

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-482/90-38 Operating License No.: NPF-42

Docket No.: 50-482

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

Facility Name: Wolf Creek Generating Station (WCGS)

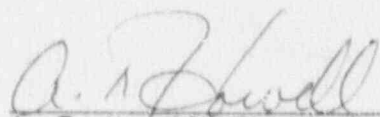
Inspection At: WCGS, Coffey County, Burlington, Kansas

Inspection Conducted: December 5, 1990 through January 16, 1991

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

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Approved:



A. T. Howell, Chief, Project Section D
Division of Reactor Projects

1-31-91
Date

Inspection Summary

Inspection Conducted December 5, 1990 through January 16, 1991
(Report 50-482/90-38)

Areas Inspected: Routine, unannounced inspection including plant status, operational safety verification, surveillance observation, maintenance observation, followup on a previously identified NRC item, review of licensee event reports, and cold weather preparations.

Results: Within the areas inspected, no violations were identified. The failure of two nonsafety-related components each affected the operability of redundant safety-related components (paragraphs 3.a). In both cases the failed components were not in the PM program. The licensee determined that there was an indication of failed fuel because of a slight increase in the level of dose equivalent iodine (paragraph 3.d). An air quality filtration unit was removed without authorization (paragraph 4.b). Improvement was noted in the control of maintenance activities (paragraph 5).

On December 23, 1990, the licensee declared a NOUE after it began a plant shutdown because both SI pumps were declared inoperable after the common RWSI recirculation line became blocked with ice. The ice blockage occurred during cold weather conditions following the failure of the nonsafety-related heat trace system (paragraph 8). This event is discussed in detail in NRC Inspection Report 50-482/90-39.

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
- *T. F. Deddens Jr., Outage Manager
- M. E. Dinger, Manager, NPE Systems
- *W. G. Eales Jr., Manager, Electrical Systems Engineering
- *R. B. Flannigan, Manager, NSE
- *C. W. Fowler, Manager, I&C
- *N. W. Hoadley, Manager, Plant Design
- *R. W. Holloway, Manager, Maintenance and Modifications
- *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
- J. M. Pippin, Manager, NPE
- G. P. Rathbun, Manager, NPE/Wichita
- *C. M. Sprout, Manager, NPE/Wolf Creek
- J. D. Weeks, Manager, Operations
- *S. G. Wideman, Senior Licensing Specialist
- *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 January 16, 1991.

2. Plant Status

The plant operated at or near 100 percent thermal power throughout most of the inspection period. On December 23, 1990, the licensee declared a NOUE because of the the initiation of a plant shutdown required by the TS. The licensee identified that both SI pumps were inoperable because of ice blockage in the common recirculation line to the RWST. Reactor thermal power was reduced to 65 percent before the blockage was cleared and one SI pump was restored to operable status. The plant shutdown and NOUE were subsequently terminated. On January 12, 1991, power was reduced to 90 percent. This power reduction was in accordance with the licensee's plans for fuel conservation. As of January 8, 1991, at 5:05 a.m. CST, the

licensee completed 232 continuous days of operation. This continuous run established a new record for SNUPPS plants.

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. Failure of Nitrogen Pressure Regulator

On January 12, 1991, at 5:55 a.m., the licensee discovered that Nitrogen Pressure Regulator INT-547 was inoperable. This nitrogen pressure regulator is an integral component in assuring operability of four safety-related accumulators. Each accumulator is the backup pneumatic supply to one S/G ARV and one AFW discharge valve. The backup nitrogen supply maintains the accumulators pressurized through the pressure regulator and ensures the valves will remain operable following a loss of the nonsafety related IAS.

At about 7:00 a.m. reactor operators noted that the pressure in one accumulator decreased below 650 psig. At 11:16 a.m., the pressure in a second accumulator decreased to below 650 psig. The licensee previously calculated that an accumulator was inoperable when pressurized below 650 psig. The licensee declared both accumulators inoperable and entered TS 3.7.1.6.b. This TS requires that with more than one of the required ARVs inoperable, restore the required the number of ARVs to operable status within 24 hours or be in HOT STANDBY within the following 6 hours. The licensee, using high pressure nitrogen bottles, pressurized the accumulators and exited the TS at 3:16 p.m.

