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial System Walkdown

a. Inspection Scope

The inspectors performed a partial system walkdown of the Unit 2 Train D emergency safety features (ESF) battery and distribution system on November 27, 2001. The inspectors used Plant Operating Procedure OPOP02-EE-0001, "ESF (Class 1E) DC Distribution System," Revision 9, to verify the proper standby electrical equipment line up. The inspectors also examined component material condition.

The inspectors performed a partial system walkdown of Unit 2 Train A and Train B auxiliary feedwater pumps while the Train D pump was out of service for planned maintenance on October 29, 2001. The inspectors used Plant Operating Procedure OPOP02-AF-0001, "Auxiliary Feedwater," Revision 15, to verify that the required standby and support systems were in a proper standby line up. The inspectors also examined component material condition.

b. Findings

No findings of significance were identified.

.2 Semi-Annual System Walkdown

a. Inspection Scope

The inspectors performed a complete system walkdown of the Unit 1 ECW system during the week of November 20, 2001. The inspectors verified that all three trains were in a proper standby equipment and control room line up, and that components were in good material condition. The system walkdown included control board and electrical line ups. The inspectors referenced Plant Operating Procedure OPOP02-EW-0001, "Essential Cooling Water Operations," Revision 17, applicable piping and instrumentation drawings, and the Updated Final Safety Analysis Report information on this system.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

.1 Routine Fire Area Walkdowns

a. Inspection Scope

The inspectors used Inspection Procedure 71111.05 to evaluate the control of transient combustibles and ignition sources. The licensee's individual plant examination, fire

preplans and Fire Hazards Analysis Report were used to identify important plant equipment, fire loading, detection and suppression equipment locations, and planned actions to respond to a fire in each of the plant areas selected. The inspection included observing the material condition and operational line up of fire protection systems and fire barriers used to prevent fire damage or propagation. The following plant areas were inspected:

- Unit 1 containment during outage (Fire Area 63)
- Unit 1 fuel handling building (Fire Area 35)
- Unit 2 electrical auxiliary building ventilation filtration room areas (Fire Zones Z005, Z039, Z049, and Z085)
- Unit 2 auxiliary feedwater pump rooms (Fire Zones Z401, Z402, Z403, and Z405)
- Unit 2 Channel II battery and distribution rooms (Fire Zones 0002)

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

The inspectors reviewed the test procedures and results of the component cooling water heat exchanger performance tests performed on all three trains in Unit 1 in October 2001, to ensure compliance with regulatory requirements. The test method, scheduling, and results were discussed with appropriate system engineering personnel. The following documents were reviewed:

- OPEP07-EW-0001, "Performance Test for Essential Cooling Water Heat Exchangers," Revision 5
- Work Package for Work Authorization Number (WAN) 142469
- Condition Report 01-16186

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

a. Inspection Scope

The inspectors observed licensed operator requalification training on November 27 and December 3, 2001. The inspectors observed crew performance during simulator sessions for clarity and formality of communications, correct use of procedures, high risk operator actions, and the oversight and direction provided by the shift supervisor. The inspectors observed the licensee's use of emergency action levels for proper emergency classification. Classroom training on lessons learned from a recent event was also observed.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Functional Failure Review (71111.12)

a. Inspection Scope

The inspectors independently verified that the licensee properly implemented 10 CFR 50.65, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," for the following equipment performance problems:

- Emergency Diesel Generator 22 speed circuit failure (WAN 416510, Condition Report (CR) 01-16808)
- Unit 1 Train C ECW pump bearing failure (WAN 212114, CR 01-14883)

The inspectors focused the review on whether the structures, systems, or components (SSCs) that experienced problems were properly characterized in the scope of the program. They also reviewed whether the SSC failure or performance problem was properly characterized. The inspectors assessed the adequacy of the licensee's significance classification for the SSC. This included the appropriateness of the performance criteria established for the SSC (if applicable), and the adequacy of corrective actions for SSC's classified in accordance with 10 CFR 50.65 a(1) as applicable.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessment and Emergent Work Evaluation (71111.13)

a. Inspection Scope

The inspectors reviewed selected activities regarding risk evaluations and overall plant configuration control. The inspectors discussed emergent work issues with work control personnel and reviewed the potential risk impact of these activities to verify that the work was adequately planned, controlled, and executed. The activities reviewed were associated with:

