APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-482/91-02 Operating License No.: 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: January 17 through February 27, 1991

Inspectors: M. E. Skow, Senior Resident Inspector
Project Section D, Division of Reactor Projects

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Division of Reactor Projects

3-8-91
Date

Inspection Summary

Inspection Conducted January 17 through February 27, 1991 (Report 50-482/91-02)

Areas Inspected: Routine, unannounced inspection including plant status, operational safety verification, surveillance observation, maintenance observation, engineered safety feature system walkdown, and followup on previously identified NRC items.

Results: Within the areas inspected, no violations were identified. Operations, security, and health physics personnel appeared knowledgeable and performed their tasks in accordance with procedures. One hot particle contamination of a worker was found although the radiation exposure to the skin was within regulatory limits. Maintenance and surveillance activities were performed in accordance with procedures. Two temporary waivers of compliance were requested and granted to permit bypassing one channel of containment pressure instrumentation while surveillance tests of other channels were performed.

An inspector followup item pertaining to future licensee actions associated with a reanalysis of the reactor vessel head vent system is discussed in paragraph 3.e.

DETAILS

1. Persons Contacted

Principal Licensee Personnel

*B. D. Withers, President and Chief Executive Officer
*J. A. Bailey, Vice President, Operations
*F. T. Rhodes, Vice President, Engineering and Technical Services
*G. D. Boyer, Director, Plant Operations
*R. S. Benedict, Manager, QC
H. K. Chernoff, Supervisor, Licensing
*M. E. Dingler, Manager, NPE Systems
*R. B. Flannigan, Manager, NSE
*C. W. Fowler, Manager, I&C
*B. Goshorn, Planning Engineer, KEPCO
*J. Haahr, Director, Engineering, KEPCO
*N. W. Hoadley, Manager, NPE Systems
*R. W. Holloway, Manager, Maintenance and Modifications
*D. Jacobs, Supervisor Engineer, RE
*W. M. Lindsay, Manager, QA
*R. L. Logsdon, Manager, Chemistry
*T. S. Morrill, Manager, Radiation Protection
*D. G. Moseby, Supervisor, Operations
*W. B. Norton, Manager, Technical Support
*C. E. Parry, Director, Quality
*A. L. Payne, Manager, Supplier/Material Quality
*J. M. Pippin, Director, NPE
*R. L. Sims, Supervisor, Equipment Engineering
*C. M. Sprout, Section Manager, NPE, WCGS
J. D. Weeks, Manager, Operations
*S. G. Wideman, Senior Licensing Specialist
*M. G. Williams, Manager, Plant Support
*R. L. Westman, Manager, Engineering-Specialist, NPE

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 February 27, 1991.

2. Plant Status

The plant was operating at 90 percent power at the beginning of the inspection period. On February 5, 1991, power was reduced to 80 percent and remained at that level through the remainder of the period. The purpose of the power reduction was to conserve fuel to ensure that sufficient fuel is available in order to operate at full power during the summer. The next refueling outage is scheduled for mid-September 1991. There were no reactor trips.

3. Operational Safety Verification (71707)

The objectives of this inspection were to ensure that the facility was being operated safely and in conformance with license and regulatory requirements and that the licensee's management control systems were effectively discharging the licensee's 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 LCOs, corrective actions, and review of facility records.

a. Valve Binding in Safety Injection System

On January 20, 1991, the licensee was performing Surveillance STS EM-201, Revision 3, "Safety Injection System Inservice Valve Test." As part of this procedure, motor-operated Valve EM HV-8924, RHR to SI Pump "A" upstream isolation, was shut while Valves EM HV-8807A and -B were stroked open and shut. Following those valve manipulations, the operators attempted to open EM HV-8924, but it failed to stroke. The operators were able to manually open the valve, which is the required safeguards position. The licensee stated that binding was causing the breaker to the motor operator to trip. The licensee radiographed the valve to verify that it was in the open position. They were unable to identify a cause of the binding. Further investigation into the cause of valve binding will occur during an outage when this portion of the system can be taken out of service.

