

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

NRC Inspection Report: 50-482/90-07

Operating License: NPF-42

Docket: 50-482

Licensee: Wolf Creek Nuclear Operating Corporation (WCNOC)  
P.O. Box 411  
Burlington, Kansas 66839

Facility Name: Wolf Creek Generating Station (WCGS)

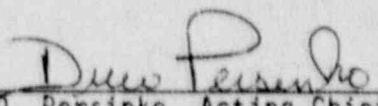
Inspection At: WCGS, Coffey County, Burlington, Kansas

Inspection Conducted: March 1-31, 1990

Inspectors: M. E. Skow, Senior Resident Inspector  
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Approved:

  
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Division of Reactor Projects

4/6/90  
Date

Inspection Summary

Inspection Conducted March 1-31, 1990 (Report 50-482/90-07)

Areas Inspected: Routine, unannounced inspection including plant status, onsite followup of events at operating power reactors, operational safety verification, monthly surveillance observation, monthly maintenance observation, refueling activities, spent fuel pool activities, preparation for refueling, review of licensee event reports, and followup on previously identified NRC items.

Results: There were three occasions where inattention to procedures had the potential for serious consequences. One occasion, where workers performing local leak rate testing (LLRT) failed to follow procedure, led directly to the contamination of three workers. This was a noncited violation (paragraph 5). The other two occurrences included shutting off the reactor cavity fan while reactor coolant temperature was greater than 135°F and taking both centrifugal charging pumps out of service (paragraph 4). While inappropriate, the actions did not cause immediate risk. At the end of the inspection period, the operators moved the spent fuel pool bridge crane while it was still engaged

with a control rod assembly in a test location. Pending completion of the inspector's review of the event, this is an unresolved item (paragraph 8). The licensee has found degradation of a containment cooler and a diesel generator (DG) intercooler (paragraph 6).

## DETAILS

### 1. Persons Contacted

#### Principal Licensee Personnel

B. Withers, President and CEO  
 \*J. A. Bailey, Vice President, Operations  
 \*F. T. Rhodes, Vice President, Engineering and Technical Services  
 G. D. Boyer, Plant Manager  
 \*R. S. Benedict, Manager, Quality Control (QC)  
 \*H. K. Chernoff, Supervisor, Licensing  
 \*R. D. Flannigan, Manager, Nuclear Safety Engineering (NSE)  
 \*J. E. Fletcher, Maintenance Engineering  
 \*T. L. Foster, Manager, Modifications  
 \*C. W. Fowler, Manager, Instrumentation and Control (I&C)  
 \*J. F. Hall, Supervisor, QC  
 \*R. W. Holloway, Manager, Maintenance and Modifications  
 \*W. M. Lindsay, Manager, QA  
 \*R. C. Logsdon, Manager, Chemistry  
 \*D. G. Mosebey, Supervisor, Operations  
 W. B. Norton, Manager, Technical Support  
 \*C. E. Parry, Manager, QA, WCGS  
 \*J. M. Pippin, Manager, Nuclear Plant Engineering (NPE)  
 \*C. Sprout, Section Manager, NPE, WCGS  
 \*H. L. Stubby, Supervisor, Technical Training  
 \*J. Weeks, Operations Manager  
 \*S. G. Wideman, Licensing Specialist III  
 \*M. G. Williams, Manager, Plant Support

The inspectors also contacted other members of the licensee's staff during the inspection period to discuss identified issues.

\*Denotes those personnel in attendance at the exit meeting held on March 30, 1990.

### 2. Plant Status

The plant operated in Mode 1 (96 percent reactor thermal power) at the beginning of the inspection period due to "B" train feedwater heaters being isolated. On March 2, 1990 (CST), the plant entered coastdown to the refueling outage. On March 8, 1990, shutdown was commenced and at 12:27 a.m. on March 9, 1990, the operators opened the generator output breakers to begin the unit's fifth refueling outage. The plant remained shut down for the remainder of the inspection period. There were no reactor trips or unplanned turbine trips.

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

The purpose of this inspection activity was to provide onsite inspection of events at operating power reactors. Specific inspection activities included:

- o Observing plant status;
- o Evaluating the significance of the events, performance of safety systems, and actions taken by the licensee;
- o Confirming that the licensee had made proper notification of the events and of any new developments or significant changes in plant conditions, and
- o Evaluating the need for further or continued NRC response to the events.

The following items were considered during the followup:

- o Details regarding the cause of the event,
- o Event chronology,
- o Functioning of safety systems as required by plant conditions,
- o Radiological consequences and personnel exposure,
- o Proposed licensee actions to correct the cause of the event, and
- o Corrective actions taken or planned prior to resumption of facility operations.

A selected event requiring a licensee event report (LER) that occurred during this report period is listed in the table below:

<u>Date</u>	<u>Event</u>	<u>Plant Status</u>	<u>Cause</u>
3/20/90	CPIS/CRVIS*	Mode 6 (Shutdown, refueling)	High gas activity in pressurizer relief tank

CRVIS - Control room ventilation isolation system actuation

CPIS - Containment purge isolation system actuation

Selected inspector observations regarding the event is discussed below:

On March 20, 1990, at 2:29 a.m., operators started a containment purge. High radiation levels were detected by the vent radiation monitors which isolated the containment purge and the control room ventilation.