- (Unit 2) Qualified Data Processing System APC-B2 emergent work (B train work while in C train work week)
- (Unit 1) Main Steam Isolation Valve 1B air line leak repair
- (Unit 1) Train C battery cell replacement
- (Common) North switchyard bus outage
- (Unit 2) Group 2 control rods failed to move during monthly control rod operability surveillance

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors used Inspection Procedure 71111.15 to review selected operability evaluations conducted by the licensee during the report period involving risk-significant systems or components. The inspectors evaluated the technical adequacy of the licensee's operability determination, verified that appropriate compensatory measures were implemented, and verified that the licensee considered all other pre-existing conditions, as applicable. Additionally, the inspectors evaluated the adequacy of the licensee's problem identification and resolution program as it applied to operability evaluations. Specific operability evaluations reviewed are listed below.

- (Unit 1) Electrical conduit hangers missing welds in DC distribution rooms (CR 01-16077)
- (Unit 2) Residual Heat Removal Valve MOV-60 missing bolt (CR 01-15594)
- (Unit 1) Failed surveillance time for turbine throttle valve (CR 01-17277)
- (Unit 1) Auxiliary Feed Water Pump 14 governor valve seat nondestructive examination indications (CR 01-17048)

- (Unit 1) ECW Pump 1A degraded due to low pump differential pressure (CR 01-18004)

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing (71111.19)

a. Inspection Scope

The inspectors witnessed or reviewed the results of postmaintenance testing for the following maintenance activities:

- (Unit 1) E1A ESF transformer motor operated disconnect switch replacement (WAN 187979)
- (Unit 1) Train C battery replacement (Work order 183039)
- (Unit 2) Auxiliary Feedwater Pump 24 turbine overspeed trip test (WAN 214664)
- (Unit 2) Emergency Diesel Generator 22 speed control circuit failure (WAN 416510)
- (Unit 2) Emergency Diesel Generator 21 extended allowed outage work (WAN 193940)
- (Unit 1) ECW Pump 1B rebuild (Work Order 406260)

In each case, the associated work orders and test procedures were reviewed to determine the scope of the maintenance activity and determine if the test adequately tested components affected by the maintenance. The Updated Final Safety Analysis Report, Technical Specifications, and Design-Basis Documents were also reviewed to determine the adequacy of the acceptance criteria listed in the test procedures.

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities (71111.20)

.1 Review of the Unit 1 Outage Plan

a. Inspection Scope

The inspectors reviewed the Unit 1 Tenth Refueling Outage Shutdown Risk Assessment to verify that the licensee appropriately considered risk in planning and scheduling the outage activities. The results of the licensee's Outage Risk Assessment and

Management program, time to boil, and time to core damage profiles were reviewed against the schedule of activities to identify periods of increased risk and activities for additional inspection focus. The work schedule and risk profiles were discussed with the operations support outage coordinator.

The inspectors focused on the following activities:

- Transition and midloop operation
- Fuel offload and reload
- Periods with reduced cooling to the spent fuel pool

b. Findings

No findings of significance were identified.

.2 Monitoring of Reactor Shutdown and Plant Cooldown Activities

a. Inspection Scope

The inspectors observed control room operator actions during the reactor shutdown and assessed the licensee's compliance with Technical Specification limits during plant cooldown. Plant operating procedures OPOP03-ZG-0006, "Plant Shutdown from 100% to Hot Standby," Revision 17, and OPOP03-ZG-0007, "Plant Cooldown," Revision 30, were reviewed.

b. Findings

No findings of significance were identified.

.3 Control of Outage Activities

a. Inspection Scope

The inspectors reviewed plant conditions and observed selected refueling outage activities throughout the outage to verify that the licensee maintained the plant in a configuration consistent with the requirements of Technical Specifications and with the assumptions of the outage risk assessment. The inspectors verified that emergent issues were properly assessed for their impact on plant risk.

Electrical power availability was periodically verified to meet Technical Specification requirements and outage risk assessment recommendations. Control room operators were observed and interviewed on the status of plant conditions. The inspectors reviewed equipment tagout activities, and controls for reactivity management, decay heat removal, spent fuel pool cooling, containment integrity, and reactor coolant system inventory.

b. Findings

No findings of significance were identified.

