APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-482/93-32

Operating License: NPF-42

Docket: 50-482

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

Facility Name: Wolf Creek Generating Station

Inspection At: Coffey County, Burlington, Kansas

Inspection Conducted: December 5, 1993, through January 15, 1994

Inspectors: G. A. Pick, Senior Resident Inspector
J. F. Ringwald, Resident Inspector
R. C. Stewart, Inspector, Division of Reactor Safety

Approved: L A Yandell Feb 8 '94
L. A. Yandell, Chief, Project Branch B Date
Division of Reactor Projects

Inspection Summary

Areas Inspected: Routine, unannounced inspection including the areas of plant status, operational safety verification, maintenance observations, surveillance observations, followup on corrective actions for a violation, onsite review of a licensee event report (LER), and inoffice review of an LER.

Results:

- A noncited violation was identified because maintenance personnel used the incorrect administrative control mechanism to track the removal and installation of plant equipment (Section 2.1).
- A noncited violation was identified because operations personnel failed to perform effective clearance order tag reviews, as required by procedure (Section 2.1).
- The inspector found system engineers routinely involved in the daily problem solving of operational issues. The system engineers provided solid, thorough evaluations and solutions (Sections 2.2 and 2.4).

- Operators promptly responded to a loss of main generator load and limited the amount of time the reactor coolant system experienced a heatup transient (Section 2.3).
- The inspector determined the failure of licensee personnel to recognize the response of the reconfigured excess throttle pressure feedback circuit to be a weakness (Section 2.3).
- The inspector observed extensive management oversight and direction provided while developing the planned outage to implement a cavity cooling fan ductwork modification (Section 2.5).
- A quality assurance auditor identified that personnel added galvanized metal and aluminum, as part of a temporary modification, to the containment without an evaluation (Section 2.5).
- The inspectors identified an increased awareness of methods used to address issues within engineering by licensee management. The licensee's approach to define worklog versus backlog indicated an attempt by the licensee to develop a program designed to correct safety issues first (Section 2.6).
- The inspector concluded the licensee's limiting conditions for operation postmaintenance outage critique to be an effective tool for improving maintenance outages (Section 3.2).
- The licensee's integrated plant scheduling (IPS) personnel provided a central focal point that established controls for implementation of plant maintenance that affected system health (Section 3.3).
- The inspector determined that a system engineer performed a good evaluation and implemented good corrective actions for higher than expected turbine-driven auxiliary feedwater pump lube oil pressures (Section 4.1).
- The inspector found that the licensee had a well defined inservice test program (Section 6).

Summary of Inspection Findings:

- A noncited violation was identified (Section 2.1).
- A noncited violation was identified (Section 2.1).
- Violation 482/9209-01 was closed (Section 5).
- LERs 482/91-007 and 482/93-013 were closed (Sections 6 and 7).

Attachments:

- Attachment 1 - Persons Contacted and Exit Meeting
- Attachment 2 - Systems Included in Minor Maintenance

DETAILS

1 PLANT STATUS (71707)

The plant operated at 100 percent power throughout the inspection period until January 14, 1994, when the licensee initiated a controlled shutdown to Mode 3 for a maintenance outage.

2 OPERATIONAL SAFETY VERIFICATI (71707)

The inspectors performed this inspection to ensure that the licensee operated the facility safely and in conformance with license and regulatory requirements and that the management control systems effectively discharged the licensee's responsibilities for safe operation.

The methods used to perform this inspection included direct observation of activities and equipment, observation of control room operations, tours of the facility, interviews and discussions with licensee personnel, independent verification of safety system status and Technical Specifications limiting conditions for operation, verification of corrective actions, and review of facility records.

2.1 Breaker Installed Contrary to the Clearance Order

On December 12, 1993, operations personnel conducted a clearance order audit and found Breaker PG18LCR7, 480 Vac spare breaker, installed in the breaker cubicle when the clearance order tag (Dated January 1993) listed the breaker as removed. The operators immediately verified that no safety hazard existed and initiated Performance Improvement Report (PIR) 93-1650. The licensee determined that workers removed the breaker from the cubicle in January 1993, installed the breaker in February 1993, and terminated the breaker in May 1993. Management discussed the improper installation and termination of the breaker with the workers and applicable supervisory personnel.

Procedure ADM 01-071, "Identification and Control of Materials, Parts and Components," Revision 8, Step 8.3.2, specified that components being removed from the immediate work area as part of the work or test activity shall be tagged with an equipment removal tag. The licensee determined that workers did not use an equipment removal tag during removal of the breaker from the cubicle in January 1993. The shift supervisor changed the required clearance order position from "off" to "removed" when he learned that personnel intended to remove the breaker. Discussions with licensee personnel indicated that the shift supervisor attempted to facilitate the work activity by changing the clearance position. The inspector determined that the failure to utilize the equipment removal tag contributed to the misuse of the clearance order tag and the subsequent erroneous reinstallation of the breaker into the cubicle. This failure to use the equipment removal tag violated Technical Specification 6.8.1.a but is not being cited because the licensee satisfied the criteria in paragraph VII.B.2 of Appendix C to 10 CFR Part 2 of the NRC's

"Rules of Practice." The licensee acknowledged that workers failed to comply with Procedure ADM 01-071. The licensee conducted several meetings with plant personnel to review this event. During the meetings, the licensee reiterated management expectations and the proper mechanism to be used when removing equipment.