b. Hot Particle Exposure

On February 6, 1991, the licensee found a hot particle on the shirt of a worker. The worker had been installing scaffolding in the auxiliary building. The particle was found during routine radiological frisking as he was leaving the auxiliary building. The particle was determined to be approximately 0.2 microcuries of Cobalt 60. The evaluation concluded that the skin dose from the exposure was 0.912 rem. This hot particle was found in an area that was not previously identified as a hot particle area. The licensee surveyed the areas the worker had been in and found no other hot particles. The dose to the worker was within the limits of 10 CFR Part 20.

c. Power Reduction

On February 5, 1991, operators reduced plant power from 90 percent to 85 percent and, a few hours later, continued to reduce power to 80 percent. The inspector observed portions of the power reduction in the control room. Operators performed the power change in a professional manner. The licensee was operating at reduced power as a fuel conservation method to ensure that sufficient power is

available during the summer load demand and so that power operations may continue until the scheduled mid-September refueling outage.

d. Security

The inspector observed security operations during shift turnover and the arrival of day shift plant personnel. During the period, the inspector also observed compensatory measures taken because of fog. Security personnel performed in a professional manner in both routine and response tasks.

e. Reactor Vessel Head Vent Analysis

The final Westinghouse analysis of the reactor vessel head vent system was received during the latter part of January 1991. An evaluation of the functionality of the system was performed by engineering personnel. The thermal expansion load case, with flow assumed in only one of the two parallel paths, results in the thermal expansion stress for the pipe exceeding ASME Code limits and isolation valve nozzle loads exceeding the Westinghouse equipment specification design loads. Calculated pipe support loads are within the original design specification. The system functionality criteria as determined by the licensee are:

- The system can be operated up to five times to remove noncondensible gases from the reactor head;
- The integrity of the reactor coolant pressure boundary will be maintained; and
- A flow path will be maintained.

On the basis of meeting these criteria, the licensee determined that, if required, the head vent system would function as it is currently installed. Region IV and NRR reviewed the licensee's justification for continued operations and concurred with their conclusions. Currently, the Westinghouse reactor vessel head vent system reanalysis is being reviewed by NRC for generic applicability. Licensee corrective actions will be tracked by an inspector followup item (482/9102-01).

f. Seismic Monitor

On February 8, the setpoints for the seismic triaxial response spectrum recorder for the containment base slab were determined to be inaccurate. A setpoint revision issued in June 1984, was not factored into the original startup test requirements and the calibration procedure. Therefore, the requirement of TS 3.3.3.3, Table 3.3-7, Item 3, to submit a special report to NRC within 30 days, was not met. The error affects only the setpoint of the recorder and does not affect any equipment qualification requirements. LER 91-006

will be issued to address how this condition occurred and the corrective actions being taken.

g. Turbine Runback

On February 14, 1991, control room operators received a stator cooling flow alarm which, subsequently, cleared. The alarm began coming in and clearing frequently. Operators investigated cooling flow and found no problems. They also shifted cooling pumps. The alarm setpoint for low stator cooling flow is 10 percent below the required flow for any given main generator output. A turbine runback will occur at 15 percent below required flow. Operators and technicians found that the erroneous signal could be isolated if the circuit degraded. While investigating the problem, a turbine runback occurred and the turbine control was placed in standby which stopped the runback at 75 percent power. Technicians also lifted a lead in the stator cooling protection circuit to prevent a turbine trip which would have occurred if the 15 percent low signal locked in for 3.5 minutes. Technicians subsequently replaced a failed electronic card to repair the circuit.

Conclusions

During the observation of operations, security, and radiological control personnel activities, personnel appeared to follow procedures and were knowledgeable of their assigned tasks.

4. 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.