The pressure regulator was replaced and the failed regulator was disassembled to determine the failure mode. Examination of the internal components identified moisture and rust scale inside the regulator. The licensee stated that ice formation within the valve may have been the cause of the regulator failure. The ice could have resulted from the moisture freezing during the extreme cold weather. The licensee identified that this valve was not included in the their PM program. At the conclusion of the inspection period, the licensee was considering adding the regulator to their PM program, and was considering improving the environmental durability of the pressure regulator.

The nitrogen pressure regulator is a nonsafety-related component that supports all four safety-related S/G ARVs. A separate incident was identified in December 1990, involving the failure of nonsafety-related RWST recirculation line which led to the inoperability of both SI pumps. (This event is documented in NRC Inspection Report 50-482/90-39.) A nonsafety-related heat trace thermostat, on the common RWST recirculation line, failed. This resulted in ice blockage of the line. With the common recirculation line plugged, minimum flow requirements through the SI pumps were not assured. The inspector observed that the nonsafety-related thermostats were not included in the licensee's PM program.

b. Reactor Vessel Head Vent Analysis

Westinghouse notified the licensee of a potential safety concern involving the reactor vessel head vent design. The concern involved the use of one line in the reactor vessel head vent system rather than both parallel lines. The Westinghouse initial evaluation indicated that if only one leg is utilized, a pipe overstress condition may occur. The licensee's PSRC reviewed the safety evaluation and concluded that the reactor vessel head vent system was operable. The final analysis being performed by Westinghouse is expected to be completed by the end of January 1991. The licensee expects to complete their review of the Westinghouse final analysis in early February 1991. The licensee will then make their final operability determination and determine whether corrective actions are required.

c. Inoperable Wind Speed and Direction Indication

The meteorological tower wind speed and direction instrumentation were inoperable at elevations 10 and 60 meters because they became frozen during the cold weather. This condition existed from January 5, 1991, at 2:00 a.m. through January 13, 1991, at 12:20 p.m. Since the instrumentation was inoperable for more than 7 days, the licensee will issue a special report in accordance with TS 3.3.3.4.

d. Detection of Failed Fuel

On December 31, 1990, the DEI measured in the RCS sample exceeded $3.0E-3$ microcuries per gram for 7 consecutive days. This placed the plant in Action Level 1 in accordance with ADM 01-221, Revision 1, "Failed Fuel Action Plan," Step 6.3. At this level of activity, an assessment of the number and type of fuel failures is estimated and plans are made for the end of cycle fuel inspections. The inspectors will continue to monitor DEI levels in the RCS to assure that no significant fuel failures have occurred.

e. Gas Release to Auxiliary Building

On January 1, 1991, the No. 1 hydrogen recombiner experienced a gas leak at the flange where the rupture disk is installed. This resulted in an unplanned release into the radwaste building from the No. 8 gas decay tank. Pressure within the tank decreased from 9.2 psig at 8:00 a.m. to 2.8 psig at 11:00 a.m. The gas, which had not been sampled, was filtered through the radwaste building ventilation exhaust system. This system provides filtration through charcoal and particulate filters prior to release to the environment. Chemistry technicians were promptly notified of the unplanned release. The licensee calculated that the total activity released was less than $3.5E-4$ microCi/cc. This value is below the MPC limits established in 10 CFR 20. Future inspection followup of this event will be performed after the licensee issues the LER for this event.

f. Containment Pressure Instrumentation Spikes

On December 25, 1990, Containment Pressure Indicator PI-934 (Channel 4) spiked high resulting in a reactor partial trip alarm. The licensee determined that no actual pressure spike had occurred. A recorder was installed on Channel 4 to continuously monitor the suspect components. No problems were noted for several days. After receiving another spike on January 4, 1991, the licensee identified a defective resistor and replaced the affected card. The licensee continued to monitor the containment pressure indicator channels, but no subsequent problems were noted.

g. Steam Leak on Condensate Line

During this inspection period, a small steam leak developed in a 4-inch bypass line around a steam trap on the TDAFW pump. This bypass line is normally aligned to the condenser. The licensee isolated the steam leak by closing Valve FC HV310. The pump was declared inoperable and TS 3.7.1.2 was entered. A weld repair was made to the bypass line (nonsafety-related piping) and the TDAFW pump was returned to service. The apparent cause of the line degradation was the bypass valve around the steam trap which allowed water to accumulate in the line. The line subsequently corroded resulting in small pinhole leaks.