On January 12, 1994, in response to the inspector's questions, the licensee informed the inspector that the clearance order reviews required by Procedure ADM 02-100, "Clearance Order Procedure," Revision 28, Step 7.7.2 occurred on May 28 and July 7, 1993. However, these reviews failed to identify that the breaker was installed while the clearance order tag listed the breaker as removed. No personnel safety or equipment hazard existed with the breaker intailed and in the "off" position or physically removed. Procedure ADM 02-100, Step 7.7.2, required that personnel performing the clearance order review to visually verify that the tags are attached to the components listed on the clearance sheet and that the components are in their specified position. This failure to verify the required position of the component as specified by the clearance order tag violated Technical Specification 6.8.1.a and is not being cited because the licensee satisfied the criteria in paragraph VII.B.1 of Appendix C to 10 CFR Part 2 of the NRC's "Rules of Practice" because the violation was of minimal safety significance, the licensee promptly implemented corrective actions, and previous corrective actions would not have prevented this violation from occurring. As part of the immediate corrective actions, operations performed a review of all outstanding clearance orders and checked those components with required positions other than open, closed, on, or off to verify that no other discrepancies existed between required tag position and actual component position. Operations will add completed PIR 93-1650 to required reading.

The licensee appropriately addressed the personnel performance issues associated with this activity.

2.2 Indicating Lamp Failures

On December 14, 1993, the operators received an engineered safety features actuation system panel indicator light that indicated problems with the Centrifugal Charging Pump B room cooler. The operators promptly entered Technical Specifications 3.5.2 and 3.1.2.4. The auxiliary building watch reported that the room cooler fan motor 480 Vac breaker had tripped and would not reset. Electricians reviewed the breaker problem in accordance with troubleshooting Work Request (WR) 06859-93. The electricians replaced the control power fuses and breaker indicating light bulb. Operators started the room cooler fan motor to verify proper operation and, subsequently, exited the Technical Specifications action statements. The electricians determined that the indicating lamp on the breaker failed and the filaments shorted together, drawing increased current which opened the control power fuses. After reviewing the occurrence, the system engineer initiated PIR 93-1687 to document the issue and ensure resolution.

When the indicating lamp filaments shorted, the heat melted a hole in the plastic lens cover and turned the lens cover brown. Personnel performed detailed inspections of other motor control center 480 Vac cubicle indicating lights and found that other light bulbs also had crossed filaments that burned brighter than normal and were beginning to darken the lens cover. Engineering personnel initiated a memorandum to the shift supervisor that recommended removal of the Type 120 MB lamps from the 480 Vac safety-related motor control center breakers to preclude other failures. Engineering determined that the indicating lamps performed no active safety-related design basis function; however, their failure potentially affected the operation of safety-related equipment. The initial evaluation indicated that the Type 120 MB lamps could have been procured as nonsafety-related. The memorandum specified that not all failures occurred at the same mean time between failure and not all failures resulted in a short circuit.

On December 20, 1993, licensee personnel removed the indicating lamp from each 480 Vac breaker in 10 separate safety-related motor control centers. On January 4, 1994, after completion of a formal engineering evaluation performed for Reportability Evaluation Request 93-054, the licensee reported this occurrence to the NRC under 10 CFR 50.72(b)(2)(iii)(D) as a condition that could have prevented the fulfillment of the safety function of systems required to mitigate the consequences of an accident.

Review of design documentation did not indicate the manufacturer who originally supplied the indicating lamps for the motor control centers. Review of vendor information indicated that the 480 Vac motor control centers were normally supplied with Type 120 MB indicating lamps; however, these lamps were not suitable for use under conditions of shock or vibration. The system engineer concluded that the indicating lamps were not suitable for their application. The licensee initiated a nuclear network entry to promulgate this failure to other facilities. The licensee will report this as LER 482/94-001. The inspector concluded from discussions with the system engineer and review of documentation that the engineer performed a comprehensive review. The inspector will followup this issue during closeout of LER 482/94-001. The licensee had not determined their corrective actions by the end of the inspection period.

2.3 Sudden Decrease in Main Generator Output

On December 17, 1993, with the reactor at approximately 93 percent power (1115 megawatts electric (MWe)), operators performed main turbine control valve testing in accordance with Procedure STS AC-002, "Main Turbine Valve Cycle Test," Revision 7. As the operator transferred turbine control from the load limiter to load set, the main generator rapidly decreased in power. Operators promptly responded by increasing the load set until the power decrease stopped. The load decreased approximately 103 MWe. The operators contacted instrumentation and control (I&C) personnel who evaluated the event and subsequently determined that the power decreased because the excess throttle pressure feedback circuit activated. Prior to the rerate, steam chest pressure remained relatively stable since the first stage steam pressure feedback circuit maintained a constant steam pressure by moving the control valves. The first stage steam pressure feedback circuit was unable to further open the remaining turbine control valves during this event. Therefore, the excess throttle pressure feedback circuit activated and closed the control valves to compensate for sensed high steam chest pressure.