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

a. Safety-Related Room Cooler Heat Transfer

The inspectors observed portions of STN PE-036, Revision 0, "Safety Related Room Cooler Heat Transfer Verification and Performance Trending," being performed on the "A" MDAFP room cooler. The purpose of that procedure was to verify the heat transfer capability of the safety-related room coolers to satisfy NRC Generic Letter 89-13.

b. Incore-Excore Detector Calibration

The licensee performed Surveillance STS RE-013, Revision 3, "Incore-Excore Detector Calibration." The test was performed 2 days following the power level reduction because RCS temperature changes

may affect the calibration of the excore detectors. The detectors were found to be within their acceptance criteria and recalibration was not required.

c. Control and Shutdown Rod Operability Verification

Surveillance Procedure STS SF-001, Revision 7, "Control and Shutdown Rod Operability Verification," was observed. The purpose was to verify that each rod was operable by driving the rods in 10 steps and withdrawing the rods back to the designated full-out position. The licensee changes the designated full-out position on a regular basis to minimize wear at a single location on the rod assemblies. At the conclusion of this test, the fully withdrawn rod bank position was left at 223 steps compared with 222 steps before the test. The operators limited other scheduled surveillance activities until this test was completed to reduce potential distraction from monitoring plant response to the reactivity changes.

d. Containment Pressure Instrument Test

The inspectors observed the performance of STS IC-202, Revision 9, "ACOT 7300 Process Instrument Protection Set II." The procedure is used to perform testing of the containment pressure channels and is performed monthly. A channel is normally placed in "test" to perform the surveillance. In the "test" mode, the channel gives a trip output to the ESFAS 2/3 logic circuitry. This results in a situation where the actuation of either of the two remaining channels will initiate SI and steam line isolation signals with an associated reactor trip.

One of the three containment pressure channels was experiencing intermittent spiking. One spike was of sufficient magnitude to actuate an alarm for high containment pressure. If a spike of this magnitude occurred while another channel was in "test," the 2 out of 3 logic would be met and a trip would occur. Because of the increased vulnerability to an unnecessary plant transient, the licensee requested a temporary waiver of compliance on January 23, 1991, to allow the spiking containment pressure channel to be removed from service during the time another channel was being tested. The licensee could not remove the spiking channel from service during the testing since that would have resulted in less than the minimum channels required by TS. A temporary waiver of compliance was granted on January 24, 1991, to allow the spiking channel to be removed from service for up to 2 hours during a period of approximately 3 days. The surveillance was accomplished within the period specified by the temporary waiver of compliance authorization.

Because of the complexity and difficulty of troubleshooting and repairing a circuit with intermittent spikes, the licensee requested a second waiver of compliance on February 22, 1991. This was to support the next performance of the monthly surveillance tests. The

spikes were detected on a frequency of about once in 10-20 days. The licensee replaced a power supply in the system, but the spikes continued. As the report period ended, the licensee was preparing to replace an electronic circuit board in the pressure detector. The waiver of compliance was granted on February 27, 1991. The surveillance was scheduled for February 28, 1991.

e. Turbine Valve Testing

During performance of STS AC-002, Revision 4, "Main Turbine Valve Cycle Test", on February 14, 1991, the plant experienced a rapid load rejection of approximately 110 MWe. Steam generator atmospheric relief valves lifted briefly during the transient. Operators promptly recovered from the power reduction. This was similar to an 80-MWe power reduction that occurred on January 14, 1991, during performance of the same procedure. In anticipation of a potential load reduction, the licensee connected chart recorders to the turbine control system to aid in troubleshooting should a second load rejection occur. The information obtained aided the licensee in developing an analysis of the events and proposing corrective action.

As a result of the licensee's investigation, it was determined that, when stage pressure feedback is made active, the turbine control system monitors the difference between the actual signal driving the control valves and actual first stage pressure. A steady load signal is generated. During the test, when the system is taken off load limiting by pressing the "decrease" button, load demand is decreased even though first stage pressure is holding actual load constant because the system is operating in the pressure mode of control. When the test is complete and stage pressure feedback is released, and since load demand was decreased to go off the load limiter, the control valves close to meet the load demand which was set in the system. This caused the load rejections on January 14 and February 14, 1991. These events were not observed before because at 100 percent power the rate of change of valve movement is less than at lower power levels. The licensee stated that a change to the surveillance procedure will be issued.

f. Instrument Air

The results of the oil and particulate testing for a previous surveillance were received. The air samples indicated no detectable oil or particulates. The blank container tested indicated the presence of oil. However, the test results did not explain this anomaly. Additionally, as discussed in NRC Inspection Report 50-482/90-38, the dewpoint was outside the acceptance criteria given in the procedure. The test deficiency section of the procedure was completed. In accordance with ADM 02-300, Section 6.7.1.1, "The test performer shall coordinate with the on-shift shift supervisor and determine the actions to be taken to resolve the deficiency..." The action noted to resolve the deficiency was that the high dewpoint

was to be evaluated by the systems engineer. The STN was considered complete without an evaluation of the condition having been documented. The inspectors will continue to followup on this issue under Inspector Followup Item 482/9035-07.