The high radiation was due to gas in the purge line from the pressurizer relief tank which was used earlier to vent the reactor coolant system (RCS). The system operated properly to isolate the containment purge and prevent the release of the unanticipated gas from the pressurizer relief tank.

The inspector will review the LER for the event and will report any findings in a subsequent inspection report.

#### 4. Operational Safety Verification (71707)

The purpose of this inspection was to ensure that the facility was being operated safely and in conformance with license and regulatory requirements. It also was to ensure that the licensee's management control system was effectively discharging its responsibilities for continued safe operation. The methods used to perform this inspection included direct observation of activities and equipment, tours of the facility, interviews and discussions with licensee personnel, independent verification of safety system status and limiting conditions for operation (LCO), corrective actions, and review of facility records.

Areas reviewed during this inspection included, but were not limited to, control room activities, routine surveillances, engineered safety feature operability, radiation protection controls, fire protection, security, plant cleanliness, instrumentation and alarms, deficiency reports, and corrective actions. Selected inspector observations are discussed below:

- o The inspector observed the plant shutdown. The operators followed approved procedures to perform a controlled shutdown of the plant. Additional offshift relief crew operators were available to assist the onshift crew. Operators performed their duties in a professional manner.
- o On March 10, 1990, operators shut off the cavity cooling fan while RCS temperature was about 160°F. Procedure GEN 00-006, Revision 14, "Hot Standby to Cold Shutdown," precaution and limitation Step 2.2.5, states that one of the reactor cavity cooling fans must be in service when RCS temperature is greater than 135°F. A cavity cooling fan was started when the error was discovered by the licensee. This did not appear to be an immediate operational concern. Section 3.8.3.4.2 of the Updated Safety Analysis Report (USAR) states that a cooling system is provided on the inside face of the primary shield wall and reactor cavity to reduce the temperature gradient through the concrete by limiting the temperature at the inside concrete face of the wall to 150°F. The licensee submitted an engineering evaluation request to evaluate the event.
- o On March 12, 1990, the "A" centrifugal charging pump (CCP) was out of service for testing (discussed in paragraph 5) when the control switch for the "B" CCP was placed in pull-to-lock to put the positive displacement pump in service. Technical Specification (TS) 3.1.2.3 required that one CCP be available as part of a boron injection path

or suspend adding positive reactivity. This condition lasted from 4:05 a.m. to 11:45 a.m. when the operators recognized the condition and restored one CCP to operable. During that period, there was no addition of positive reactivity to the reactor.

- o On March 20, 1990, the operators raised the water level in the refueling cavity in the containment building and the transfer canal in the fuel building. The two pools are connected by a fuel transfer tube that is near the bottom of the pools. When the CPIS occurred, as discussed in paragraph 3, the isolated containment atmosphere began to become pressurized relative to the fuel building. One reason for the pressurization was that, as water level in the refueling cavity was increased, the atmosphere in containment was compressed. As the refueling cavity water level increased, the pressure differential approached about 18 inches of water. That meant that the water level in the transfer canal was about 18 inches higher than the level in the refueling cavity and, had fill continued, the water in the transfer canal could have overflowed. Operators were monitoring the water level only in the containment building. The control room operators recognized the pressure increase in containment and stopped filling the pools before an overflow could occur. The inspector noted that the procedure used, SYS EJ-110, Revision 7, "RHR System Fill and Vent Including RCS Fill," did not have a precaution concerning the potential for, and effect of, a differential pressure between the buildings. This was discussed with the licensee.

#### 5. Monthly Surveillance Observation (61726)

The purpose of this inspection was to ascertain whether surveillance of safety-significant systems and components was being conducted in accordance with TS. Methods used to perform this inspection included direct observation of licensee activities and review of records.

Items inspected in this area included, but were not limited to, verification that:

- o Testing was accomplished by qualified personnel in accordance with an approved test procedure,
- o The surveillance procedure was in conformance with TS requirements,
- o The operating system and test instrumentation was within its current calibration cycle,
- o Required administrative approvals and clearances were obtained prior to initiating the test,
- o LCOs were met and the system was properly returned to service, and
- o The test data were accurate and complete and the test results met TS requirements.

Surveillances witnessed and/or reviewed by the inspectors are listed below:

- o STS MT-008, Revision 2, "Main Steam Safety Valve Settings," performed March 3, 1990, and
- o STS KJ-005B, Revision 12, "Manual/Auto Start, Synchronization, and Loading of Emergency Diesel Generator NE02," performed March 25, 1990.