The sudden loss of load caused reactor coolant system temperatures to increase. The value for T-average exceeded the departure from nucleate boiling value of 585.5°F for approximately 4 minutes. The operators made log entries indicating entry into Technical Specification 3.2.5 for the 4-minute period. From discussions with licensee personnel about the circuit operation, the inspector found that the loss of load would have stopped at approximately 950 MWe. The inspector concluded that the prompt response of the operators reduced the transient by preventing an additional load decrease of approximately 63 MWe.

The inspector determined from discussions with licensee personnel that I&C personnel rescaled the excess throttle pressure feedback circuit from 999.4 psig to 930 psig as part of the power rerate. These pressures represented the full power operating pressures at the steam chest for both the old and new secondary operating conditions. Prior to the rerate, the control valves were at 45 percent open with full turbine power for 100 percent reactor power. After the rerate, the control valves were at 100 percent open for a maximum attainable power level of 98 percent reactor power (refer to NRC Inspection Report 50-482/93-29, Section 2.10).

The licensee concluded that the steam chest pressure achieved 940 psig, which exceeded the excess pressure throttle feedback circuit setpoint of 930 psig and caused the control valves to close, further increasing steam chest pressure. The licensee solved this problem by rescaling the excess throttle pressure feedback circuit range upper limit to 980 psig. The licensee chose this value because it allowed the first stage steam pressure feedback circuit to actuate but prevented the excess throttle pressure feedback circuit from actuating. The first stage steam pressure feedback circuit allows the control valves to compensate for each other during control valve stroke tests. The licensee's rerate design modification evaluation failed to identify the influence of the setpoint change on turbine operation during control valve testing. The inspector considered the failure to recognize this response of the excess throttle pressure feedback circuit a weakness when altering setpoints following the power rerate.

The licensee utilized Temporary Modification 93-061-AC to specify changing the setpoint and continued to evaluate a permanent change that would eliminate the excess throttle pressure feedback circuit.

2.4 Essential Service Water (ESW) Strainer Time Delay Relay Failure

On December 22, 1993, as operators stroked Valve EF PDV0019, ESW self-cleaning Strainer A trash valve, in accordance with Procedure STS EF-201, "ESW System Inservice Valve Test," Revision 10, Step 6.1, the motor tripped as designed after running for 3.5 minutes. The shift supervisor promptly entered Technical Specifications 3.7.4 and 3.8.1.1, declared both ESW Train A and Emergency Diesel Generator (EDG) A inoperable, and initiated WR 06991-93. Electricians found the ESW strainer motor thermal overloads tripped and reset the overloads. The operators started the strainer motor with electricians monitoring the motor operation. After 3.5 minutes, the motor thermal overloads actuated and tripped the motor. A time delay relay installed in the circuit should have stopped the strainer motor after 2 minutes. Since no exact replacement for the failed time delay relay existed in the warehouse, the licensee installed a different model time delay relay in accordance with Temporary Modification 93-062-EF that had similar characteristics except for a wider operating band. Temporary Modification 93-062-EF will remain installed until the replacement relay arrives from the vendor. The inspector verified that the licensee ordered two time delay relays, one as a replacement and the second as an available spare part.

The system engineer determined that the strainer motor could operate continuously but the strainer was designed to operate intermittently. The strainer motor operates at a current of 2.0 amperes while the thermal overloads trip at a current value greater than or equal to 1.2 amperes after 200 seconds. This design ensures that the strainer will not operate for long periods. Because the motor is designed for continuous use, no problems occurred by operating for more than 2 minutes.

From discussions with the system engineer and review of electrical drawings, the inspector concluded that the engineer was knowledgeable and had performed a strong, comprehensive evaluation of this event.

2.5 Planned Shutdown Maintenance Outage (40500-01)

During this period, Cavity Cooling Fan A failed and the blades locked. Temporary cooling fans were installed in the cavity cooling flow path in accordance with Temporary Modification 93-057-GN; however, the temporary fans could not generate sufficient flow because of the locked fan blades. The licensee formulated a plan to implement a plant modification during a planned shutdown which would allow repair of the fan with the plant online after receipt of a replacement fan motor. The licensee determined the shutdown to be prudent because they considered having redundant cavity cooling capacity important. The concern was that without cavity cooling nuclear instrumentation could overheat and fail.

The inspector attended a preoutage meeting where the Vice President Plant Operations described his expectations regarding the outage and then made the decision to delay the outage to give personnel time to finalize their plans. The inspector found management oversight to be extensive, with conservative decisions made. The Vice President Plant Operations issued a memorandum on January 14, 1994, that expressed his expectations about personnel safety, reactivity management, and the need for attention to detail. The inspector reviewed the outage scope/preparations and found the outage to be well planned and coordinated. The licensee performed extensive worker preparation that involved the employees using the work instructions and walking through the steps on a full-size mockup.

During the outage, a quality assurance inspection of the containment as part of Quality Assurance Audit K-408, "Housekeeping and Cleanliness Control," was conducted. A quality assurance auditor noticed that Temporary Modification 93-057-GN installed galvanized sheet metal that exceeded 1 square foot and used an aluminum chain hoist that exceeded 1 pound without a safety evaluation as specified in Procedure ADM 01-201, "Control of Temporary Equipment," Revision 6, Step 7.3. The licensee issued PIR 93-1736 to assure corrective actions would be implemented and issued Reportability Evaluation Request 93-055 to identify whether this amount of material exceeded the amounts specified in the design basis.