.4 Reduced Inventory and Midloop

a. Inspection Scope

The inspectors performed continuous coverage of Unit 1 midloop activities on October 5-6, and October 18, 2001. The inspectors verified that multiple sources of electrical power, multiple reactor vessel level indications, and multiple reactor coolant system temperature indications were available. Premidloop shutdown risk assessment group meetings were observed on October 4 and 16 to assess the adequacy of the licensee's control of work activities to avoid negative impact on the safe conduct of midloop activities. The inspectors observed licensee compliance with the following procedures:

- OPOP03-ZG-0009, "Mid-Loop Operation," Revision 28
- OPOP03-RC-0100, "Reactor Coolant System Vacuum Fill," Revision 16

b. Findings

No findings of significance were identified.

.5 Refueling Activities

a. Inspection Scope

The inspectors observed portions of core offload and core reload activities to determine if these activities were conducted in accordance with the Technical Specifications and administrative procedures.

b. Findings

No findings of significance were identified.

.6 Monitoring of Heatup and Startup Activities

a. Inspection Scope

The inspectors observed control room operations and reviewed control room logs to verify that the Unit 1 operational mode changes, heatup and startup were conducted in compliance with Technical Specifications and administrative procedures and requirements. The inspectors also performed a detailed containment walkdown to assess containment cleanliness and material condition of components at the end of the outage. The following procedures were reviewed:

- OPOP03-ZG-0004, "Reactor Heatup," Revision 20



- OPEP02-ZX-0002, "Initial Criticality and Low Power Physics Testing,"  
Revision 12

b. Findings

No findings of significance were identified.

.7 Identification and Resolution of Problems

a. Inspection Scope

The inspectors screened all condition reports that documented problems identified during the Unit 1 outage to assess the threshold for problem reporting, and the effectiveness of significance screening, mode restraint screening, operability assessment, and impact to shutdown risk. The inspectors followed up on the licensee's actions regarding the following issues:

- Core barrel specimen plug found in wrong hole, damaged and unremovable. This allowed more core bypass flow than normal during the previous operating cycle (CR 01-15955)
- While draining the component cooling water common header for maintenance, approximately 3000 gallons of water were spilled into rooms containing safety related equipment (CR 01-15822)
- Operators diluted the reactor coolant system to prestartup concentration while Nuclear Instrument 45 troubleshooting was in progress (CR 01-17426)
- Spurious steam dump operations during heatup to hot standby (CRs 01-17364 and 01-17612)
- While flooding the reactor cavity prior to refueling, the cavity overflowed through ventilation ducts (CR 01-15888)

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors evaluated the adequacy of periodic testing of the following important nuclear plant equipment. This included aspects such as preconditioning, the impacts of testing during plant operations, the adequacy of acceptance criteria including test frequency and test equipment accuracy, range and calibration, procedure adherence, record keeping, the restoration of standby equipment, and the effectiveness of the

licensee's problem identification and correction program. The inspectors observed or reviewed the following tests:

- (Unit 1) 0PSP15-CC-0001, "Component Cooling Water System Inservice Pressure Test," Revision 4
- (Unit 1) 0PSP03-RI-0001, "Digital Rod Position Indication Operability Test," Revision 6
- (Unit 2) 0PSP03-II-0005, "One Point Incore-Excore Detector Calibration," Revision 4
- (Unit 1) 0PSP03-DG-0009, "Standby Diesel 13 LOOP Test," Revision 11
- (Unit 2) 0PSP06-DJ-0001, "125 Volt Class 1E Battery 7 Day Surveillance Test," Revision 16

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors reviewed Temporary Modification T1-01-16499-1, "Install Jumper Across Cell 29 in Unit 1 Train C Battery," Revision 0, following Inspection Procedure 71111.23 with respect to design-bases documentation, approvals, and tracking. The inspectors reviewed the 10 CFR 50.59 screening, updated procedures, and drawings (Work Order 401100).