Selected inspector observations are discussed below:

- o On March 12, 1990, the licensee performed STS KJ-001A. This test verifies that the essential loads will shed from the dead bus, the DG will start, and the essential loads will be sequenced back onto the bus. The "A" safety injection (SI) pump did not start automatically. The operators placed the switch in pull-to-lock while the breakers were checked locally. No problems were found. The operators returned the switch for the SI pump to the auto position and the pump started. The licensee is working to resolve the failure of the pump to start under Work Request (WR) 01239-90.
- o On March 23, 1990, at approximately 12 noon, the licensee was performing LLRT STS PE-17 and LLRT Valve Lineup CKL PE-023 on the chemical and volume control system letdown line in Penetration 23. About 48 pounds per square inch (psi) air was applied to the letdown line inside containment up to the inside containment isolation valve, BG HV-8160. The individuals performing the test directed the control room operators to shut the outside containment isolation valve, BG HV-8152, and then open BG HV-8160 to pressurize up to BG HV-8152. However, they neglected to shut the two valves, BG-V363 and BG-V364, on the drain line between the isolation valves. They also did not verify shut two other vent and drain valves that had been shut earlier in the procedure. These actions were required by Step 4.3.2 prior to opening BG HV-8160. As a result, air and moisture were blown from the drain causing contamination of three workers in the south mechanical penetration room of the auxiliary building. Spread of contamination was limited to that room. The individuals and the area of the spill were decontaminated. The dose received by the workers was well within the limits of 10 CFR 20, therefore, the event was not reportable in accordance with 10 CFR 50.72 or -50.73 to the NRC by the licensee. The cause of the spill was the failure of the test performers to follow procedure. This is a violation (482/9007-01). The violation is not cited because it is of minor safety concern, was corrected by the licensee, and meets the criteria specified in Section V.G of the General Statement of Policy and Procedure for NRC Enforcement Actions. No written response to this violation is required. This noncited violation is closed.

#### 6. Monthly Maintenance Observation (62703)

The purpose of inspections in this area was to ascertain that maintenance activities on safety-related systems and components were conducted in



accordance with approved procedures and TS. Methods used in this inspection included direct observation, personnel interviews, and records review.

Items verified in this inspection included:

- o Activities did not violate limiting conditions for operation and that redundant components were operable;
- o Required administrative approvals and clearances were obtained before initiating work;
- o Radiological controls were properly implemented;
- o Fire prevention controls were implemented;
- o Required alignments and surveillances to verify postmaintenance operability were performed;
- o Replacement parts and materials used were properly certified;
- o Craftsmen were qualified to accomplish the designated task and additional technical expertise was made available when needed;
- o QC hold points and/or checklists were used and QC personnel observed designated work activities; and
- o Procedures used were adequate, approved, and up to date.

Portions of selected maintenance activities regarding the WRs were observed. The following WRs and related documents were reviewed by the inspectors:

<u>No.</u>	<u>Activity</u>
WR 05182-89	Install orifice flanges and plates in service water lines for PMR 02149
WR 04754-90	Implement wiring changes for PMR 02073
WR 01561-90	Hydrostatic test of SGN01D containment cooler

Selected inspector observations are discussed below:

- o During maintenance on the "A" DG water jacket intercooler, the licensee found that it had developed tube leaks that required the complete retubing of the cooler. The cooling water for the coolers is from the essential service water system.



- o During maintenance activities on the "A" containment cooler, the licensee found that 11 of 12 sections had leaks. One section the licensee expects to repair in place; the other sections required removal for repair or replacement. The cooling water for the containment coolers is also from the essential service water system.

The licensee has had other coolers that required repair. In NRC Inspection Report 50-482/89-16, Unresolved Item 482/8916-01 discussed tube and tube sheet repair to Safety-Related Chillers SGK04A and -B and SGK05A and -B. The cooler problems recently discovered appear similar to those discovered last year. The licensee is continuing to evaluate the root cause of the cooler problems that they have encountered.

No violations or deviations were identified.

## 7. Refueling Activities (60710)

The purpose of this inspection area was to ascertain whether refueling activities were being controlled and conducted as required by TS and approved procedures. The NRC inspector observed portions of fuel load from the fuel building, control room, and containment. Items inspected included:

- o Fuel handling operations and other ongoing activities were performed in accordance with TS and approved procedures,
- o Plant conditions were maintained as required by TS,
- o Good housekeeping and loose object control were maintained in the refueling and spent fuel areas,
- c Licensee staffing was in accordance with TS and approved procedures, and
- o Periodic testing and verification of the operability of refueling related equipment and systems was performed as required by TS and approved procedures.

The inspector observed defueling operations and activities in the containment building. The licensee maintained proper control of the fuel movement. Health physics and housekeeping activities appeared adequate.

The licensee performed a sludge lance of each steam generator. A total of approximately 180 pounds of material was removed from the steam generators. This compares with a total of about 40 pounds of material removed during the previous refueling outage.

No violations or deviations were noted.

## 8. Spent Fuel Pool Activities (86700)

The purpose of this portion of the inspection was to ascertain that the licensee's spent fuel handling activities were in conformance with TS and 10 CFR. Methods used to perform this inspection activity included procedure review and direct observation of fuel pool activities and operations. The following procedures were reviewed:

Attributes verified during the procedure review included provisions for verifying that:

- o Crane interlocks and physical stops that prevent the crane from passing over fuel storage positions were properly set and verified;
- o Hoists, cranes, and related fuel handling tools were checked for proper operation prior to and periodically during fuel handling;
- o Ventilation, filters, and charcoal absorbers were operating as required;
- o Isolation of the spent fuel building occurred on a high radiation signal;
- o Radiation and airborne radioactivity monitors were operable;
- o Minimum water level requirements were monitored;
- o The spent fuel pool cooling and cleanup system was operable; and
- o Spent fuel pool and makeup system water chemistry were as required.