Engineering determined that the added galvanized material used 3.7 percent of the remaining margin and the aluminum hoist and other amounts of aluminum inside containment amounted to one-half that assumed in the accident analysis for post loss of cooling accident hydrogen generation. The inspector considered the auditor's evaluation to be comprehensive and determined that his questioning attitude led to the discovery of an adverse condition. The licensee's planned corrective actions included developing a checklist similar to that used for other plant modification request packages for inclusion in the temporary modification process.

2.6 Engineering Meeting (40500-02)

During this period, the inspectors conducted a meeting with licensee engineering managers to update the status of the system engineering program, discuss changes to the plant modification program, and discuss efforts to define and reduce the backlog in engineering programs.

In an attempt to improve engineering support of daily plant operations, engineering management implemented measures to shift the more difficult problems to the design groups. This change was done to ensure that system engineers were kept free to focus on real time plant issues. The system engineering manager limited the average number of issues worked per system engineer at any time to five. Plant programs that have had significant involvement by system engineers included operability determinations troubleshooting activities, scheduling meetings, and developing engineering solutions including temporary modifications.

The licensee determined that they needed a more efficient and effective plant design modification process. A revision to the design modification process was identified as a performance enhancement program action plan item. The inspectors found that the proposed revised process changes the method/level of effort required by engineers to evaluate plant configurat on changes that do no affect the design basis. The process consisted of several decision making points which specified increasing review requirements. Each decision point based the additional review criteria on safety significance.

Another performance enhancement program action plan required defining a backlog. Backlog was characterized as work in excess of manageable levels that potentially could adversely impact system safety. This manageable level of work was defined as worklog, which was further defined as the acceptable age of items commensurate with the assigned priority that can be outstanding and still maintain the system in good working order. The licensee stated that worklog would be characterized in terms of age, priority (safety impact), and schedule history rather than a fixed number of outstanding documents. The licensee planned on developing worklogs for WRs, engineering evaluation requests, industry technical information program items, and procurement change notices. This planned system should allow the licensee to readily shift resources to allow emphasis to be placed on important, emerging safety issues.

Engineering intends to eliminate their backlogs by the end of 1994. The licensee's goal is to eliminate all site backlogs by the end of 1995. The licensee has initiated development of a worklog/backlog computer program that will enable them to forecast backlogs and identify worklogs that risk becoming backlog items.

The licensee's revised design change process provides a method for the licensee to apply a proper level of detail and review effort to assure that changes to structures, systems, and components remain in compliance with the design basis. Creating a worklog and defining backlogs indicated the licensee's intent to manage their work efforts and resources to concentrate on safety issues. The inspectors found that engineering management exerted good oversight of the system engineering and design change programs. The inspectors concluded that the worklog process provides an appropriate tool for the licensee to arrange outstanding work activities relative to their safety significance.

These engineering issues were discussed at a meeting between the licensee and Regional management at a meeting in the NRC Region IV office on February 1, 1994.

2.7 Conclusions

Two noncited violations resulted because the licensee identified several procedural violations and took prompt and appropriate corrective actions. The licensee identified that personnel failed to use the appropriate administrative control for tracking the removal and installation of plant equipment. Additionally, two previous clearance order tag audits failed to identify an obvious clearance tag discrepancy.

When an indicating lamp shorted, a control power fuse opened that made a safety-related room cooler inoperable. The system engineer performed a thorough review and determined the occurrence to be reportable.

System engineering performed a prompt, comprehensive review into the ESW strainer time delay relay failure. The engineer properly developed a temporary modification that allowed the stainer to be returned to service.

The inspector found that the prompt operator response to a 100 MWe decrease in main generator load limited the reactor coolant system heatup transient. The inspector considered the licensee failure to anticipate the response of the excess throttle pressure feedback circuit to be a minor weakness in the power rerate activities.

Because of a reactor cavity cooling fan failure, the licensee made plans to perform a modification in Mode 3 so that repairs could be performed at power upon receipt of replacement parts. The inspector considered the licensee to be proactive in its approach and noted that senior management provided extensive oversight and direction to this effort. The inspector noted that the licensee ensured craft personnel who performed the modification were well prepared.

The inspector noted that a quality assurance auditor's questioning attitude resulted in the identification of material being brought into the containment without a proper evaluation.

The inspectors noted that the ongoing activities being implemented by engineering management addressed previous program problems, and their familiarity with the issues indicated strong senior management oversight.

3 MAINTENANCE OBSERVATIONS (62703)

During this inspection period, the inspectors observed and reviewed the selected maintenance and activities listed below to verify compliance with regulatory requirements and licensee procedures, required quality control department involvement, proper use of safety tags, proper equipment alignment and use of jumpers, personnel qualification, appropriate radiation worker practices, calibrated test instruments, and proper postmaintenance testing. Specifically, the inspectors witnessed portions of the following maintenance activities:

- Residual Heat Removal Pump A boric acid cleaning/casing drain flange retorquing
- Centrifugal Charging Pump A boric acid cleaning/flange retorquing
- Centrifugal Charging Pump A motor bearings oil sampling and oil change
- Train A 4160 Vac Group 4 isolation transformer power supply replacement
- Preventive maintenance for an EDG rocker lube oil pump time delay relay
- Replace EDG turbocharger manifold gasket
- Repair EDG valve cover housing oil leak
- Implement Plant Modification Requests 03988, "Relocation of EDGs A and B

Inlet Combustion Air Pressure Indicators," and -02060, "Setpoint Adjustment of EDGs A and B Air Intake Pressure Switch"

Inspectors found that personnel implemented the above listed maintenance activities in an effective manner.

