

ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket Nos.: 50-498; 50-499
License Nos.: NPF-76; NPF-80
Report No.: 50-498/98-02; 50-499/98-02
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
Dates: January 12-15, 1998
Inspectors: Michael P. Shannon, Senior Radiation Specialist
Michael C. Hay, Radiation Specialist
Approved By: Blaine Murray, Chief
Plant Support Branch
Division of Reactor Safety
Attachment: Supplemental Information

EXECUTIVE SUMMARY

South Texas Project Electric Generating Station, Units 1 and 2
NRC Inspection Report 50-498/98-02; 50-499/98-02

This announced, routine inspection reviewed external exposure controls, internal exposure controls, dose assessment and dose records, controls of radioactive materials and contamination, staff training and qualification in radiological protection programs, and radiation protection quality assurance activities.

Operations

- Following an airborne radiation alarm in the Unit 1 reactor containment building, control room personnel failed to inform the health physics staff of the alarm in accordance with management expectations (Section R1.3).

Plant Support

- Overall, a good external exposure control program was in place; however, problems were identified with a prejob as low as is reasonably achievable (ALARA) briefing. High radiation area controls were effective (Section R1.1).
- Hot workkeeping within the radiological controlled areas of Unit 1 and 2 was very good (Section R1.1).
- Overall, a good internal exposure control program was implemented (Section R1.2).
- Overall, a good program was in place for calibration and response checking of station radiation survey meters. Effective controls were implemented to prevent the spread of contamination. All radioactive material was properly labeled and posted (Section R1.3).
- A violation was identified for the failure to survey for radioiodine airborne activity in the Unit 1 reactor containment building (Section R1.3).
- A non-cited violation was identified for the failure of workers to follow radiation work permit requirements (Section R1.3).
- A violation was identified for the failure to post the reactor cavity as an airborne radioactivity area (Section R1.3).
- A violation, with two examples, was identified for the failure to inform workers of changing radiological conditions (Section R1.3).
- Effective training programs were maintained for radiation protection technicians and radiation workers (Section R5.1).

Report Details

Summary of Plant Status

Both Units 1 and 2 operated at full power during the inspection period.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 External Exposure Controls

a. Inspection Scope (83750)

Selected radiation workers and radiation protection personnel involved in the external exposure control program were interviewed. Tours of the radiological controlled area were performed. The following items were reviewed:

- Radiological controlled area access controls
- Job coverage by radiation protection personnel
- Housekeeping within the radiological controlled area
- Dosimetry program

b. Observations and Findings

The inspectors conducted several tours of the radiological controlled area and performed independent radiation measurements to confirm the appropriateness of radiological postings. All Technical Specification high radiation areas were properly locked and posted. All workers observed in the radiological controlled area wore their dosimetry properly and knew to contact radiation protection personnel if their electronic dosimeters alarmed. Housekeeping throughout the radiological controlled area was very good.

The inspectors determined that job coverage provided by radiation protection technicians was appropriate for the radiological work observed. The inspectors attended a Unit 1 prejob ALARA briefing addressing entry into the reactor containment building during power to remove insulation from a valve. The inspectors observed a good exchange of information among the participants including: expected dose rates obtained from historical surveys; unexpected radiation levels that would warrant turning back; and proper handling, storage, and tagging of the insulation material following its removal. The health physics technician assigned to provide job coverage discussed the expected radiological conditions with the worker. The discussion also included a change in radiological conditions that would be present in approximately 2 days, when the valve was to be removed and the letdown heat exchanger was secured.

The inspectors commented that discussing future radiological conditions could lead to workers' confusion. This observation was similar to observations made in NRC Inspection Report 50-498/97-10; 50-499/97-10. Health physics management agreed that

further attention was needed to ensure that workers understood applicable radiological information.

A review of Radiation Work Permit 1998-1-0155, Revision 0, used for the above task identified that the radiological work area dose rates were listed as 50-60 millirems per hour. However, a review of the radiological survey information revealed work area dose rates were documented as 70-100 millirems per hour. The inspectors commented that providing radiological information on a radiation work permit that was not accurate could lead to workers' misunderstanding of the radiological conditions. Health physics management acknowledged the inspectors' comment.

Neutron Doses

The licensee stated that approximately 8 to 10 entries into the reactor containment building at power have been made weekly since 1994. The inspectors reviewed neutron doses for workers that entered containment at power between January 1991 - June 1996. The inspectors noted that the highest individual neutron dose was 100 millirem in a year. Extensive surveys of neutron exposure rates were conducted by the licensee in both Units reactor containment buildings at 100 percent reactor power to document neutron dose rates. The licensee informed the inspectors that the average neutron energy spectra encountered in the reactor containment at power were between 20 - 60 kilo-electron volts (keV).