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)

a. Inspection Scope

The inspector performed an in-office review of the following documents against the requirements of 10 CFR 50.54(q) to determine if the revisions decreased the effectiveness of the plan:

- South Texas Project Electric Generating Station Emergency Plan, ICN 19-3, submitted July 16, 2001

- Emergency Plan Implementing Procedure 0ERP01-ZV-IN01, "Emergency Classification," Revision 5, submitted August 27, 2001

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01)

a. Inspection Scope

The inspector interviewed radiation workers and radiation protection personnel involved in high dose rate and high exposure jobs during Refueling Outage 1RE10. The inspector also conducted plant walkdowns within the Unit 1 radiologically controlled area and conducted independent radiation surveys of selected work areas. The following items were reviewed and compared with regulatory requirements:

- Area posting and other controls for airborne radioactivity areas, radiation areas, high radiation areas, locked high radiation areas, and very high radiation areas
- Locked and very high radiation area key controls
- Radiation work permits and radiological surveys involving airborne radioactivity areas and high radiation areas
- Access controls, surveys, and radiation work permits for the following four significant high dose work areas during Refueling Outage 1RE10: steam generator nozzle dam removal (Radiation Work Permit 2001-1-0243), cavity decontamination (Radiation Work Permit 2001-1-0286), install freeze seals on guide tubes to support replacement fittings (Radiation Work Permit 2001-1-0308), and reactor head disassembly/reassembly (Radiation Work Permit 2001-1-0314)
- ALARA prejob briefings for two potential high radiation dose jobs (installation of freeze-seals and the replacement of the fittings for the bottom mounted instrumentation thimble seals and steam generator nozzle dam removal)
- Dosimetry placement for work involving a potential significant dose gradient
- Controls involved when handling highly radioactive items (transport of high activity radwaste in support of 1RE10, Radiation Work Permit 2001-1-0406)

- A summary of condition reports written since January 2001 that involved high radiation area and work practice incidents, specifically (01-1835, 01-2916, 01-3517, 01-4353, 01-5230, 01-5264, 01-5267, 01-5742, 01-10972, 01-13155, 01-14357, 01-15708, 01-16001, 01-16355, 01-16360, 01-16365, 01-16500, 01-16535, and 01-16593)
- Health physics self-assessment for control of radioactive material performed August 13-23, 2001, and health physics monitoring reports involving high radiation area controls performed since January 2001

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES (OA)

4OA1 Performance Indicator Verification (71151)

.1 Barrier Integrity

a. Inspection Scope

The inspectors reviewed performance indicators for the period from October 2000 through September 2001, to assess the accuracy and completeness of the indicator reporting. The inspectors reviewed performance indicator data reported by the licensee in order to assess the accuracy and completeness of the information. The inspectors used Nuclear Energy Institute (NEI) Guidance NEI 99-02, "Performance Indicator Verification," Revision 2, as guidance for this inspection. Data was reviewed for the following indicators for both units:

- Reactor Coolant System Specific Activity
- Reactor Coolant System Leak Rate

b. Findings

No findings of significance were identified.

.2 Occupational Exposure Control Effectiveness

a. Inspection Scope

The inspector reviewed corrective action program records for Technical Specification required locked high radiation areas, very high radiation areas, and unplanned exposure occurrences since October 2000, to confirm that these occurrences were properly recorded as performance indicators (Condition Reports 01-2919, 01-4201, 01-4353, 01-4667, 01-5267, and 01-16566). Radiologically controlled area entries with exposures greater than 100 millirems were reviewed, and selected examples were examined to determine whether they were within the dose projections of the governing radiation work

permits. Whole-body counts or dose estimates were reviewed if the radiation worker received a committed effective dose equivalent of more than 100 millirems.

b. Findings

No findings of significance were identified.

.3 Radiological Effluent Technical Specification/Offsite Dose Calculation Manual  
Radiological Effluent Occurrences

a. Inspection Scope

The inspector reviewed radiological effluent release program corrective action records, licensee event reports, and annual effluent release reports documented since October 2000, to determine if any events exceeded the performance indicator thresholds.

b. Findings

No findings of significance were identified.