3.1 Centrifugal Charging Pump A Motor Oil Change

During the Centrifugal Charging Pump A motor bearings' oil sampling and oil change, the inspector noted that the WR did not specify which bearing needed maintenance. As a standard practice, the electricians changed and sampled the oil in both bearings. Quality control personnel present agreed that this was not clear. The licensee initiated PIR 93-1705 to address this issue. Quality assurance personnel initiated PIR 93-1738 to address other issues relating to spilled oil, potential for damaged hardware, and potential personnel safety hazards.

3.2 EDG B Train Outage

On January 5, 1994, the inspector observed maintenance personnel perform selected repair activities for EDG B. The activities observed included Preventive Maintenance WR 60109-93 and WRs 05006-92, 03810-93, and 03641-90 (which implemented Plant Modification Requests 02060 and 03988).

WR 60109-93 specified requirements to perform the annual test of the rocker lube oil pump time delay relay. The time delay relay ensured that the rocker lube oil pump operated for 5 minutes to assure a prelube oil supply to the rocker arms. The inspector found the electricians knowledgeable of the relay operation/design function and the purpose of the preventive maintenance. The electricians used controlled drawings and had a copy of the procedure. The WR referenced Procedure MGE EOOP-015, "Auxiliary Time Delay Relay (TDR) Testing," Revision 2. The inspector verified that the licensee performed an appropriate postmaintenance test. The licensee verified that the time delay relay functioned properly by performing testing in accordance with Procedure SYS KJ-121, "Diesel Generator NE01 and NE02 Lineup for Automatic Operation," Revision 13, Step 4.5.3.

WR 05006-92 required replacement of the EDG B turbocharger to the intake Manifold 8 gasket. The inspector considered that the work instructions in combination with the drawings provided strong guidance for work performance. While performing the work, mechanics disconnected a fuel supply line. After approximately 1 gallon of fuel drained, the mechanics requested a change to the standing clearance order to isolate the line. The inspector found from discussions with personnel that the system engineer thought the line was a return line and did not require isolation of the fuel system. A mechanical supervisor initiated PIR 94-0037 that documented this error.

WR 03810-93 documented an oil leak from a valve cover housing and required disassembly of the rocker arm. The mechanics recognized they needed a change to the clearance order to isolate jacket water lines that required disconnection. In addition, the mechanics determined that tightening the valve cover housing hold-down bolts would stop the oil leak; therefore, the WR steps were marked not applicable. A troubleshooting sheet was added to the WR with instructions to tighten the valve cover housing bolts. The mechanical maintenance supervisor initiated PIR 94-0033, which documented the failure to recognize that jacket water required isolation.

Plant Modification Request 02060 documented the replacement of existing vacuum pressure switches with a newer model to obtain better accuracy and repeatability. Plant Modification Request 03988 identified relocating the local pressure indicator to allow easier access for cleaning and removing the jacket water heat exchanger tubes. The inspector observed that modifications personnel followed the detailed work instructions. The inspector observed that the craft personnel skillfully implemented their activities. A field engineer and quality control personnel remained present for the activities after the initial tack welding of the instrument brackets.

Following the EDG B train outage, IPS personnel performed a maintenance outage critique. The inspector found that the licensee performed critiques for each Technical Specifications limiting conditions for operation maintenance outage. The licensee used the critique to more accurately define the amount of time and/or number of personnel needed for each specific work activity, identify areas of miscoordination that would improve timeliness, if implemented, and identify other problem areas. The licensee identified numerous areas for improvement during this critique and issued eight PIRs to track correction of the identified problems. From discussions with IPS personnel, the inspector concluded the critique meeting to be an effective mechanism for improving weaknesses and concerns identified during limiting conditions for operations maintenance outages.

3.3 IPS Group Activities (40500-03)

The inspector reviewed the licensee's program for scheduling daily work activities. The following licensee procedures and instructions described the IPS activities for scheduling routine maintenance.

- ADM 01-127, "Work Scheduling During Power Operations," Revision 8
- ADM 01-128A, "Prioritization of Wolf Creek Activities," Revision 0
- AI 30-300, "Schedule Performance Monitoring," Revision 0

The procedures described the daily scheduling of maintenance and the trending of work performance results. In addition, IPS includes outage planning and scheduling, which coordinates the forced outage schedule, any planned shutdown outages, and refueling outages. IPS has three separate sections: plant scheduling, outage, and resource analysis.

IPS coordinators were assigned responsibility for specific systems. In addition, they were assigned responsibility for developing the daily WR status addendum to the weekly schedule for their designated weeks. The coordinators had a goal for placing target work dates on initiated WRs within 3 work days. From daily reviews of the daily addendum sheets, the inspector determined that IPS personnel appropriately scheduled items that impacted system health.