NRC inspector observations are discussed below:

On March 29, 1990, operators were placing a rod cluster control assembly (RCCA) in a test location so that eddy current testing could be performed. After it was placed in the test location, personnel operating the fuel pool bridge crane and RCCA tool were changed. The new operators began to move the crane when other workers saw that the tool was not disengaged from the RCCA. The motion of the crane appeared to flex the RCCA, although the licensee states that it does not appear damaged. The licensee stated that the RCCA will not be used again in the reactor; a spare RCCA will be substituted. Pending completion of the inspector's review of the event, this will remain Unresolved Item 482/9007-02.

## 9. Preparation for Refueling (60705)

The purpose of this inspection was to verify the adequacy of the receipt, inspection, and storage of new fuel and the adequacy of licensee preparations for refueling.



During this inspection period, the licensee completed repair to the RCCA handling tool and performed tests to verify the operability of the fuel handling equipment. The equipment required for fuel reconstitution arrived onsite and was installed in the fuel building. Preparation for refueling activities appeared adequate.

10. Review of Licensee Event Reports (LERs) (92700)

During this inspection period, the inspectors performed followup on WCGS LERs. The LERs were reviewed to ensure that:

- o Corrective action stated in the report has been properly completed or work is in progress;
- o Response to the event was adequate;
- o Response to the event met license conditions, commitments, or other applicable regulatory requirements;
- o The information contained in the report satisfied applicable reporting requirements; and
- o Generic issues were identified.

The LERs discussed below were reviewed and closed:

- o 86-043, Revision 1, "Indeterminate Wiring." This LER was closed in NRC Inspection Report 50-482/90-05 but, due to an error, it was listed as LER 87-043, Revision 1. LER 86-043, Revision 1, is closed.
- o 86-072, "Improper Classification of Emergency Diesel Generator Test Results in Noncompliance With Technical Specification Required Testing Frequency." The licensee classified the termination of a DG surveillance test due to a fuel oil leak as an invalid failure. The licensee later determined that this was in error and should have been classified as a valid failure. This meant that the DG testing frequency had not been adjusted as required by TS. The licensee has increased and enhanced the training concerning how to use Regulatory Guide 1.108. The fuel leak was repaired and inspections for other leaks were performed. Since this oil leak occurred, other leaks have been identified. The licensee performed additional 24-hour runs to ensure operability of the DGs and verification that vibration-induced leaks were corrected. This LER is closed.
- o 87-058, "Technical Specification Violation Due To Error In Design Document." The licensee replaced heat shrink moisture seals on containment penetration assemblies due to installation errors. This was documented in LER 87-052 which was reviewed and closed in NRC Inspection Report 50-482/90-05. During that replacement effort, instrumentation and control personnel observed electrical terminations which did not have a moisture seal. An engineering



evaluation determined that the connections were required to have a moisture seal. The terminations were a part of the containment high range radiation monitors and they were declared inoperable. The licensee installed the necessary moisture seals, corrected the electrical termination list, and corrected the containment penetration assembly vendor manual. The licensee also reviewed designed documents and equipment qualification records in order to verify that the problem was bounded and fully corrected. This LER is closed.

- o 87-060, "Procedural Inadequacy Resulting In Technical Specification Violation." During a review of a surveillance test procedure, the licensee discovered that a portion of the P-4 reactor trip interlock was not being tested as required by TS. P-4 was being tested up to the solid state protection system; however, the turbine trip on reactor trip function was not being tested. The surveillance procedure was revised and reperformed. The P-4 turbine trip on reactor trip operated satisfactorily during subsequent testing. In response to this and other examples, the licensee performed a 100 percent review of the TS in order to identify other missed surveillances. This LER is closed.
- o 88-001, "Radiation Monitor Spike Causes Engineered Safety Features Actuation . . . ." Due to a spike on a gas detector, a fuel building ventilation isolation signal (FBVIS) was received. An FBVIS automatically causes a CRVIS to be generated. All required equipment operated as designed. The licensee was unable to determine a root cause for the spike. This LER is closed.
- o 88-002, 88-015, and 88-019, "Containment Purge Isolation Due Radiation Monitor Spikes." On three separate occasions, a CPIS was generated due to problems with Radiation Monitor GT RE-32. Troubleshooting revealed an intermittent failure of a connection and a loose connection on a current isolator socket. The loose connection was repaired and other similar connectors were checked. No other root cause could be identified. These LERs are closed.
- o 88-007 and Revision 1, "Technical Specification Violation On Two Instrument Setpoints Due To Faulty Procedure." Due to a personnel error, the procedures for setting the trip setpoint for the overpower differential temperature (OPDT) and overtemperature differential temperature (OTDT) instrument loops were not as conservative as required by TS. The licensee determined that at all times the setpoints were greater (more conservative) than the allowable value and, thus, were within the values analyzed in the accident analysis. However, TS require that, with a setpoint less conservative than the desired value but more conservative than the allowable value, the setpoint should be adjusted. The licensee revised all of the procedures that verified other TS setpoints and reperformed the

surveillances necessary to ensure that the TS were being satisfied. In August 1989, the licensee determined that the original method of calibrating the trip setpoint was valid and no TS violation had occurred. This LER is closed.