Two different nonsafety-related components failed affecting operability of redundant safety-related components. These failed components were not included in the licensee's PM program. The licensee is appropriately monitoring the DEI concentrations in the RCS. Reports will be submitted for the meteorological instruments being out of service and for a gas leak in the radwaste system. The licensee has been effectively managing contaminated areas. A reduction in the radiologically contaminated area was noted in the north mechanical penetration room.

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. Problems with Moveable Incore Flux Detector

During flux mapping of the reactor core on December 31, 1990, the licensee identified problems with the "D" moveable incore neutron flux detector. The licensee was performing core flux mapping in accordance with SYS SR-200, Revision 5, "Moveable Incore Detection Operation," when discrepancies were noted between the actual and measured location of the "D" detector. Initially, the licensee suspected problems with the flux map instrumentation and replaced a speed control card. The problems continued to persist such that on January 10, 1991, the incore detector, its cable, and takeup reel were replaced and the limit switches were adjusted. No further problems were noted, and on January 11, 1991, the flux mapping system was returned to service.

b. Instrument Air Quality Testing

On January 3 and 4, 1991, the inspector observed the performance of IAS air quality testing performed in accordance with STN KA-001, Revision 1, "Air Quality Testing." Filtration units were attached to spare air taps located in the turbine building to capture particulates and oil. Air flow was established through the filters at a rate of 3.5 to 4.0 liters per minute. The filtration units were left in place for approximately 7 hours. One filtration unit was removed by maintenance personnel who wanted to utilize the connection for pneumatic tools; however, the control room was not notified that the unit was removed. The inspector noted that the sampling methods were not prescribed by the procedure and the sampling filters were not tagged in the field. The dew point was measured as -7°F which was greater than the acceptance criteria in the procedure. Licensee review of the out-of-tolerance dew point will be tracked by inspector followup item 482/9035-07. The inspector will review the results of the particulate and oil samples when they became available from the laboratory in 2 to 3 weeks.

c. STN MA-001, "Main Generator Hydrogen Leak Rate Test," Revision 1

On December 21, 1990, the licensee determined that hydrogen leakage from the main generator was 863.6 cubic feet per day. A subsequent surveillance performed on January 11, 1991, determined the leakage was 1147.75 cubic feet per day. The licensee's safety department was

tasked with identifying the leakage paths to ensure volatile concentrations of hydrogen were not accumulating. The licensee was still investigating this condition at the close of the inspection period.

The inspectors reviewed the following surveillance tests and verified that the test results were properly documented:

- o STS PE-013, Revision 8, "Airlock Seal Test," including Temporary Procedure Change MI 90-852;
- o STS SE-001, Revision 9, "Power Range Adjustment to Calorimetric;"
- o STN BB-001, Revision 0, "RC Pump Temperature Log;"
- o STS GK-001B, Revision 8, "Control Room Ventilation System Train 'B' 10-Hour Operability Test;" and
- o STS EJ-100B, Revision 7, "RHR Inservice Pump 'B' Test."

An IAS air quality filtration unit was removed without authorization from the control room. Other surveillance tests appeared to be performed in accordance with approved procedures by knowledgeable personnel.

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. Air Compressor Maintenance

Corrective maintenance on the "C" air compressor was performed on December 17, 1990, in accordance with WR 05956-90. The licensee identified that the high pressure rider ring was worn. Maintenance personnel replaced both the high pressure and the low pressure rider and compression rings in accordance with the approved work instructions. The post-maintenance operability test was completed satisfactorily and the air compressor was returned to service.

b. Investigation into Control Building Air Condition Unit Degradation

During this inspection period, the inspector observed the inspection of the Control Building Air Condition Unit SGK-04A. Maintenance and NPE personnel entered SGK-04A to evaluate any physical degradation of the unit. This activity was performed in accordance with WR 05651-90. The licensee found the fan motor base was bent and also

had worn sheaves. These conditions presently do not affect operability of the unit. The appropriate modification to the unit is being evaluated.