IPS personnel developed an annual schedule of safety-related and nonsafety-related equipment outages from review of WR equipment history, discussions with work groups, system unavailability goals, and consideration of Technical Specifications surveillances. For example, each safety-related train had two EDG/ESW train outages this year. IPS personnel developed a rolling weekly schedule that implemented the outages listed on the annual schedule and that periodically required safety-system outages to assure system health. IPS personnel finalized the weekly schedule of planned maintenance and surveillance activities 10 days prior to the beginning of the affected work week. The licensee planned the work for scheduled maintenance outages 8 weeks in advance.

IPS personnel conducted daily 7 a.m. meetings which identified WRs from the previous 24 hours that required attention that day or were scheduled for repairs at a future date. During the meetings, the shift supervisors identified WRs that affected plant operation. From periodic attendance at the 7 a.m. meetings and review of work activities accomplished, the inspector determined that the licensee had improved their ability to appropriately prioritize and address maintenance activities.

IPS resource analysis personnel developed several trends to track work group performance. Resource analysis personnel trended the completion percentage of scheduled and emergent WRs as a total and by work group. Also, resource analysis personnel trended the completion percentage of scheduled activities alone. The work groups identified the reasons why work was not completed on schedule (i.e., completed late, rescheduled, or completed early). Resource analysis personnel assigned deviation codes and trended the deviation codes. The licensee had not identified any adverse trends for rescheduled or late WRs. The inspector found that the licensee on average completed 92 percent of the scheduled work activities and emergent work activities added to the schedule. Another trend developed by the licensee that demonstrated individual system health involved monitoring the number of outstanding corrective WRs for each system. The inspector verified that the total number of corrective WRs for each system decreased.

From September 14 to December 7, 1993, the licensee reduced the total number of corrective WRs that affected system health from 1403 to 1280. The decrease, combined with the reduction in emergent work, resulted in a 24 percent per year reduction rate. At the beginning of 1994, the licensee decreased the tracking number of corrective WRs that affected system health by approximately 400. The 400 WRs were minor maintenance WRs and nonpower block maintenance. Minor maintenance WRs affecting the buildings and/or systems are listed in Attachment 2.

The licensee considered maintenance outside the power block as general upkeep of the facility. The licensee was developing a procedure that would define the activities and site locations for work accomplished outside the work control process. The licensee planned to develop a form to track and control these activities. Generally, the work activities involved equipment that did not affect plant safety, power generation, security, or power distribution. Some examples of items included are shop and laboratory equipment, vehicles, outlying buildings, and sidewalks. The licensee continued to plan, schedule, and work minor and nonpower block WRs; however, the licensee did not consider that they affected system health. The inspector verified that the licensee's definitions of minor maintenance and nonpower block maintenance were appropriate.

3.4 Conclusions

The inspectors found that knowledgeable personnel implemented work activities in accordance with work instructions appropriate to the circumstances. The inspector found the maintenance outage critique to be a strength of the scheduling group. IPS personnel provided a good method for scheduling work in a manner that maintains system health and focuses on safety-related equipment. Licensee management demonstrated strong oversight in that the licensee developed administrative processes to better categorize maintenance and to effectively utilize resources. This strong oversight was demonstrated by a reduction of outstanding safety-related, equipment WRs.

4 SURVEILLANCE OBSERVATIONS (61726)

The inspectors reviewed this area to ascertain whether the licensee conducts surveillance of safety significant systems and components in accordance with Technical Specifications and approved procedures.

4.1 Turbine-Driven Auxiliary Feedwater Pump

On December 29, 1993, the inspector observed licensee personnel perform the monthly operability test of the turbine-driven auxiliary feedwater pump in accordance with Procedure STS AL-103, "TDAFW Pump Inservice Pump Test," Revision 17. The surveillance verifies proper pump performance as specified in Technical Specification 4.0.5. The inspector noted from discussions with the system and test engineers that personnel were knowledgeable about the test sequence and purpose. The personnel had installed calibrated test instruments. During the test performance, the inspector noted excellent cooperation/coordination and good communications among operators and engineers.

From review of the completed procedure, the inspector found that the data met the acceptance criteria. The licensee documented that the lube oil pressure reached 18 psig, which was outside the normal operating parameters specified (14-16 psig). The system engineer informed the inspector that the pressure had exceeded the 16 psig during a previous test and that he had contacted the vendor. The vendor had indicated that, as long as the oil pressure remained in the vicinity of 14-16 psig, there would be no problem. The system engineer further identified that bearing vibrations matched previous measurements and oil temperatures remained within limits. After the inspector questioned the system engineer regarding upper and lower limits for the lube oil pressure, the system engineer again contacted the vendor. The vendor confirmed that 10-20 psig would be a good operating range provided the vibration levels and bearing oil temperatures remained within specifications and the lube oil flow remained adequate.

The system engineer determined that increased lube oil viscosity associated with a decrease in lube oil cooler cooling water temperature most likely caused the upward trend in lube oil pressure. The system engineer altered the surveillance procedure to require recording the lube oil pressure instead of placing a check mark in the procedure. Further, the licensee changed the procedure to require that personnel initiate a WR for adjusting the lube oil pressure to within limits during the next scheduled surveillance test. The inspector found the system engineer's activities to be appropriate.