- o 88-009, "Less Than Adequate Training Leads To Personnel Error Resulting In Technical Specification Violation." The Licensee removed the high range channel of the unit vent system noble gas monitor (GT RE-21B) from service for maintenance. Due to additional corrective maintenance, the monitor was not restored within the 7 days allowed by TS. The operators were under the mistaken impression that GT RE-21A was satisfying TS. It was later learned that there is only one high range channel and that was GT RE-21A. The licensee identified this too late to satisfy the 14-day reporting requirement of the TS. As required by TS, 12-hour grab samples were performed during the time the monitor was out of service. The licensee modified the licensed operator requalification program to add further details of these and other similar radiation monitors.
- o 88-014, "TS Violation Caused By Channel Check Requirements Being Changed In Surveillance Procedure." This LER was first discussed in NRC Inspection Report 50-482/88-24 and at that time a Notice of Violation was issued (482/8824-02). This violation was reviewed and closed in NRC Inspection Report 50-482/90-04. All followup to this LER was performed under this Notice of Violation. This LER is closed.
- o 88-016, "Inoperable Control Room Ventilation System." In response to inspector prompting, the licensee performed an engineering evaluation of the CRVIS. The evaluation showed that without the air conditioning unit (ACU), the CRVIS was unable to meet its design basis. Previously, if an ACU was out of service, the licensee considered CRVIS fully operable. With the new information, the licensee changed the TS interpretation and now considers CRVIS inoperable with an ACU inoperable. The licensee performed a records review to determine if an ACU had been inoperable longer than allowed by TS (under the new interpretation). Two instances were identified. Once both trains of CRVIS were inoperable for approximately 5 minutes and thus TS 3.0.3 should have been entered. The second time occurred during the start of Refueling Outage II when one ACU was inoperable for 23 days, which is longer than the TS-allowed 7 days. The licensee changed the TS interpretation to account for the new information and now recognized the importance of evaluating equipment in TS systems prior to removing it from service. Additional information on this issue is available in NRC Inspection Reports 50-482/88-22 and -88-24. This LER is closed.
- o 88-018, "Engineered Safety Features Actuation Caused By Failed Radiation Monitor Signal Cable." An FBVIS and subsequent CRVIS occurred due to a broken shield on a coaxial signal cable giving an indicated high radiation alarm. The broken shield was located at a



high stress point where a cable made a sharp bend. This cable is disconnected and reconnected on a monthly basis in order to perform a surveillance test. The licensee performed an engineering evaluation to study the possibility of installing a better connector. Engineering Evaluation Requests 88-SP-02 and 88-SP-04 along with Plant Modification Requests (PMR) 01646 and 02817 were issued allowing the coaxial cables and connectors to be replaced on 34 radiation monitors. All eight of the safety-related radiation monitors have been completed. The nonsafety-related ones will be replaced on an as needed basis. This LER is closed.

- o 88-021 and Revisions 1, 2, and 3, "Containment Cooling Fan Motor Potential Overcurrent Condition." During an integrated leak rate test, the licensee discovered a motor overload condition on one of the four (two per train) containment cooler fan motors which may have rendered it inoperable. The licensee declared the fan motor inoperable and returned it to the supplier for testing. The testing and subsequent calculations determined that the containment cooling fan motor could have been relied upon to perform its intended function. During their followup of this issue, the licensee identified acceptance program deficiencies. Corrective action included revision of purchase order requirements to add routine motor test reports and deficiency resolution to the receipt packages. In addition, other motor test reports on motors received from that manufacturer were reviewed for discrepancies. This LER is closed.
- o 88-024, "Faulty Power Supply Causes Loss Of Power To Logic Cabinet Resulting In Engineered Safety Features Actuation." A CPIS, CRVIS, and FBVIS occurred when a +15 V DC power supply failed. All operable equipment operated as designed. The power supply was replaced but, due to it being a sealed unit, a root cause could not be identified. Since this was the second failure of the +15 V power supply (see LER 86-016), Engineering Analyses 88-SA-01 was issued to determine if a more reliable power supply was available. The analysis determined that the power supplies should be replaced. Since the only available unit would have to be procured as nonsafety-related usage, this would not be completed until Refueling Outage V (fall of 1991). This LER is closed.
- o 88-030, "TS Violation Caused By Failure To Document Performance Of Containment Inspection." A quality assurance audit identified two instances of not documenting the performance of a containment inspection following containment entries. Due to the timeframe between the lack of documentation and identification of the problem (approximately 5 months), it could not be verified whether or not the inspections had been made as required by TS. The dates of the two instances were January 2 and 5, 1988. The next inspection known with certainty to be completed was January 7, 1988. That inspection did not document any abnormal findings. To prevent



recurrence, the licensee modified the tracking chart used to follow required surveillances in order to ensure that the required surveillance is performed on a daily basis. This LER is closed.