4OA3 Event Followup (71153)

.1 Notice of Enforcement Discretion (NOED) Followup

a. Inspection Scope (71153)

The inspectors reviewed the events surrounding the licensee's request for enforcement discretion due to exceeding the allowed outage time on ECW Pump 1C when a shaft bearing failed on September 21, 2001. The focus of this inspection was to assess the root cause and significance of the event. The inspectors interviewed maintenance, operations, and risk-assessment personnel. The following documents were reviewed:

- Condition Report 01-14883 and 01-14896
- Work Order 406266, "ECW Pump 1C Has Degraded Output" (WAN 212114)
- Root Cause Investigation Report CR 01-14883, Revision 1
- Condition Report Operations Evaluation 01-14896 "Cross Connecting Train 1A/1B ECW to Train 1C ECW on LOOP"
- Operations Procedure 0POP02-EW-0001, "Essential Cooling Water Operations," Revisions 16 and 18
- Maintenance Procedure 0PMP04-EW-0001, "Essential Cooling Water Pump Maintenance," Revisions 8, 9, 10 and 12

- General Procedure 0PGP03-ZM-0006, "Control of System Cleanness During Maintenance," Revision 10
- South Texas Project letter requesting enforcement discretion from Technical Specification 3.7.4, "Essential Cooling Water System," dated September 23, 2001
- ECW Pump Vendor Instruction Manual VTD-H127-0004

b. Findings

An apparent violation was identified for the root cause of a failure of an ECW pump following maintenance which led to a NOED. The violation involved two procedures which were inappropriate to the circumstances for rebuilding and operating the pump. This issue will be treated as an unresolved item pending additional information to be supplied by the licensee needed to support an assessment of the safety significance of the issue by the NRC.

**Description of Events**

On September 21, 2001, the 1C ECW pump was started for postmaintenance testing. The pump had been inoperable for planned maintenance since September 17, 2001. The pump was started in accordance with the fill and vent portion of the operating procedure. The local operators reported a satisfactory pump start based on normal discharge pressure, water flow from the lubricating water filter vent, adequate seal leakoff coming from the pump packing, satisfactory oil level, and stable motor current. As required by the procedure, instrument and control technicians vented the lubricating water flow and filter differential pressure gauges shortly after the pump start. After venting, the gages indicated zero. This was reported to the control room, and the instruments were vented again with no change in indication. After the pump was running for approximately 10 minutes, the discharge pressure dropped to zero, a loud noise was heard, and the pump was manually stopped. The pump was observed to come to an abrupt stop instead of the normally observed gradual coastdown.

Following disassembly of the pump, the licensee identified damage to the center shaft bearing and indications of overheating in the lower pump shaft. Given the extent of the repairs necessary, the licensee requested that the NRC exercise enforcement discretion and allow additional time beyond the 7 days that Technical Specification 3.7.4 allowed to complete the necessary repairs, since much of the original allowed outage time had already been used while performing the original maintenance. The NRC verbally granted enforcement discretion on September 23, 2001, and confirmed this action in a letter to the licensee dated September 25, 2001, allowing an additional 5 days of outage time. The NRC concluded that enforcement discretion was warranted because the NRC was satisfied that the action involved no safety impact and had no adverse radiological impact on public health and safety or adverse consequences to the environment. Repair work was completed on September 26, 2001, and the ECW system was restored to operable status.

### **Root Cause of the Event**

The licensee determined that foreign material in the pump had caused insufficient cooling and lubricating flow to the pump by obstructing the bearing flow orifices. The root cause of the foreign material intrusion was less than adequate implementation of the station's foreign material exclusion program during the pump maintenance. A rotary wire brush used to remove scale buildup from pump components lost filaments inside the pump without being noticed, which later obstructed flow through the bearing orifices. This lack of cooling caused bearing failure and shaft overheating. The licensee concluded that the work order and the pump maintenance procedure did not adequately invoke the appropriate cleanliness control measures of the foreign material control program.

Additionally, operators did not recognize that adequate lubricating water flow to the bearings was not available. Two abnormal instrument indications were disbelieved, and the pump was allowed to run while additional attempts to vent the instruments were made. The system operating procedure did not correctly incorporate vendor manual information to ensure that a pump would be shut down if lubricating water was not available within 45 seconds of starting the pump. Instead, the procedure inappropriately treated a pump start to fill and vent the system as a special case, and gave different criteria that did not assure adequate lubricating and cooling flow to the bearings.