The licensee currently process its dosimeters on site and was certified by the National Voluntary Laboratory Accreditation Program for all categories with the exception of category 1 which pertains to accident low energy photons. Neutron doses are based on use of correction factors that were developed using bonner sphere measurements to characterize the neutron fluence and energy spectra encountered in the reactor containment building during power. A two-chip lithium-6 dosimeter was used by the licensee for evaluating neutron doses to personnel. The inspectors concluded that the neutron personnel dosimeters would provide an accurate response to the neutron energies workers would encounter during containment entries.

c. Conclusions

Overall, a good external exposure control and dosimetry program was implemented. All Technical Specification required high radiation area doors were properly locked and posted. Housekeeping within the radiological controlled area was very good. All personnel observed wore their dosimetry properly. Prejob ALARA briefings were adequate.

R1.2 Internal Exposure Controls

a. Inspection Scope (83750)

Selected radiation protection personnel involved with the internal exposure control program were interviewed. The following items were reviewed:

- Respiratory protection program
- Whole-body counting program, including the calibration of the counter
- The internal dose assessment program

b. Observations and Findings

The inspectors were informed that no respirators had been issued for radiological protection since the previous inspection.

Whole body counters were verified to be calibrated using standards traceable to the National Institute of Standards and Technology (NIST). The inspectors noted that an acceptable phantom was used along with radiation sources that covered energy ranges between approximately 88 - 1836 keV. The inspectors concluded that a proper whole body calibration program was in place.

Internal dose assessments were reviewed. Both whole-body counting of individuals and estimates derived from average airborne concentrations of I-131 taken from air sampling data resulted in proper estimates of committed dose equivalent. Both techniques were compared by the inspectors and found in good agreement.

Upon review of air sample data for Unit 1 reactor containment building, the inspectors identified that an airborne radioactivity area greater than 0.25 derived air concentration (DAC) occurred on September 28, 1997, in the reactor cavity. However, the inspectors determined that no DAC-hour assessments were performed. The licensee initiated Condition Report 98-659 to evaluate the internal radiation exposure for personnel known to have been in the affected area during the event. See Section R1.3, "Unit 1 Reactor Cavity Event," for disposition of this matter.

c. Conclusions

Overall, a good internal exposure control program was implemented. Whole-body counters were properly calibrated. Internal dose estimates conducted by the licensee were properly performed.

R1.3 Control of Radioactive Materials and Contamination: Surveying and Monitoring

a. Inspection Scope (83750)

Areas reviewed included:

- Portable instrumentation calibration and performance checking programs
- Posting and labeling
- Radiological surveys necessary to assess personnel exposure
- Radiation Work Permits

b. Observations and Findings

The inspectors reviewed neutron survey meter instrumentation for proper calibration and energy response testing. A neutron spectrum analysis was performed using bonner sphere neutron spectroscopy in the reactor containment building at power. From these measurements correction factors were calculated. A review of calibration certification documents noted that the neutron survey meters were calibrated using a PuBe (plutonium-beryllium) source which was traceable to NIST. These meters were calibrated to exposure rates ranging from 2 millirems per hour through 200 millirems per hour that adequately covered the licensee's normal exposure rates of 20-60 millirems per hour encountered in the reactor containment building at power. The inspectors concluded that the licensee had implemented a proper neutron survey instrument calibration program.

During tours in the radiological controlled area, the inspectors noted that all portable radiation protection survey instrumentation observed was properly calibrated and source response checked.

Radioactive material observed was labeled and posted properly. Contamination boundaries were all marked and posted clearly.

Unit 1 Reactor Containment Building Airborne Event

The inspectors reviewed Condition Report 97-16562. This report documented a September 22-23, 1997, event in which the airborne concentration of radioiodine in Unit 1 reactor containment building increased above 0.25 DAC. Areas greater than 0.25 DAC are required by station procedures to be posted as an airborne radioactivity area. A time line describing the event follows:

September 22, 1997

- 12:30 p.m. Stopped surveying Unit 1 reactor containment building for airborne radioiodine activity
- 3:41 p.m. Unit 1 reactor containment building purge placed out-of-service for scheduled calibration

- 7:52 p.m. Unit 1 reactor containment building atmosphere monitor removed from service
- 8:08 p.m. Unit 1 reactor containment building chill water secured for open loop cooling water system outage
- 10:31 p.m. Contaminated Unit 1 reactor containment building worker alarmed personnel contamination monitor
- 11:00 p.m. Contaminated worker given whole body count, results indicated iodine radioactivity was present
- 11:40 p.m. Unit 1 health physics personnel received a reactor containment building atmosphere monitor alarm at the radiological access area