4.2 Spent Fuel Pool Cooling Pump Inservice Test

On December 29, 1993, the inspector observed licensee personnel perform the quarterly inservice test of the Train B spent fuel pool cooling water pump in accordance with Procedure STS EC-100B, "Spent Fuel Pool Cooling Pump B Inservice Test," Revision 9. Personnel performed this surveillance to verify compliance with Technical Specification 4.0.5.

The inspector verified that data met specifications, that personnel used calibrated test equipment, and that personnel used good radiation work practices. The engineer who monitored the vibration identified that the drawing incorrectly listed vibration data Points 3 and 4. The engineer issued PIR 94-0018 to ensure personnel implemented appropriate corrective actions.

4.3 Instrument Calibrations

On January 5, 1994, the inspector observed I&C technicians perform 18-month local instrument calibration checks of the rocker lube oil filter differential pressure indicator, the rocker lube oil strainer high differential pressure switch, the main lube oil strainer differential pressure indicator, and the main lube oil strainer high differential pressure switch. The technicians verified that the gauges remained calibrated using a nine-point calibration technique. Personnel listed test points and acceptance criteria on the data sheets. The technicians found the instruments within calibration.

The technicians performed the calibrations in accordance with the program described by Procedure ADM 08-806, "I&C Group Calibration of Process Instrumentation and Special Maintenance," Revision 10, that specified I&C personnel develop procedures for calibration of components and instrumentation loops. The procedure directed the required content of the governing loop and component procedures.

The I&C technicians performed the calibration checks in accordance with the guidelines contained in Procedure INC C-1004, "Calibration of Indicators," Revision 3, and performed the pressure switch calibration checks in accordance with Procedure INC C-1001, "Calibration of Switches," Revision 5. The procedures describe, in general, the steps needed to perform the calibration, use of appropriate test equipment, acceptance criteria, and an example of a typical data sheet.

During the rocker arm lube oil strainer pressure switch calibration check, the technicians could not achieve the reset within the specified range. The adjustment screw only changed the setpoint but had no affect on the reset value. Subsequently, the technicians stopped the calibration check and consulted the total plant setpoint document. The technicians found that the reset value should have been 0.1 psig instead of 1.0 psig. The actual reset value had a specified range of 0.1 psig to 4.0 psig less than the setpoint; therefore, the incorrect reset value would have had no effect on equipment operation. The licensee initiated a PIR to document the error in the transfer of information from the total plant setpoint document to the data sheet.

4.4 Conclusions

The inspectors determined that workers' performance during the inservice pump tests was good. I&C technicians performed calibration verifications and initiated a PIR for a minor human error.

5 FOLLOWUP ON CORRECTIVE ACTION FOR A VIOLATION (92702)

(Closed) Violation (482/9209-01): Violation of Technical Specification 4.0.5

On June 4, 1992, during an NRC inspection of the inservice test program, the inspectors identified that the range for a temporary differential pressure gauge, used in surveillance testing of Containment Spray Pumps A & B, did not comply with Section XI of the ASME code. ASME Section XI, paragraph WP-4120 requires that, "The full-scale range of each instrument shall be three times the reference value or less." On May 20, 1992, personnel performed the surveillance tests and utilized a temporary differential pressure gauge with a range of 0-10 inches water column. The reference value for the specific differential pressure was 2.24 inches of water column. Although, the inservice test engineer had previously identified the discrepancy, the engineer had not documented the condition and corrective actions implemented, as required by plant procedures.

In response to the violation, the licensee stated that personnel had previously calibrated a Model 990 Controlotron flow instrument for use in lieu of the water column gauge. The licensee attributed the failure of the inservice test engineer to immediately document the condition in accordance with plant procedures as personnel error. As noted in the response, personnel initiated a corrective WR to document the ASME code noncompliance. The engineering disposition to the corrective WR concluded that the use of the gauge did not affect the ability of the pumps to perform the design functions and that tests met the intent of the ASME code. In addition, a reportability evaluation determined that the issue was not reportable.

The licensee revised Procedures STS EN-100A & -100B, "Containment Spray Pump A(B) Inservice Pump Test," to replace the differential pressure gauge with the controlotron flow instrument. The licensee revised Procedure ADM 05-200, "ASME Code Testing of Pumps and Valves," to clearly identify what actions must be taken to address ASME code noncompliance conditions.

The inspector verified that the licensee implemented the above procedure changes. However, the licensee elected to incorporate the resolution of this issue with the completion of the inservice test program review committed to in LER 482/91-007 (refer to Section 6). The licensee committed to review all inservice test pump and valve procedures to specifically address the guidance in NRC Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs." The licensee performed the reviews to ensure they had technically adequate procedures that complied with the ASME code and NRC Generic Letter 89-04.

6 ONSITE REVIEW OF AN LER (92700)

(Closed) LER 482/91-007-00: Inadequate Testing of Component Cooling Water to Reactor Coolant Pump Thermal Barrier Check Valves

On May 22, 1991, the licensee determined Procedure STS EG-206, "Component Cooling Water System Inservice Valve Test," Revision 0, did not adequately test the component cooling water to reactor coolant pump thermal barrier check valves in their closed position because of an inadequate test boundary. This deficiency violated Technical Specification 4.0.5.