### **Corrective Actions**

The following major corrective actions were implemented that corresponded directly with the indicated root cause and preventing damage to the ECW pump:

- Revised the ECW system operating procedure to require an ECW pump to be stopped if the associated lubricating water flow indicator does not indicate greater than 3.0 gpm flow within 45 seconds after any pump start.
- Revised the ECW pump maintenance procedure to specify cleaning instructions and verifications of cleanliness for the pump internals.
- Conducted training for work planners, supervisors, and craftsmen on their responsibilities for implementing cleanliness requirements, inspections, and maintenance verification points per station procedures.

This issue is in the licensee's corrective action program as CR 01-14883.

### **Inspection Issue**

Rebuilding and starting this safety-related pump were activities affecting quality. As such, 10 CFR 50, Appendix B, Criterion V requires that such activities shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. It further requires that instructions, procedures, or drawings

shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

The inspectors concluded that the operating and maintenance procedures discussed above were inappropriate to the circumstances. The maintenance procedures for rebuilding the pump did not adequately ensure that the appropriate cleanliness requirements were implemented during the work, and the portion of the operating procedure used to fill and vent the system following maintenance did not correctly incorporate vendor manual information to ensure a pump would be secured if clear indications of adequate cooling water flow were not promptly obtained. This was determined to be an apparent violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings." Preliminary assessments indicated that this issue potentially had safety significance of greater than very low significance (Green), but additional information from the licensee was needed to complete a final significance categorization. Therefore, this will be treated as an unresolved item pending NRC assessment of the risk significance of this issue (URI 50-498/2001-06-01; EA-02-007).

.2 Failure to Recognize that Two Evolutions Using the Same System Conflicted

a. Inspection Scope

The inspectors conducted an event followup inspection following an inadvertant filling of the fuel oil storage tank (FOST) for SDG 12. The inspectors reviewed Condition Reports 01-19023 and 01-19256. The inspectors discussed the licensee's analysis of the event with the operations managers and the Unit Supervisor. The following procedures were reviewed:

- OPOP02-FO-0001, "Fuel Oil Storage and Transfer System," Revision 32
- OPGP03-ZA-0010, "Performing and Verifying Station Activities," Revision 25
- Conduct of Operations Manual

The inspectors also reviewed the corrective actions for an event with similar causes, documented in Condition Report 01-14307.

b. Findings

Operators failed to recognize that two routine evolutions using the fuel oil storage and transfer system conflicted because they did not properly verify that the prerequisites were satisfied. When an attempt was made to add fuel oil to the technical support center diesel day tank, the FOST for SDG 12 was filled instead. This was identified as an additional example of a previously identified NCV for failure to follow procedure.

**System Design and Sequence of Events**

The fuel oil storage and transfer system used a large auxiliary fuel oil storage tank to provide fuel oil to numerous local diesel day tanks. In the case of the SDGs, the day tank function was performed by a large FOST. The system was provided with a filtration



skid to remove sediment from oil going to the SDG FOSTs, since these safety-related tanks had high fuel oil purity requirements specified in Technical Specifications.

On November 20, 2001, the FOST for SDG 12 was being recirculated through the filtration skid to remove sediment. The operating crew decided to add fuel oil to the technical support center diesel day tank. A discussion was held in the control room as to whether both evolutions could be performed simultaneously. The Unit Supervisor concluded that "since the procedure did not prohibit this, it must be OK." However, when the system was aligned to fill the selected day tank, no increase in fuel oil level was observed. Control room operators then recognized that 800 gallons of fuel had been added to the FOST for SDG 12. The evolution was secured.

### **Issues**

The licensee wrote Condition Reports 01-19023 and 01-19256 following this event. While this was initially categorized as a condition not adverse to quality by the operating crew, management subsequently changed it to a station level condition adverse to quality because it was recognized that this event was similar to a previous event.

In the previous event, operators did not properly verify procedure prerequisites prior to attempting to make a blended makeup to the chemical and volume control tank. Because the system was aligned to perform another evolution, only pure water was actually added. Following that event, a noncited violation was identified for failure to follow procedure and verify that the system was in the required alignment, in part because of a culture that permitted a loose interpretation of what constituted the required system alignment. The licensee's corrective action program had focused on the importance of the plant impact after operator actions to mitigate the error, so the importance had been under classified and a cause analysis had not been performed. This issue was documented in Inspection Report 498/499;01-05.