September 23, 1997

- 12:43 a.m. Unit 1 reactor containment building air sample revealed greater than 0.25 DAC (0.32 DAC), which required that the building be posted as an airborne radioactivity area
- 1:33 a.m. Unit 1 reactor containment building posted as an airborne radioactivity area
- 2:26 a.m. Unit 1 reactor containment building air sample less than 0.25 DAC (posting of airborne radioactivity area removed)

The licensee evaluation determined that the following factors contributed to the unexpected increase in radioiodine airborne concentration in Unit 1 reactor containment building: (1) it was known that minor fuel damage existed prior to outage 1REC7 as evidenced by noble gas, iodine, and cesium concentrations in the reactor coolant; (2) core alterations were in progress with the reactor cavity full of water; and (3) reactor containment building purge and chill water systems were out-of-service resulting in an increase in temperature and humidity. This increase in temperature and humidity within the Unit 1 reactor containment building caused an unexpected increase in radioiodine being carried out of solution from the reactor cavity and going airborne.

Failure to Inform Workers of a Change in Radiological Conditions

During review of Condition Report 97-16562, the inspectors noted that approximately 87 workers were in the reactor containment building on September 22-23, when airborne radiological conditions changed, thus requiring the building to be posted as an airborne radioactivity area. All workers were signed in on radiation work permits that stated, "No entry into posted airborne radioactivity areas (excluding noble gas)." The inspectors noted no actions were taken to inform the workers of the change in radiological conditions or posting. The licensee investigation revealed that the night shift health physics division manager provided instructions [to his staff] "not to stop work," even

though radiation work permits in use did not permit entry into posted airborne radioactivity areas. The licensee's investigation noted that the night shift health physics manager stated that his decision was based on his "assessment that the dose potential for workers due to the low concentration was minimal and that his experience led him to believe that subsequent confirmatory sampling in progress would show air concentrations below the criteria requiring posting."

10 CFR 19.12(a) states, in part, that all individuals, who in the course of employment, are likely to receive in a year an occupational dose in excess of 100 millirems shall be kept informed of the storage, transfer, or use of radiation and/or radioactive material. The inspectors concluded that workers in the Unit 1 reactor containment building on September 22-23, 1997, were likely to receive an occupational dose in excess of 100 millirems per year. The inspectors noted that a similar event occurred again on September 28, 1997, in the Unit 1 reactor cavity which is described on pages 11 and 12. Corrective actions to prevent a recurrence were identified in Condition Report 97-16562, action item No. 2. The inspectors noted that action item No. 2 required an evaluation of the "health physics response to posting Unit 1 reactor containment building as an airborne radioactivity area." The inspectors reviewed this investigation report, which was dated November 10, 1997, and noted that recommended corrective action No. 2, stated, "Evaluate current procedures to ensure appropriate methods are in place to both allow health physics to amend radiological controls in the field with appropriate evaluations/approvals and to communicate field changes to workers." However, the inspectors concluded that there were no immediate corrective actions that addressed the failure to inform the workers in the reactor containment building of a change in radiological conditions.

The inspectors concluded that corrective actions were not implemented within a reasonable time to prevent the second event which occurred on September 28, 1997. Therefore, this licensee identified event involving the failure to inform the workers of the presence of airborne radioactive material in excess of the station posting airborne threshold requirements, is being cited as the first example of a violation of 10 CFR 19.12 (a), because the criteria for exercise of discretion as described in Section VII.B.1 of the NRC's Enforcement Policy were not satisfied (50-498/ 02-01).

The licensee's position, as stated in the additional material provided to the inspectors on January 21, 1998, is that they do not believe the events involved a violation 10 CFR 19.12(b) because no new radiological health problems were introduced by the insignificant change in the Total Effective Dose Equivalent (TEDE) stemming from the airborne radioiodine. Specifically, the licensee stated that the airborne level change was minimal (adding only approximately 0.24 millirems per hour TEDE to a worker), and that workers in the area were informed, via radiological postings (radiation area), that conditions up to 100 millirems per hour TEDE could exist in the work area.