The inservice test engineer discovered that the test procedure required applying pressure downstream of the check valves, while a pressure gauge upstream of the valve monitored for leakage (evident by a rapid increase in pressure). The test deficiency resulted from unisolated flow paths upstream of the check valves that prevented a closed system; therefore, a pressure increase would not have been detected and a failed check valve would not have been identified.

The licensee determined that personnel did not include sufficient technical information during the initial test procedure development. Because of this deficiency and other identified deficiencies that did not result in documented noncompliances, the licensee performed a technical review of inservice test procedures to ensure their technical adequacy and ASME code compliance. The review utilized the guidance provided in NRC Generic Letter 89-04.

During this inspection, the inspector reviewed all pertinent documentation relative to this matter that included, "The IST Program Audit/Evaluation Report," dated May 28, 1992, conducted by a vendor; the inservice test program self-assessment results and corrective actions; and the inservice test program upgrade to the incorporation of the ASME/ANSI OMa - 1988, Part 10. The inspector verified the results of the above evaluations and reviewed Document WCOP-02, "Inservice Test Program," Revision 10, dated

October 13, 1993. The inspector found the program provided detailed guidance for performing tests, documenting deviations, and evaluating and resolving deviations.

7 INOFFICE REVIEW OF AN LER (90712)

The inspector reviewed the following LER and determined that personnel completed the corrective actions discussed in the report.

(Closed) LER 93-013: Incorrect Wiring of the 10-60 Meter Differential Temperature Instrument

ATTACHMENT 1

1 PERSONS CONTACTED

1.1 Licensee Personnel

T. A. Conley, Supervisor, Health Physics
R. Q. Dunlap, Regulatory Compliance Specialist
C. W. Fowler, Manager, Maintenance and Modifications
R. B. Flannigan, Manager, Nuclear Safety Engineering
R. C. Hagan, Vice President Nuclear Assurance
D. Jacobs, Manager, Mechanical Maintenance
O. L. Maynard, Vice President Plant Operations
B. T. McKinney, Manager, Operations
R. A. Meister, Senior Engineering Specialist, Regulatory Compliance
R. W. Miller, Supervisor, Plant Scheduling
K. J. Moles, Manager, Regulatory Services
T. S. Morrill, Manager, Radiation Protection
W. B. Norton, Manager, Nuclear Engineering
C. E. Parry, Director, Corporate Development
J. M. Pippin, Manager, Integrated Plant Scheduling
F. T. Rhodes, Vice President Engineering
C. E. Rich, Jr., Manager, Electrical Maintenance
T. L. Riley, Supervisor, Regulatory Compliance
R. S. Robinson, Supervisor, Instrumentation and Control
R. L. Sims, Supervisor, Operations
B. B. Smith, Manager, Modifications
C. M. Sprout, Manager, System Engineering
S. G. Wideman, Supervisor, Licensing

1.2 NRC Personnel

T. P. Gwynn, Deputy Director, Division of Reactor Projects
L. A. Yandell, Chief, Project Section B, Division of Reactor Projects

The above personnel attended the exit meeting. In addition to the personnel listed above, the inspectors contacted other personnel during this inspection period.

2 EXIT MEETING

An exit meeting was conducted on January 14, 1994. During this meeting, the inspectors summarized the scope and findings of the report. The licensee acknowledged the inspection findings identified in this report. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspectors.

ATTACHMENT 2

Systems I cluded in Minor Maintenance

CO	Carbon Dioxide System
CQ	Plant Security System
CR	I&C Shop Compressed Air System
CS	Communication Systems
DR	Onsite & Offsite Drainage System
EL	Site Emergency Lighting - DC
GX	Grounding & Cathodic Protection System
HB	Liquid Radwaste System
HC	Solid Radwaste System
HD	Decontamination System
HX	Hoists-Cranes-Elevators & Manlifts Systems
KB	Breathing Air System
KF	Cranes-Hoists & Elevators System
LB	Roof Drains System
LC	Yard Drainage System
MT	Shop Building Machine Tool Power Supply
NR	I&C Shop Nitrogen System
PS	Construction Power Loop
QA	Normal Lighting System (includes 120/208 V power)
QE	Telephone System
QF	Public Address System (Intercom)
QH	Cathodic Protection System
QN	Miscellaneous Equipment System
RC	Radiation Chemistry Computer System (Cables Only)
RG	Administration Building Heating, Ventilation, and Air Conditioning (HVAC) Refrigeration System
RH	Closed Circuit TV
RT	Emergency Response Facility Info System
RU	Site Computers I&C Shop (Main Frame)
ST	Sewage Treatment System
VA	I&C Shop HVAC System
VB	I&C Shop Computer Room HVAC System
VC	Health Physics Computer Room HVAC
VE	Education Center HVAC
VJ	Shop Building Machine Shop Area Vent System
VL	Shop Building HVAC System
VM	Vehicle Maintenance/Fuel
VS	Administrative Building HVAC System
VT	Technical Support System HVAC
VV	Shop Building Water Treatment Area Vent System
VW	Waste Water Treatment Ventilation
WD	Potable Water System
WL	Cooling Lake Makeup Water and Blowdown System
WT	Waste Water Treatment
ZC	Circulating Water Screen House
ZF	Education Center
ZG	Technical Support Center
ZJ	Security Building
ZM	Makeup Screen House

ZN Administration Building
ZP1 Shop Building
ZR Site Railroad