- o 89-001, "Personnel Error In Altering Emergency Diesel Generator Testing Frequency Results In TS Violation." During an internal review, the licensee determined that, due to a personnel error, the testing frequency of the diesel was relaxed from the required once per 7 days to once per 31 days. The error was discovered after 12 days had elapsed. This meant the test was 5 days late. The error occurred when a licensed operator/manager misread a TS requirement. The manager was counseled/cautioned to be more diligent. The manager has since left the site and has been replaced due to other unrelated causes. This LER is closed.
- o 89-002, "Spurious Signal In Main Turbine Vibration Monitoring Circuitry Results In High Vibration Causing Main Turbine and Reactor Trip." The vibration monitoring circuitry for the main turbine/generator erroneously indicated high vibration on the No. 7 bearing and automatically tripped the turbine. This, in turn, caused an automatic reactor trip on an anticipated loss of secondary heat sink. All equipment operated as expected. The licensee modified the trip circuitry to provide an alarm function only. This was done to prevent any further unnecessary challenges to safety systems. During restart and subsequent power operations, the turbine was monitored and did not exhibit abnormal vibration. Until multi-coincidence trip logic can be installed, the trip function will remain in bypass. This LER is closed.
- o 89-003, "Significant Fire Protection System Degradation Caused By Improper Crimping of Vendor Supplied Wiring In Fire Protection System Panels." During a routine plant modification, several improperly crimped wiring lugs were found in a Halon control panel. As part of their investigation of the problem, other Halon control panels were inspected and similar discrepancies were identified. The licensee posted fire watches, as required, and commenced relugging all Halon control panels. It was determined that even though the crimps were not up to requirements, the surveillance tests were being successfully completed and the panels were capable of performing their intended functions. The licensee also relugged the other fire protection system control panels when inspections identified similar deficiencies. When the fire protection panels were initially installed, no special crimping standards had been imposed. Since that time, the specifications have been modified to be more stringent. This LER is closed.
- o 89-007, "Failure To Perform TS Required Surveillance Caused By Personnel Error." TS require that while in Mode 1, with one emergency DG inoperable, that certain breaker alignments and power availability be checked at least once per 8 hours. After the DG had

been restored to service, it was determined that the final 8-hour surveillance had been missed by 2 hours and 12 minutes. The licensee performed the surveillance on this discovery and completed it satisfactorily. The licensee counseled the operating crew that missed the surveillance and then added this LER and the procedure governing the supervising operator's duties to the required reading file. This LER is closed.

11. Followup on Previously Identified NRC Items (92701 and 92702)

(Closed) Violation (482/8806-01): Failure To Have Adequate Procedures - Part A of the violation concerned inadequate procedure for RCS draindown. The licensee installed instrumentation in the control room according to PMR 02538 to display the level in the RCS during cold vented conditions. The instrument was used during the current refueling outage when the vessel water level was lowered in preparation for head removal. Part A of the violation is closed. Part B of the violation concerned inadequate procedure for startup of a residual heat removal (RHR) train. This part was reviewed and was found ready to close in NRC Inspection Report 50-482/88-23. Violation (482/8806-01) is closed.

(Closed) Open Item (482/8924-01): Testing Of Auxiliary Building Pressure Boundary - This open item tracked the licensee finding a condition that may have caused both emergency exhaust systems to be inoperable. During routine annual maintenance on the access tunnel transfer fan, two dampers in series were removed from service and left in the open position. These dampers go closed on an accident signal in order to ensure that the emergency exhaust system can maintain the auxiliary building at negative 0.25 inches of water. With both dampers blocked open, upon an accident signal, the inleakage to the auxiliary building could have been so great as to not allow it to reach the required negative pressure. The licensee committed to perform a pressure test with the dampers in the open position. On March 3, 1990, the test was performed and showed that, even with the dampers open, the required negative pressure was achieved. To prevent recurrence, the licensee instructed personnel who issue and handle clearances on the thought process which should be involved when setting clearances. In addition, this information was made required reading and a lesson plan was included in the licensed operator requalification training program. This open item is closed.

(Closed) Open Item (482/89-05): Siltation Rate of the Ultimate Heat Sink (UHS) - During routine inspection activities, the inspectors determined that the UHS was silting up at a faster rate than was expected. An open item was written to follow the licensee's updating of the USAR.

On March 12, 1990, the licensee issued Revision 3 of the USAR. This revision modified the USAR to show how much water volume of the UHS could be lost to silt and still safely support a unit shutdown. This open item is closed.



(Closed) Violation (482/8908-03): Inadequate Testing - This violation involved the licensee's failure to conduct a battery performance test properly and failure to evaluate the test results in an appropriate manner. The inspectors stated in NRC Inspection Report 50-482/89-08 that the licensee's corrective actions appear satisfactory and comprehensive. No written response to this violation was required of the licensee. This violation is closed.