However, the inspectors noted that at the time the reactor containment building monitor alarmed at 11:40 p.m. on September 22, 1997, the potential radiological health protection problems were unknown. The fact that the change in radiological conditions was minimal was not known during the event. The inspectors concluded that conditions

were unknown for the following reasons: (1) sampling for radioiodine in containment had stopped at 12:30 p.m. on September 22, 1997, thus indicating that the health physics staff was not expecting a radioiodine airborne condition; (2) a review of the reactor containment building atmosphere monitor data for September 22, 1997, revealed that airborne radiological conditions were recorded as 2 DAC, and the health physics staff was not aware of this condition; (3) the health physics staff was not aware of an increasing trend in reactor containment building airborne condition that began when the reactor containment building purge system was placed out-of-service at approximately 4 p.m. on September 22, 1997; and (4) at 11 p.m. on September 22, 1997, the cause of a reactor containment building workers contamination alarm was determined to be radioiodine activity; however, the licensee took no actions to verify airborne conditions in the reactor containment building. Additionally, the health physics staff was not aware of the Unit 1 reactor containment building atmosphere monitor set point until the licensee's investigation of this event. The inspectors noted that the monitor was set to alarm at approximately 4 DAC.

Failure to Survey

On September 22, 1997, at 3:41 p.m., the licensee placed the reactor containment building purge system out of service for calibration. The inspectors reviewed the Unit 1 reactor containment building atmosphere monitor data and noted an increasing trend in radiological airborne conditions of $3.25\text{E-}10\text{uCi/cc}$ at 4 p.m. to $3.88\text{E-}8\text{uCi/cc}$ (approximately 2DAC) at 7 p.m. From interviews with health physics personnel, the inspectors determined that the licensee was not aware of this increasing trend during this time. At 7:52 p.m., the monitor was removed from service for a scheduled surveillance test. The health physics staff was not aware that the monitor was removed from service until the inspectors' review of this event on January 13, 1998. Additionally, once the airborne monitor was placed out-of-service, no radioiodine airborne surveys were performed until 12:15 a.m. on September 23, 1997, in response to the reactor containment building atmosphere monitor alarm. Subsequently, the first time that radioiodine air sampling was performed following the decision to stop air sampling at 12:30 p.m. on September 22, 1997, was at 12:15 a.m. on September 23, 1997, some 11 and 3/4 hours later.

During review of additional material provided to the inspectors on January 21, 1998, by the licensee, the inspectors noted that the licensee stated that they had identified the issue of failure to survey and were sampling the Unit 1 reactor containment building airborne radioactivity by using the reactor containment building atmosphere monitor. The inspectors agree that the atmosphere monitor was in service from the time the licensee stopped sampling for radioiodine airborne activity on September 22, 1997, at 12:30 p.m. until the time it was removed from service at 7:52 p.m. that same evening. However, there was no information provided to the inspectors to conclude that this airborne information was being evaluated in an effort to maintain an awareness of the airborne radiological conditions in the Unit 1 reactor containment building on September 22, at 12:30 p.m. until the monitor was removed from service. Additionally, a review of the reactor containment building atmosphere monitor data from 7 p.m. on September 22,

1997, revealed that airborne radiological conditions were recorded at 2 DAC, and no actions were taken by the licensee to verify this condition.

The licensee also stated that in the analysis section of Condition Report 97-16562: (1) item No. 1, identified that airborne radioiodine concentrations above the current thresholds for posting was projected by health physics prior to the outage. However, the information was not synthesized into outage radiation work permits; (2) item No. 2, stated that, the alert alarm set point for RE80111B at approximately 4 DAC was too insensitive to provide meaningful warning of increasing reactor containment building radioiodine concentrations; and (3) item No. 5, stated that, the decision to cease air iodine grab sampling removed air sampling as a method for early warning of increasing air iodine concentrations.

The inspectors noted that although the licensee projected the airborne radioiodine concentrations prior to the outage, it did not relieve the licensee of the requirement to evaluate the potential radiological hazards that could be present during the time that work was being performed in a radiological controlled area. Additionally, the inspectors noted that corrective action No. 8 of Condition Report 97-16562 stated "develop guidance for adjusting radiation monitoring system alarm set points to account for changing plant conditions, outage periods should be especially reviewed to ensure that adequate warning of changing conditions is provided when compared to normal plant conditions." However, there were no actions identified to perform or evaluate surveys after the atmosphere monitor was removed from service to ensure compliance with station procedures or 10 CFR 20.1501(a) requirements.

Technical Specification 6.11.1 states, in part, that procedures for personnel radiation protection shall be prepared consistent with the requirements of 10 CFR Part 20 and shall be approved, maintained, and adhered to for all operations involving personnel radiation exposure.

10 CFR 20.1501(a) states, in part, ". . . that each licensee shall make or cause to be made, surveys that: (1) May be necessary for the licensee to comply with the regulations in this part; and (2) Are reasonable under the circumstances to evaluate - (ii) concentrations or quantities of radioactive material; and (iii) The potential radiological hazards that could be present."