c. Hydromotor Maintenance on Control Room AC Unit

The licensee performed corrective maintenance activities on the control room AC unit. The hydromotor, (water actuated valve) which governs ESW flow through the AC unit, was not opening sufficiently to maintain control room temperature. The hydromotor was adjusted and calibrated in accordance with the work instructions provided in WR 52129-90. The valve was tested following the maintenance activity and was declared operable.

d. Replacement of Reactor Coolant Makeup Water Transfer Pumps

The reactor coolant makeup water transfer pumps were experiencing repeated bearing failures. The licensee initiated PMR 2966 to replace both the "A" & "B" reactor coolant makeup water transfer pumps. The "B" pump was replaced the week of January 7, 1991. The "A" pump was replaced the week of January 14, 1991. The pumps were tested and returned to service following the maintenance activities.

e. Repair of CVCS Positive Displacement Pump

The licensee noted that leakage around the plungers for the positive displacement pump became excessive on December 28, 1990. The PDP was removed from service and PMR 3633 was initiated to replace the plungers with a different design. At the time the leakage occurred, noble gas level in the room increased to 12.8 MPC. Health physics personnel posted the area and restricted access until the levels could be reduced. The PDP was restored to service on January 5, 1991.

f. Catalytic Hydrogen Recombiner Flange Leak

WR 00007-91 was initiated January 1, 1991, to replace the rupture disk for the "A" hydrogen recombiner. Supplemental work instructions were provided with the WR, and QC hold points were established in the the instructions and observed by maintenance personnel. Following the work activity, a leak was still evident. The licensee evaluated the condition and increased the flange bolt torque from 88 inch-pounds to 25 foot-pounds. The leak appeared to stop; however, on January 10, 1991, the leak reappeared. The licensee was evaluating this condition at the end of the inspection period.

g. Wattmeter Calibration

The licensee initiated a WR to calibrate the "A" emergency diesel generator wattmeter. Because the calibration is performed with the DG operable, approved procedure RNM C-1703, Revision 1, "AC

Wattmeter," was developed to control the activity. The procedure was performed by knowledgeable personnel. The procedure included the data sheet and a lifted conductor list was utilized. This procedure was in accordance with a licensee commitment to control work on inservice equipment with an approved procedure.

Maintenance activities were performed using appropriate controls. The use of an approved procedure during calibration of an inservice emergency diesel generator wattmeter was in accordance with a licensee commitment to control work on inservice equipment with an approved procedure. Personnel appeared knowledgeable and followed procedures.

6. Followup on a Previously Identified NRC Item (92701)

(Closed) Followup Item (482/9035-01): Use of 69kV Line For Offsite Power.

This followup item concerned the use of the 69kV offsite power line during off normal conditions. The licensee initiated Temporary Procedure Change MI 91-003 to Procedure SYS NB-200, Revision 1, "Transferring XNB01 Supply Between SL-7 and No. 7 Transformer." This change provides an additional caution statement to allow energizing only 1 emergency bus from this line at a time. This item is closed.

7. Review of Licensee Event Reports (92700)

The following 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:

a. (Closed) LER 482/89-012, "Control Room Ventilation Isolation Signal Caused by Loss of Power to Control Room Air Intake Radiation Monitor."

This LER was issued as a result of actuation of safeguards equipment, the "B" train control room air conditioning unit. The actuation resulted from a blown fuse in the power supply to the RM-80 microprocessor associated with GK RE-04. The blown fuse resulted from a blown varistor in a communication isolation box which the licensee believes was caused by a voltage transient. The root cause

of the voltage transient could not be identified. The equipment was repaired and systems returned to normal operation. This LER is closed.

- b. (Closed) LER 482/89-015, "Personnel Error Causes Incorrect Valve Lineup Resulting in a Failure to Obtain Required Turbine Building Sump Sample."

The licensee determined that this event resulted from the inadequate review of a P&ID for the turbine building sump. The licensee's review indicated that this was an isolated incident involving the failure to restore the discharge of the turbine building sumps from the site oily waste separator to the "Hi" and "Lo" total dissolved solid tanks. As a result, chemistry samples required by the TS were not taken. Licensee corrective actions appeared appropriate. This LER is closed.