g. Fire Protection

Procedure ADM 13-100, Revision 3, "Fire Protection Manual," was recently revised. Section 3.2 states, "All time controlled activities specified in this procedure shall be performed within the specified time interval with a maximum allowable extension not to exceed 25 percent of the stated time interval." As discussed with the fire protection engineer, this broad statement could be misconstrued as allowing 25 percent more time prior to establishing a firewatch, performing hourly firewatch tours, or, as discussed in Section 7.3.1.1.3, complying with times to restore pump operability. The licensee has submitted a procedure change to revise the procedure to clarify that the 25 percent extension is for time intervals associated with surveillance testing.

Additional surveillances were observed, including:

- STN IC-218A, Revision 0, "Diesel Generator Room 'A' Temperature Sensor TE-1 and Ventilator Controls;"
- STS EC-100A, Revision 4, "Spent Fuel Pool Cooling Pump 'A' Inservice Pump Test;"
- STS EJ-100A, Revision 7, "RHR System Inservice Pump 'A' Test;" and
- STS AL-102, Revision 11, "Motor Driven Auxiliary Feedwater Pump 'B' Inservice Pump Test;"

Conclusions

The surveillances that were observed were performed by knowledgeable personnel in accordance with approved procedures. During performance of the inservice pump tests, control room operators took care to ensure that operators in the plant knew the locations of instruments and other equipment before related steps were performed. The evaluation of the high dewpoint for instrument air was not completed prior to considering the surveillance test complete.

5. 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. Portions of selected maintenance activities regarding the WRs were observed. The WRs and related documents reviewed by the inspectors are listed below:

a. Component Cooling Water System Maintenance

The inspector observed preventive maintenance on the "B" train pump room cooler, pump room fan coil, and the "D" CCW pump motor. The equipment was removed from service, which allowed the work to be performed under WR instructions. Maintenance on the room cooler and fan coil included checking the filters, fan inlet guide vanes, fan wheel, and drive belts. The fan and motor bearings were lubricated. A sample of the pump motor oil was taken and new oil was added to make up for the removed sample. Additional work instructions for the oil sampling were in Procedure MPM OS-001, Revision 0, "Preventive Maintenance Lubrication Sampling and Replenishment at Various Frequencies." The workers had copies of the WRs, bill of material, and clearance orders appropriate for their jobs. The specific WRs inspected were:

- WR 50114-91 CCW Pump Room "B" Room Cooler
- WR 50181-91 CCW Pump Room "B" Fan Coil
- WR 50091-91 "D" CCW Pump Motor Oil Sample

b. "A" RHR Pump Motor Sample and Oil Change

The inspector observed work activities associated with WR 52563-90, "A" RHR pump motor sample and oil change. The workers had maintenance instructions in the WR as well as supplemental instructions in Procedures MPM OS-001 and MPE ML-001, Revision 0, "Motor Lubrication PM Activity On Various Equipment." The oil used matched the description required in the WR.

c. Repacking Isolation Valve For Steam Flow Transmitter

On February 13, 1991, Valve AB V022 was repacked under WR 00337-91. The valve is one of the isolation valves for Flow Transmitter FT-513, which provides "A" steam generator steam flow indication. The valve located inside containment was successfully repacked and the transmitter was returned to service.

d. Replacement of Rupture Disks For Hydrogen Recombiners

Because of leaks around the flange that holds the rupture disk for the hydrogen recombiner, the rupture disks for both recombiners were replaced on February 8, 1991. Subsequently, the flange for the "A" recombiner continued to leak. The rupture disk was replaced under WR 00562-91 on February 15, 1991. No leakage was detected. The hydrogen analyzers for Train "A" were calibrated and returned to service. Improper piping alignment which affects the flange alignment appears to have been the root cause of the repeated problems with rupture disk leakage. Health physics coverage and QC coverage were adequate for the tasks performed. Craft personnel were knowledgeable of the skills needed to perform the maintenance.