Section 4.6.4 of Radiation Protection Procedure OPGP03-ZR-0050, "Radiation Protection Program," Revision 1, states, in part, that, "Job coverage, or specific surveys, shall be of the type and frequency . . . to assess the extent of . . . concentrations of radioactive materials and the potential radiological hazards to which workers may be exposed."

The inspectors concluded that specific corrective actions were not completely identified to address the entire event. Therefore, this licensee identified event involving the failure to survey for radioiodine from 3:41 p.m. on September 22, 1997, until 12:15 a.m. on September 23, 1997, to determine the concentrations of radioactive material and the potential radiological hazards present in the Unit 1 reactor containment building is being

cited as a violation of Technical Specification 6.11.1, because the criteria for exercise of discretion as described in Section VII.B.1 of the NRC's Enforcement Policy was not satisfied (50-498/9802-02).

Failure to Follow Radiation Work Permit Instructions

During the review of Condition Report 97-16562, the inspectors noted that on September 23, 1997, the Unit 1 Reactor Containment Building was posted as an "Airborne Radioactivity Area" from 1:33 a.m. until 2:26 a.m. During discussions with health physics staff, the inspectors were informed that between 1:33 a.m. and 2:26 a.m., approximately 24 workers entered the reactor containment building, a posted airborne radioactivity area, using radiation work permits that did not allow entry into this area. A review of the corrective actions identified that prior to the next refueling outage, this event would be highlighted during the training cycle, and means to physically deter workers from entering an area where radiological conditions have changed would be evaluated. The inspectors concluded that these corrective actions would likely prevent a similar occurrence.

Technical Specification 6.8.1 a states, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978. Regulatory Guide 1.33, Appendix A, Section 7.e.1, recommends procedures for the radiation work permit system.

Radiation Protection Procedure OPGP03-ZR-0051, "Radiological Access and Work Controls," Revision 7, Section 5.3.3, states, in part, "RWP (Radiation Work Permit) instructions, radiological postings and barriers, . . . shall be adhered to at all times."

The failure to follow the airborne restrictions on the radiation work permits is identified as a violation of Technical Specification 6.8.1. However, this nonrepetitive licensee-identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII. B.1 of the NRC Enforcement Policy (50-498/9802-03).

As discussed previously, during review of the airborne event on September 22, 1997, the inspectors noted that a radiation monitor alarm for Unit 1 reactor containment was received in the Unit 1 control room; however, no response actions were documented by the control room staff. In discussions with the Unit 1 operations manager, the inspectors were informed that if an alarm is expected, documentation was not required. However, the inspectors were informed by operations management that it was management's expectation that this alarm should have been communicated to the health physics staff. Operations management stated that they would review the circumstances of this event to improve future communications between operations and health physics staff.

Unit 1 Reactor Cavity Event

The inspectors reviewed Unit 1 reactor cavity air sample data and identified that on September 28, 1997, at 11:07 p.m. air sample results indicated that airborne radiological

activity was 1.5 DAC. During discussion with the health physics staff, the inspectors noted that the health physics division manager was not aware of this event until it was identified by the inspectors, on January 13, 1998. On January 14, 1998, the licensee documented the event in Condition Report 98-659. The inspectors interviewed the acting health physics supervisor who was involved in this event to gain an understanding of the circumstances surrounding it. The supervisor informed the inspectors that he was confused by the fact that the 1.5 DAC air sample was just radioiodine activity and not a mixture of isotopes. The inspectors were informed that no actions were taken to inform the workers of the change in radiological conditions because it was the acting health physics supervisor's opinion that a backup air sample would result in an airborne radioactivity concentration below the procedural posting limit (<0.25DAC). The inspectors questioned the fact that if radioiodine was not expected by the acting health physics supervisor did he have a complete understanding of the event. The inspectors noted that the backup air sample results taken at 11:45 p.m. on September 28, 1997, were less than 0.25 DAC. The inspectors review of the radiological survey data concluded that workers in the Unit 1 reactor cavity on September 28, 1997, were likely to receive an occupational dose in excess of 100 millirems per year.

A review of Radiation Work Permit 1997-1-0261, Revision 0, which was used for reactor cavity decontamination revealed that it stated, "No entry into posted airborne radioactivity areas (excluding noble gas)." The failure to inform the workers of the presence of airborne radioactive material in excess of the station posting airborne threshold on September 28, 1997, is a second example of a violation of 10 CFR 19.12(a) (50-498/9802-01).

The inspectors reviewed radiological postings concerning the September 28, 1997, event and identified that from 11:07 p.m. to 11:45 p.m. on September 28, 1997, air sample data revealed that airborne concentration in the Unit 1 reactor cavity area was 1.5 DAC.