The inspectors reviewed the licensee's corrective actions from the previous event. Actions included attending training for licensed operators on the previous event, fundamentals of procedure use, and management expectations for verifying system alignments. The inspectors concluded that the planned corrective actions from the previous event were adequate, but had not been completed before the second event. Specifically, the crew that inadvertently filled the SDG 12 FOST had not received the training.

This event had no direct safety significance. The licensee would normally have sampled oil being used to fill a SDG FOST to verify that Technical Specification purity requirements were satisfied prior to filling. However, samples of SDG 12 FOST obtained after filling demonstrated that Technical Specification requirements were not violated. However, as with the earlier event, this issue was determined to be more than minor because the violation suggested a programmatic problem in procedure adherence that could have a realistic potential safety or regulatory impact. If left uncorrected, this violation would become a more significant safety and regulatory concern.

Understanding and properly adhering to approved procedures is a key element of human performance necessary to support reactor safety.

The inspectors determined that the operators violated 0POP02-FO-0001 by not satisfying the prerequisite system alignment prior to starting the fuel oil transfer. That prerequisite required that the system was in the shutdown lineup. The implication was that the two operations being attempted were not assured of being procedurally compatible. Failure to follow 0POP02-FO-0001 was a violation of Technical Specification 6.8.1. This violation constituted an additional example of a previously identified violation (NCV 499/2001005-02) and is not being cited individually. A number will be assigned for administrative tracking purposes (NCV 498/2001006-02). Further corrective actions for this additional example are expected to be taken in conjunction with corrective actions for the previous violation.

- .3 (Closed) Licensee Event Report 50-498/2001-001: Essential Cooling Water Pump 1C failure following maintenance. The licensee was granted enforcement discretion for exceeding the allowed outage time of Technical Specification 3.7.4. Details of this event are discussed in Section 4OA3.1 of this report. This issue was addressed in the licensee's corrective action program under CR 01-14883. The inspectors reviewed the licensee's corrective actions to prevent recurrence and found that they adequately addressed the problem.
- .4 (Closed) Licensee Event Report 50-499/2001-002: Manual reactor trip. During switchyard breaker manipulations, one phase pole for Breaker Y600 failed to close. During subsequent breaker manipulations, three circulating water pumps tripped due to phase imbalances. Operators responded per procedure and manually tripped the plant due to the impending loss of the normal heat sink, since insufficient cooling was available to the main condenser. All plant equipment responded as expected. The breaker failure was determined to be caused by a manufacturing defect in which the bushing between the linkage pin and the operating linkage was not installed. The breaker was a 362 kV Mitsubishi 300 SFMT 50E breaker. Inspections of other switchyard breakers identified no additional problems. The breaker was subsequently repaired. No issues were identified during this review.
- .5 (Closed) Licensee Event Report 50-499/2001-001: Manual reactor trip following inadvertent de-energization of two 13.8 kV buses. Unit 2 operators improperly executed an attempt to transfer two 13.8 kV buses from one offsite power transformer to another, de-energizing the buses. One train of ESF equipment lost power, and was re-energized from its standby diesel generator. Operators manually tripped the reactor in response to the loss of power to Reactor Coolant Pump 2A. The event was caused by operator error, lack of procedure guidance, time pressure to satisfy breaker interlocks, improper communications, and lack of effective supervision. This event was discussed in detail in Inspection Report 498/499;2001-04, and a noncited violation was identified for failure to provide adequate procedural steps to transfer offsite power sources. No additional issues were identified during the review of this licensee event report. Corrective actions were completed and appeared to be adequate to prevent recurrence.

4OA6 Meetings, including Exit

Exit Meeting Summary

The results of the access control to radiologically significant areas and performance indicator verification inspection were presented to Mr. J. Sheppard, Vice President, Engineering and Technical Support, and other members of licensee management at the conclusion of the inspection on October 19, 2001. The licensee acknowledged the findings presented.

The inspector presented the results of the in-office review of changes to the emergency plan and implementing procedures to Mr. C. Morgan, Supervisor, Emergency Response, and other members of licensee management during a telephonic exit meeting conducted on October 16, 2001. The licensee acknowledged the findings presented.

The results of the resident inspection were presented to Mr. W. Cottle, President and Chief Executive Officer, and other members of licensee management at the conclusion of the inspection on January 7, 2002. The licensee acknowledged the findings presented.