Conclusion

The maintenance activities were performed by knowledgeable workers. Procedures and controls in effect were adequate.

6. Engineered Safety Features Walkdown (71710)

The CCW system was walked down during this inspection period. The scope of the inspection and selected inspector observations are discussed below:

- The accessible portions of the system were inspected. Valve, switch, and breaker positions were verified to be in accordance with plant checklists for operation in Mode 1.

- A discrepancy was noted on Piping and Instrumentation Diagram M-12EG02. Valves EF V021, -026, -046, and -051 are on vent lines for the heads of the CCW heat exchangers. The lines past these isolation valves are shown as OPEN on the drawing when they are actually capped.

- Drawing M-15EG03, Revision 9, "Hanger Location Drawing for CCW System, Auxiliary Building "B" Train," has four areas marked HOLD. The support drawings were derived from piping isometric drawings. The HOLDs were originally related to the isometric drawing. The HOLDs will be removed the next time the support drawing is updated.

- Checklist CKL EG-120 requires alignment of Valve EG-C001, -C002, -C003, and -C004 which are vent and drain valves on the CCW surge tanks. These valves are not shown on Drawing M-12EG01. The valves are past the root valves. Other small valves are not included on the P&IDs or on the checklists.

- The CCW system appears to be well maintained. Housekeeping in the areas of the pumps, heat exchangers, and CCW piping was good.

- Hangers and supports that were inspected were properly installed and maintained.

- Support systems essential to system actuation were operable. The valves supplying instrument air to air-operated valves were verified to be open. However, the inspectors noted that small instrument air valves are not tagged and valve positions are not indicated on valve checklists.

- The design data for flows and heat loads for CCW system requirements for normal operation, shutdown operations at 4 hours, and post-LOCA, as detailed in USAR Tables 9.2-9, -10, and -11, were reviewed. The inspectors verified that emergency procedures adequately addressed the isolation of flow to the spent fuel pool when the RHR heat exchanger is put into service.

7. Followup on Previously Identified NRC Items (92702)

(Closed) Violation (482/9005-03): Failure to Follow Procedure

This violation concerned a failure to perform a maintenance activity utilizing an authorized WR. Maintenance and Modifications Information Bulletin No. 45, dated April 9, 1990, was issued by the licensee. The bulletin emphasized the requirement for workers to have in their possession work documents at the work location. Repeats of this violation have not been observed. This violation is closed.

(Closed) Violation (482/9031-01): Failure to Have an Approved Procedure

This violation concerned a failure to have an approved procedure during performance of a test of the main generator voltage regulator. Procedure ADM 08-201, Revision 5, states that procedures shall be used when performing both preventive and corrective maintenance work activities on systems or components that are in service. The use of an inservice maintenance procedure was observed and noted in NRC Inspection Report 50-482/90-38. This violation is closed.

8. Exit Meeting (30703)

The inspectors met with licensee personnel (denoted in paragraph 1) on February 27, 1991. The inspectors 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.

ATTACHMENT

Acronym List

ADM	administrative procedure
CCW	component cooling water
ESF	engineered safety features
ESFAS	engineered safety feature actuation signal
KEPCO	Kansas Electric Power Cooperative
LCO	limiting conditions for operation
LER	licensee event report
MDAFP	motor driven auxiliary feedwater pump
MPE	maintenance preventive-electrical
MPM	maintenance preventive-mechanical
Mwe	megawatt
NPE	nuclear plant engineering
NRC	Nuclear Regulatory Commission
NSE	nuclear safety engineering
P&ID	piping and instrumentation diagram
PMR	plant modification request
QA	quality assurance
QC	quality control
RCS	reactor coolant system
RE	results engineering
RHR	residual heat removal
SI	safety injection
SNUPPS	standardized nuclear unit power plant system
STN	surveillance nontechnical specification
STS	surveillance technical specification
TS	Technical Specification
USAR	Updated Safety Analysis Report
WCGS	Wolf Creek Generating Station
WCNOC	Wolf Creek Nuclear Operating Corporation
WR	work request