Technical Specification 6.8.1.a states, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978. Regulatory Guide 1.33, Appendix A, Section 7.e.3, recommends procedures for airborne radioactivity monitoring.

Radiation Protection Procedure OPRP04-ZR-0015, "Radiological Posting and Warning Devices," Revision 3, Section 2.2 states, in part, "STP (South Texas Projects) will post airborne radioactivity areas at 0.25 DAC or greater."

The failure to post the reactor cavity as an airborne radioactivity area on September 28, 1997, from 11:07 p.m. until 11:45 p.m., in accordance with Procedure OPRP04-ZR-0015, Revision 3, is a violation of Technical Specification 6.8.1 (50-498/9802-04).

c. Conclusions

A good program was in place for proper calibration and response checking radiation survey meters. Radioactive material was properly labeled and posted. Violations were

identified for the failure to: (1) perform a radiological survey; (2) post the reactor cavity as an airborne radioactivity area; and (3) inform workers of changing radiological conditions. A non-cited violation was identified for the failure to follow radiation work permit airborne restrictions.

R5 Staff Training and Qualification in Radiological Protection

R5.1 Staff Training and Qualifications

a. Inspection Scope (83750)

Personnel involved with radiation protection technician and radiation worker training were interviewed. The following items were reviewed:

- Radiation protection technician continuing training lesson plans
- Radiation worker required training

b. Observations and Findings

The inspectors interviewed an instructor responsible for the development of radiation protection technician continuing training lesson plans. The inspectors were informed that performance issues identified by the condition reporting system, along with health physics management input, were useful in determining objectives for upcoming continuing training. The inspectors reviewed the latest radiation protection technician lesson plan and noted that it contained appropriate subject information.

The inspectors reviewed the training requirements for radiation workers requiring unescorted access to the radiological controlled area. Procedure 0PRP01-ZR-0005, "Access Control Point Management," Revision 2, Section 4.1.2, requires that all persons requiring unescorted access to the radiological controlled area shall have current GET II training. The training records for five radiation workers who performed cavity decontamination during the Unit 1 Outage 1RE07 were reviewed. The licensee's documentation verified that each worker was properly trained.

c. Conclusions

The licensee had implemented effective training programs for radiation protection technicians and radiation workers.

R7 Quality Assurance in Radiological Protection and Chemistry Activities

R7.1 Quality Assurance Audits and Surveillances, and Health Physics Division Self-Assessments.

a. Inspection Scope (83750)

Selected personnel involved with the performance of quality assurance audits and surveillances, and radiation department self-assessments were interviewed. The following items were reviewed:

- Quality assurance audits performed since August 1997
- Quality assurance surveillances performed since August 1997
- Health Physics division self-assessments performed since August 1997

b. Observations and Findings

No quality assurance audits or surveillances had been performed since the last radiation protection inspection in August 1997. Additionally, the inspectors noted that the last operational based health physics self-assessment was performed in April 1997.

The inspectors reviewed 17 quality assurance monitoring reports (observations) and noted no negative trends.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at an exit meeting on January 15, 1998. The licensee acknowledged the findings presented. The licensee stated that they did not agree with the potential violation pertaining to failure to inform the workers when radiological conditions changed because the actual change in radiological conditions did not constitute a substantial increase to the workers TEDE. No proprietary information was identified.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Groth, Vice President, Nuclear Engineering
R. Aguilera, Radiation Protection Supervisor
J. Alessi, Sr. Health Physicist Technician
P. Arington, Licensing Engineer
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S.C. Horak, Sr. Health Physicist Technician
D. Huberak, Health Physics Technician
J. Inman, Health Physicist
R. Logan, Health Physics Division Manager
J. Lovell, Manager, Unit 1 Operations
R.E. Masse, Unit 2 Plant Manager
J. Sepulveda, Radiation Protection Supervisor
S. Smith, QA Specialist

NRC

W. Sifre, Resident Inspector

INSPECTION PROCEDURE USED

83750 Occupational Radiation Exposure

LIST OF ITEMS OPENED AND CLOSED

Opened

50-498/9802-01	VIO	Failure to inform workers of a change in radiological conditions
50-498/9802-02	VIO	Failure to survey
50-498/9802-04	VIO	Failure to post and airborne radioactivity area

Opened and Closed

50-498/9802-03	NCV	Failure to follow RWP requirements
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LIST OF DOCUMENTS REVIEWED