During the fall of 1987, while the licensee was in the midst of their second refueling outage, events occurred which the NRC considered significant. These events were documented in NRC Inspection Reports 50-482/87-27, -87-28, -87-31, -87-32, -87-36, and -88-14. These reports culminated in the issuance of Enforcement Action (EA) 87-213 and Imposition of a \$100,000 Civil Penalty. The \$50,000 base value had been increased by 100 percent due to the number of examples and failure to take prompt corrective actions. The conclusion stated in NRC Inspection Report 50-482/88-14 (Systematic Assessment of Licensee Performance (SALP)) was "Aggressive management involvement to address problems that occurred during the outage was lacking." The licensee initiated corrective action and in the 1989 SALP Report (NRC Inspection Report 50-482/89-14) the NRC stated "Your management efforts to address significant weaknesses noted during the previous SALP period with control of outage activities . . . are especially noteworthy."

(Closed) Violation (A: Enforcement Action 87-213): Failure To Follow Procedures (Six Examples)

1. This first example dealt with a failure to follow an electrical maintenance procedure which resulted in the death of a worker, an engineered safety features (ESF) actuation and an LER. LER 50-482/87-048, Revision 1, was issued June 24, 1988, and states, in part, "On October 14, 1987, at approximately 2037 CDT, an Unusual Event (UE) was declared due to a fire being reported in the ESF switchgear room. It was discovered that a worker had come in contact with an energized part of the "B" train safety-related 4160 volt ESF bus. Subsequent operator action (deenergizing the "A" train 4160 volt ESF bus to deenergize the cross-tie to the "B" train ESF bus) resulted in a loss of the RHR system for approximately 17 minutes and an automatic actuation of "A" diesel generator. The UE was exited at approximately 2111 CDT after RHR was restored. The diesel start and shutdown sequencer actuation are being reported per 10 CFR 50.73(a)(2)(iv). The loss of RHR is being reported per 10 CFR 50.73(a)(2)(v) and 10 CFR 50.73(a)(2)(vii). The fire and the fatality are being reported per 10 CFR 50.73(a)(2)(x). The DG failure is being reported to satisfy the Special Report requirements of Regulatory Guide 1.108."

The licensee stated that the root causes were:

- a. Failure of the qualified electrician to follow the maintenance procedure which required that the stationary disconnects be checked for high voltage potential,



- b. Failure of the work group to perform a comprehensive prejob briefing, and
- c. Failure of the workmen and supervisors to verify the clearance order boundaries.

An additional root cause identified by the NRC was the failure of management to emphasize strict procedural adherence.

The corrective action included:

- a. Stopping work in the electrical switchgear,
- b. Revising the electrical maintenance procedure to change the precaution step which checked for voltage to be a mandatory double signoff,
- c. Initiating an internal investigation and cooperating with the occupational safety and health administration investigation, and
- d. Issuing a memo from the Vice-President, Nuclear Operations to all personnel on the requirement of a prejob briefing.

The following corrective actions taken by the licensee were also applicable to the other example given in this violation.

- a. Refueling Outage II work was temporarily suspended,
- b. Work groups were required to hold meetings and discuss the events and corrective actions,
- c. Increased the support staff of the outage manager and had him report to the plant manager,
- d. Combined the maintenance organization with the facilities and modifications organization to improve coordination and communications,
- e. Restructured the daily planning meetings to focus more on problems and corrective actions than on work status, and
- f. The Vice-President, Nuclear Operations met with all field work groups to discuss the seriousness of procedural compliance and individual worker responsibility.

The inspectors observed that the remainder of Refueling Outage II was conducted in a more thorough and methodical manner. As noted in the 1989 SALP Report, "During Refueling Outage III, increased management involvement was evident" (as compared to Refueling Outage II). This violation example and LER 87-048, Revision 1, are closed.

2. Finding 2 dealt with two contract workers breaching a pressurized, contaminated system in violation of procedures. The resulting spray of radioactive water and resin contaminated the workers, their equipment, a large area of the floor, portions of a 20-foot high ceiling, and both sides of a 15-foot wall. The workers then attempted to cover their mistake by cleaning up the spill on their own and being uncooperative upon discovery. During the initial followup in 1987, the inspector observed two members of licensee management who failed to realize the significance of the contractor's careless disregard for plant procedure and property. However, once senior licensee management became aware of the event, a different attitude was observed. Contractor radwaste operations were suspended and senior contractor management was summoned to the site and "recalibrated."

Health Physics (HP) personnel performed whole body counts and dose calculations of the two personnel involved. They were determined to have received a dose less than the NRC limit. However, as noted in NRC Inspection Report 50-482/87-28, the licensee failed to make this determination properly and a violation was issued (482/8728-01).

This violation was closed in NRC Inspection Report 50-482/88-25. HP also decontaminated the area at a cost of some 640 man-hours. The contractor revised the procedures to add a requirement to notify HP prior to breaching any system. The workers involved have since found other employment. The licensee now provides closer support and monitoring of the licensee's activities. This violation example is closed.