In each case, the inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

4OA7 Licensee Identified Violations

The following finding of very low significance was identified by the licensee and was a violation of NRC requirements which meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600 for being dispositioned as a noncited violation.

NCV Tracking Number

50-498;499/200106-03

Requirement Licensee Failed to Meet

Technical Specification 6.8.1 requires the implementation of procedures listed in Regulatory Guide 1.33, Appendix A. Section 4.4 of Plant General Procedure OPGP03-ZR-0051, "Radiological Access and Work Controls," Revision 14, requires radiation workers to review and comply with applicable radiation work permit [requirements]. On February 20, 2001, three workers entered an overhead area in the Unit 2 radiologically controlled area without contacting health physics personnel. On October 13, 2001, a worker entered a high radiation area in Unit 1 that was not authorized by the radiation work permit. These events are described in the licensee's corrective action program, reference Condition

Reports 01-2916 and 01-16500 (respectively).  
This is being treated as a noncited violation.

The safety significance of this finding was determined to be very low by the Occupational Radiation Safety Significance Determination Process because there was no actual over-exposure or substantial potential for an over-exposure, and the ability to assess dose was not compromised.

ATTACHMENT

Supplemental Information

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Berg, Manager Operating Experience Group  
K. Coates, Manager, Maintenance  
W. Cottle, President and Chief Executive Officer  
J. Crenshaw, Manager, Systems Engineering  
R. Gangluff, Manager, Chemistry  
C. Gann, Manager, Technical Training  
C. Grantom, Manager, Risk Management  
E. Halpin, Plant Manager  
A. Harrison, Licensing  
S. Head, Manager, Licensing  
T. Jordan, Manager, Engineering  
W. Jump, Manager, Projects  
A. Kent, Manager, Testing/Programs  
D. Leazar, Manager, Nuclear Fuel Analysis  
R. Lovell, Manager, Nuclear Training  
F. Mangan, Vice President, Business Services  
M. McBurnett, Director, Quality and Licensing  
C. Morgan, Supervisor, Emergency Response  
G. Parkey, Vice President, Generation  
T. Powell, Manager, Health Physics  
D. Rencurrel, Operations Department Manager  
K. Richards, Outage Director  
P. Serra, Manager, Plant Protection  
J. Sheppard, Vice President, Engineering and Plant Support  
S. Stillwell, Supervisor, Risk and Reliability  
S. Thomas, Manager, Plant Design Engineering  
D. Towler, Manager, Generation Quality  
T. Walker, Manager, Quality  
J. Wells, Outage Manager  
J. Winters, Maintenance Rule Coordinator

NRC

T. Pruitt, Senior Reactor Analyst, Region IV

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-498/2001-06-01	URI	Apparent violation of Appendix B, Criterion V for procedures inappropriate to the circumstances that led to failure of ECW Pump 1C (Section 40A3.1)
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50-498/2001-06-02	NCV	Additional example of failure to follow procedure violation identified in 50-498;499/2001-05 (Section 4OA3.2)
50-498;499/2001-06-03	NCV	Failure to follow radiation work permit requirements (Section 4OA7)
<u>Closed</u>		
50-498/2001-06-02	NCV	Additional example of failure to follow procedure violation identified in 50-498;499/2001-05 (Section 4OA3.2)
50-498;499/2001-06-03	NCV	Failure to follow radiation work permit requirements (Section 4OA7)
50-498/2001-001	LER	Essential Cooling Water Pump 1C failure following maintenance (Section 4OA3.3)
50-499/2001-002	LER	Manual reactor trip. During switchyard breaker manipulations, one phase pole for Breaker Y600 failed to close (Section 4OA3.4)
50-499/2001-001	LER	Manual reactor trip following inadvertent de-energization of two 13.8 kV buses (Section 4OA3.5)

#### LISTS OF ACRONYMS USED

ALARA	as low as reasonably achievable
CFR	Code of Federal Regulations
CR	condition report
ECW	essential cooling water
ESF	engineered safety feature
FOST	fuel oil storage tank
LER	licensee event report
LOOP	loss of offsite power
NCV	noncited violation
NEI	Nuclear Energy Institute
NOED	Notice of Enforcement Discretion
SDG	standby diesel generator
SDP	significance determination process
SSC	structure, system, or component
URI	unresolved item
WAN	work authorization number