- Procedure 0PGP03ZR0048, "Personnel Dosimetry Program," Revision 2
- Procedure 0PGP03ZR0050, "Radiation Protection Program," Revision 1
- Procedure 0PRP02ZR0007, "Evaluation of Intakes," Revision 2
- Procedure 0PRP02ZR0010, "Personnel Exposure Investigation," Revision 3
- Procedure 0PRP02ZR0011, "Calibration of WBC System," Revision 0
- Procedure 0PRP02ZX0022, "Non-Routine Dosimetry Issue and Control, Revision 5
- Procedure 0PRP04ZR0004, "Release of Materials From Radiologically Controlled Areas,"
Revision 1
- Procedure 0PRP04ZR0013, "Radiological Survey Program," Revision 4
- Procedure 0PRP07ZR0010, "Radiation Work Permits," Revision 4

ENCLOSURE 3

January 21, 1998

To: M. A. McBurnett

From:  R. V. Logan

Subject: STP Notes on Potential Violations Identified in NRC Inspection
98-2 Radiation Protection Program

The following is our analysis of the potential violations identified in the NRC Exit Meeting on January 15th. We believe that the potential violation related to notification of individuals required by Part 19.12 is not valid. We believe that we have previously identified, with corrective action in progress, the potential violations relative to the entry into a posted airborne area without the proper RWP and relative to the failure to perform a survey. Additionally, we would like to ensure the circumstances relative to the failure to post an airborne area are clearly understood. Accordingly, the following describes our position on each of the Potential violations.

Summary of potential violation

10CFR19.12(a)(1) states: "All individuals who in the course of employment are likely to receive in a year an occupational dose in excess of 100 mrem (1 mSv) shall be kept informed of the storage, transfer, or use of radiation and/or radioactive material."

Contrary to the requirements of 10CFR19.12(a)(1) STP failed to keep workers informed of a change as required on two occasions. The first occasion occurred on 09/22/97 when workers were not notified when measured airborne radio-iodine levels were verified to be 0.32 DAC in the reactor containment building. The second occasion occurred on 09/27/97 when workers in the reactor cavity were not informed of measured radio-iodine levels at 1.5 DAC. In neither case was entry into posted airborne radioactivity areas allowed under the radiation work permits in use. The failure to notify the affected individuals that the instructions previously given, by radiation work permit, were no longer applicable constitutes a failure to properly inform workers.

Position

South Texas Project does not believe that the events described represent a violation of NRC Requirements.

10CFR19.12(b) states "In determining those individuals subject to the requirements of paragraph (a) of this section, the licensee must take into consideration assigned activities during normal and abnormal situations involving exposure to radiation and/or radioactive material which can reasonably be expected to occur during the life of a licensed facility. The extent of these instructions must be commensurate with the potential radiological health protection problems present in the work place."

It is clear (by direct reference) that section 19.12(b) qualifies the preceding section (a) by describing:

- (i) Who must receive the information in section (a)
- (ii) To what extent these instructions must be made available, based on the potential radiological health protection problems present.

While not explicitly stated, the potential radiological health protection problems referenced in section 19.12(b) for a power reactor facility can be assumed to stem from the total effective dose equivalent (TEDE), found by summing the committed effective dose equivalent (CEDE) and deep dose equivalent (DDE) for the exposure involved.

In the first occasion cited above, an airborne level of 0.52 DAC equates to an approximately equivalent change of 0.24 mrem/hr TEDE. Workers in the area were informed, via radiological postings, that conditions up to 100 mrem/hr TEDE could exist in the work area. During interviews conducted for this investigation the night shift Health Physics Manager indicated that this decision was based on his assessment that the dose potential for workers due to this low concentration was minimal and that his experience led him to believe that subsequent confirmatory sampling in progress would show air concentration below the criteria requiring posting. He stated that he had considered a plant page announcement informing workers of the airborne radioactivity but rejected this as he believed that the message would not be clearly understood and potentially cause undue concern. Additionally, he indicated that he rejected the idea of using the containment evacuation alarm as he felt this would result in undue panic on the part of workers resulting in potential personnel injury. In direct questioning regarding the extent to which he felt schedule pressure may have influenced his decisions, the night shift Health Physics Manager indicated that his understanding of the minimal exposure potential that the airborne condition represented and his concern for not creating undue worker concern and confusion lead to these decisions.

We believe that no new potential radiological health protection problems were introduced by this insignificant change in the TEDE as a result of the presence of an additional 0.24 mrem/hr in the area. Consequently, we have met our duty to keep workers informed as required by 19.12(a)(1) through the initial instructions provided to the workers.

In the second occasion cited above, an airborne level of 1.5 DAC equates to an approximate change of 1.13 mrem/hr TEDE. Workers in the area were informed, via radiological postings, that conditions up to 1000 mrem/hr TEDE could exist in the work area. Discussions with the Health Physics personnel in the area has revealed that they considered the need to pull the individuals out of the area due to the measurement obtained. However, they believed that this would have resulted in higher total exposures to the workers due to the need to traverse the area to exit and subsequently re-enter the

area upon completion of the verification sample. While our full investigation of this occurrence is not yet complete, the Health Physics personnel have stated that they had the best interest and safety of the workers at the forefront during the event.