3. Finding 3 dealt with the fact that, during the event described in Finding 2, a continuous air sample was not being drawn as required. As noted above, procedural and training enhancements were implemented in order to prevent recurrence of this event. This violation example is closed.
4. Finding 4 dealt with the licensee's unintentional release of radioactive material to the Coffey County landfill. This event was also a part of Violation 482/8736-01. This violation was followed up on and closed in NRC Inspection Report 50-482/88-25 by regional HP inspectors. This violation example is closed.
5. Finding 5 dealt with personnel not documenting a relief valve setting during a hydrostatic test and for failure to get a QC verification when placing an air dam bag. The licensee terminated the maintenance supervisor involved who had exhibited disregard for adherence to station procedures. In addition, the QA department issued Work Hold Agreement 23 in response to this and other concerns.

The suspension involved all forming, fitting, rigging, and aligning of safety-related piping. This eventually resulted in the combining of the maintenance and modification groups to ensure better



communications and more effective utilization of resources. Licensee management held discussions with appropriate personnel on the importance of following work instructions and on paying attention to detail. The implementation of work instructions was noticeably improved in Refueling Outages III and IV. This violation example is closed.

6. Finding 6 dealt with two examples of welders improperly performing safety-related welds and one example of an improper QC signoff. The work hold agreement discussed above was also applicable to these examples. The unqualified welds were removed and later properly rewelded. A maintenance supervisor was reprimanded. Discussions were held with maintenance managers, QC personnel, and maintenance personnel on ensuring compliance with procedures and attention to detail. The management and attitude changes made that were discussed in the paragraphs above are also applicable to this finding. This violation example is closed.

The six examples that make up Violation A to EA 87-213 are closed. Violation A to EA 87-213 is closed.

(Closed) Violation (B: Enforcement Action 87-213): Failure To Have Appropriate Procedures (Four Examples)

1. This finding dealt with a hydrogen burn in the pressurizer. Due to an inadequate procedure on degassing the RCS upon entry into an outage, a small bubble of hydrogen was left in the pressurizer. The introduction of air during maintenance activities allowed a burnable mixture to form. When a weld was later performed, the spark ignited the burnable mixture. The licensee's and vendor investigation verified that the pressurizer and RCS were not harmed during the burn. The licensee performed a walkdown of the pressurizer and verified the burn and resulting thrust had not caused any damage to piping or pipe supports.

The degas procedure was extensively revised by the licensee to ensure hydrogen is removed from the RCS coolant and all vapor spaces. In the two refueling outages since this event, the licensee was observed to follow the revised procedure and ensure that all required dissolved hydrogen was removed from the RCS. This violation example is closed.

2. This finding dealt with the failure to take a sample of an enclosed space (the pressurizer) prior to performing a weld. In addition to the corrective action described in Example 1 above, the licensee revised the ignition source procedure to check for combustible gases. Personnel were trained on the new procedural requirements. This violation example is closed.



3. This finding dealt with the lack of a procedure for calculating the length of time that battery banks could be left under load without being on their chargers. This issue was also identified as Unresolved Items 482/8807-15 and 482/8727-04. These were closed in NRC Inspection Report 50-482/89-08. This item should have been closed at that time. This violation example is now closed.
4. This finding dealt with TS not being met during core alterations. TS required that both source range (SR) neutron flux monitors be operable; however, both were inadvertently deenergized during a surveillance test. The licensee immediately halted core alternations and restored the SR to operable status. A procedure change was made in order to complete the surveillance test. Other tests were reviewed for similar situations. Procedure changes as necessary were completed for these tests also. This violation example is closed.

The four examples that make up Violation B to EA 87-213 are closed. Violation B to EA 87-213 is closed.

As both Violations A and B to EA 87-213 are closed, EA 87-213 is also closed.

(Closed) Violation (482/88200-03): Inadequate Procedure - This violation was issued concerning an inadequate procedure. During the removal of a bearing to one of the component cooling water pumps, the inspectors determined that the instructions did not include appropriate precautions on heating the bearing. In the licensee's response, dated November 30, 1988, the licensee denied the violation but did agree to provide additional procedural detail to draft procedures. The licensee stated that bearing removal activity fell within "skill of the craft," but that work instruction writers would be instructed to not rely too heavily on the use of "skill of the craft." The inspector reviewed the work request (WR) involved in this violation (WR 02799-87) and verified that additional precautions had been added following identification of the concern. In their response to a request for additional information, the licensee stated that on-the-job training (OJT) Module MM1327408, "Coupling Removal and Installation," had been developed and was being incorporated into the training program. A review of the training records verified that the mechanics had completed the required OJT course. This violation is closed.

## 12. Unresolved Item

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable, items of noncompliance, or deviations. One unresolved item disclosed during the inspection is discussed in paragraph 8.

13. Exit Meeting (30703)

The inspector met with licensee personnel (denoted in paragraph 1) on March 30, 1990. The inspector summarized the scope and findings of the inspection. The licensee did not identify as proprietary any of the information provided to, or reviewed by, the inspectors.