- c. (Closed) LER 482/89-017, "Spurious Spike on Chlorine Monitor Results in Engineered Safety Features Actuation."

The licensee evaluated this event as an isolated incident. The licensee did not experience any further problems with the chlorine monitor through the remainder of 1989 and through 1990. This LER is closed.

- d. (Closed) LER 482/89-020, Revision 0 and -1, "Seismic Analysis Discrepancies Affecting Containment Cooling Fan System Housing."

This condition was identified in NRC Inspection Report 50-482/89-29 as unresolved item 482/8929-02. This unresolved was evaluated and closed in NRC Inspection Report 482-90-32. This evaluation is also applicable to this LER. This LER is closed.

- e. (Closed) LER 482/90-008, "Fuel Building Exhaust Radiation Monitor Causes Engineered Safety Features Equipment Actuation as a Result of Loss of Power."

This LER describes an event that occurred on May 4, 1990, involving ESF equipment. A FBIS and CRVIS were generated as a result of a burned out "operate" lamp and a blown fuse in the RM-80 microprocessor associated with GG RE-27. The licensee evaluated the event and determined that the appropriate corrective action was to replace the failed components and restore the systems to normal operation. This LER is closed.

- f. (Closed) LER 482/90-009, "Failure to De-Energize Breakers for Accumulator Outlet Isolation Valves Results in Inoperable Accumulators and Entry Into TS 3.0.3."

The event and corrective actions described in this LER were reviewed in NRC Inspection Report 50-482/90-22. This review resulted in a noncited violation. This LER is closed.

- g. (Closed) LER 482/90-23, "Engineered Safety Features Actuation - Switchyard Breaker Failure Causes Partial Loss of Offsite Power and Shut Down Sequencer Actuation."

The inspector reviewed the hardware failure analysis for Breaker 345-90. The analysis concludes that the breaker failed because of an internal short. The short was caused by internal contaminants that were displaced when gas was added to the breaker. This LER is closed.

8. Cold Weather Preparations (71714)

During a period of cold weather that started on December 21, 1990, freeze protection trouble alarms were received on water storage tanks and radiation monitor heat trace circuits. Questionable indications of several circulating water pressure indicators resulted from freezing and problems with the circulating water screens developed. A safety-significant problem with the refueling water storage tank is discussed in NRC Inspection Report 50-482/90-39. Freeze protection for the ESW pump is provided by Nonclass 1E unit heaters and the power block relies on heating from the auxiliary boiler if the plant is not at power. The backup air compressor had a temporary enclosure built around it to protect it from the cold weather.

9. Exit Meeting (30703)

The inspectors met with licensee personnel (denoted in paragraph 1) on January 16, 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

AC	air conditioning
ADM	administrative procedure
AFW	auxiliary feedwater
ARV	atmospheric relief valve
CVCS	chemical and volume control system
CRVIS	control room ventilation isolation signal
DEI	dose equivalent iodine
ESF	engineered safety features
ESW	essential service water
FBIS	fuel building isolation signal
IAS	instrument air system
I&C	instrumentation and control
kV	kilovolt
LCO	limiting conditions for operation
LER	licensee event report
MPC	maximum permissible concentration
NOUE	notice of unusual event
NPE	nuclear plant engineering
NRC	Nuclear Regulatory Commission
NSE	nuclear safety engineering
PDP	positive displacement pump
PM	preventive maintenance
PMR	plant modification request
PSI	pounds per square inch
PSIG	pounds per square inch gage
PSRC	plant safety review committee
QA	quality assurance
QC	quality control
RC	reactor coolant
RCS	reactor coolant system
RE	results engineering
RHR	residual heat removal
RWST	refueling water storage tank
S/G	steam generator
SI	safety injection
SNUPPS	standardized nuclear unit power plant system
SIN	surveillance nontechnical specification
STS	surveillance technical specification
TDAFW	turbine driven auxiliary feed water
TS	Technical Specification
WCGS	Wolf Creek Generating Station
WCNOC	Wolf Creek Nuclear Operating Corporation
WR	work request