We believe that that no new potential radiological health protection problems were introduced by this insignificant change in the TEDE as a result of the presence of an additional 1.13 mrem/hr in the area. Consequently, we have met our duty to keep workers informed as required by 19.12(a)(1) through the initial instructions provided to the workers.

Summary of violation

Workers failed to heed radiological airborne postings thus violating their radiation work permits and procedures OPGP03-ZR-0050 and OPGP03-ZR-0051. On 09/23/97 approximately 24 workers failed to adhere to station procedures governing radiation work permits in that they entered a posted airborne radioactivity area when prohibited to do so by instructions on their radiation work permit.

Position

STP concurs that these violations occurred; however, these occurrences were self-identified through condition report 97-16562 under the analysis section, item #8, "Workers entering the containment on RWPs after 0133 and before 0226 failed to observe the change in postings and thus failed to comply with their RWPs and with several procedure steps requiring RWP compliance." While our initial corrective actions should be effective in minimizing the recurrence of similar events in the future, additional measures were recommended to help institutionalize the change. These suggestions have been included for consideration to help prevent recurrence.

Corrective actions from the condition report.

- C5 - Include this event in general employee training industry events. This should be timed to ensure that the majority of STPNOC employees review this topic during requal prior to the next outage and contractors coming in for the next outage are also presented this material.
- C6 - Include a summary of this event in the outage focus day for 2RE06.
- C1 - Consider a means to physically deter workers from entering an area where radiological conditions have changed which may require new radiological work permit instructions.

Summary of violation

10CFR20.1501(a) states: "Each licensee shall make or cause to be made, surveys that (1) may be necessary for the licensee to comply with the regulations in this part; and (2) are reasonable under the circumstances to evaluate (i) the extent of the radiation levels; and (ii) concentrations or quantities of radioactive materials; and (iii) the potential hazards that could be present."

On 09/22/97 the licensee failed to perform the required airborne radioactivity surveys to identify the presence of airborne radio-iodine in concentrations up to 2.0 DAC.

Position

STP concurs that we did not adequately comply with 10CFR20.1501; however, this issue was self-identified and is appropriately covered in our actions completed under Condition Report condition report 97-16562.

A survey, as defined in 10CFR20.1003 means "an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation. When appropriate, such an evaluation includes a physical survey of the location of the radioactive material and measurements or calculations of levels of radiation, or concentrations or quantities of radioactive material present."

While a survey was performed prior to the outage, and continuous measurements were being obtained by plant monitoring instruments (RE8011B - During the investigation this instrument was used to calculate the maximum concentration present in the work place during the event), the staff failed to utilize these surveys appropriately. This was identified in the analysis section of condition report 97-16562, item #1, "Airborne radio-iodine concentrations above the current thresholds for posting was projected by health physics prior to the outage. This information was not synthesized into outage RWPs.", item #3, "The alert alarm set point for RE8011B at approximately 4 DAC was too insensitive to provide meaningful warning of increasing RCB radio-iodine concentrations." and , item #6, "The decision to cease air iodine grab sampling removed air sampling as a method for early warning of increasing air iodine concentrations."

Corrective actions from the condition report -

- C7 - Include a discussion of this event and subsequent programmatic changes which have occurred in Health Physics continuing training prior to 2RE06.

- C8 - Develop guidance for adjusting radiation monitoring system alarm set points to account for changing plant conditions. Outage periods should be especially reviewed to ensure that adequate warning of changing conditions is provided when compared to normal plant operations.

Summary of potential violation

Health Physics failed to properly post an airborne area as required by station procedures.

During Unit 1's seventh refueling outage, Health Physics failed to post the reactor cavity as an airborne radioactivity area as required by station procedures. Air sampling during cavity decontamination activities identified radio-iodine concentrations of up to 1.5 DAC in the work area. No action was taken by Health Physics personnel present in the area to post the area as airborne radioactivity area.

Position

STP concurs that the violation occurred. The individual involved was aware that the previous air samples taken in the area indicated less than 0.25 DAC and fully believed that the sample indicating 1.5 DAC was cross contaminated and invalid. He elected to obtain another air sample in the work area prior to posting the area. The back up air sample identified concentrations below 0.25 DAC which the individual believed justified taking no action prior to obtaining the confirmatory air sample. A full investigation is being performed under condition report 98-0659. A full root cause investigation into the event is expected to be completed by 1/26/98 with appropriate corrective actions identified.