

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-482/90-32

Operating License: NPF-42

Docket: 50-482

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

Facility Name: Wolf Creek Generating Station (WCGS)

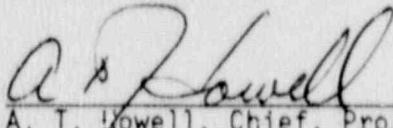
Inspection At: WCGS, Coffey County, Burlington, Kansas

Inspection Conducted: September 15 through October 24, 1990

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

11-23-90
Date

Inspection Summary

Inspection Conducted September 15 through October 24, 1990 (Report 50-482/90-32)

Areas Inspected: Routine unannounced inspection including plant status, operational safety verification, surveillance observations, maintenance observations, prompt onsite response of an event at operating power reactors, review of licensee event reports, and followup on previously identified items.

Results: Within the areas inspected, one noncited violation was identified (failure to follow procedure). The noncited violation concerned failure to properly utilize the industry technical information program (paragraph 8). The inspector found a spread of contamination outside of a designated "contaminated area," which appeared to be an isolated event in the licensee's radiological controls area (paragraph 3). Examples of good quality verification were demonstrated by the identification and resolution of defects found in certain snubber parts assemblies and in the licensee's response to a pinned spring can (paragraph 4). Insufficient human factors considerations contributed to procedural weaknesses in a surveillance test procedure (paragraph 4). Control of troubleshooting and maintenance was good (paragraphs 3, 4, and 5) although inattention to detail caused control of two auxiliary feedwater valves to shift

to the auxiliary shutdown panel (paragraph 5). A partial loss of offsite power caused engineered safety features actuations including an emergency diesel generator start. All systems functioned properly (paragraph 6).

DETAILS

1. Persons Contacted

Principal Licensee Personnel

- *B. D. Withers, President and CEO
- J. A. Bailey, Vice President, Nuclear Operations
- *F. T. Rhodes, Vice President, Engineering and Technical Services
- *G. D. Boyer, Plant Manager
- *R. S. Benedict, Manager, Quality Control (QC)
- H. K. Chernoff, Supervisor, Licensing
- *M. E. Dingler, Manager, Nuclear Plant Engineering (NPE) Systems
- *R. B. Flannigan, Manager, Nuclear Safety Engineering (NSE)
- *C. W. Fowler, Manager, Instrumentation and Control (I&C)
- *R. C. Hagan, Manager, Nuclear Services
- *R. W. Holloway, Manager, Maintenance and Modifications
- *W. M. Lindsay, Manager, Quality Assurance (QA)
- *R. L. Logsdon, Manager, Chemistry
- *O. L. Maynard, Manager, Regulatory Services
- 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 Materials Quality
- J. M. Pippin, Manager, NPE
- *C. M. Sprout, Section Manager, NPE, WCGS
- J. D. Weeks, Manager, Operations
- *S. G. Wideman, Senior Engineering Specialist
- *M. G. Williams, Manager, Plant Support
- *J. A. Zell, Manager, Training

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 October 24, 1990.

2. Plant Status (71707)

The plant operated at 100 percent power during the inspection period, except for brief reductions to 98 percent power to conduct surveillance tests.

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 to ensure 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 limiting conditions for operation (LCOs), corrective actions, and review of facility records.

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

a. Spread of Contamination Beyond a Contamination Boundary

On September 19, 1990, during a routine tour, the inspector found water splashing from the "B" centrifugal charging pump (CCP). The licensee had shut off the positive displacement charging pump to repair the speed controller and was running the "B" CCP in the interim. Leak off past the pump bearing and seal was dripping into a temporary plastic catch device. However, the device was collapsed and ineffective at collecting the leak-off. During the time that the "B" CCP was not running, the leak-off, although not contained by the device, did not spread beyond the roped-off contaminated area of the pump and its foundation. With the room cooler and pump both in operation, however, the additional air currents appeared to cause the leak-off water to splash beyond the roped off area. The splashing was small but sufficient to cause a spread of contamination. The inspector notified health physics (HP) of the potential contamination and the HP technician found that the floor in the area of the splashing was contaminated. HP took appropriate actions to rope off the area to limit further spread of contamination. This appeared to be an isolated event in the licensee's evaluations of and actions taken to limit the spread of contamination.

b. Spurious Tripping of Diesel Generator Room Supply Fan "B"

On October 3, 1990, control room personnel were reviewing existing plant status during shift turnover and noted that there was no indication that the diesel generator (DG) Room Supply Fan "B" was operating. Personnel were dispatched to verify the problem, and it was determined that the DG Supply Fan "B" supply breaker had tripped. The breaker was reset and the fan began running. Since the cause of the breaker tripping was not known, however, the DG "B" was declared inoperable at the time that the condition of the fan trip was first identified at 7:09 a.m.

Technical Specification (TS) Action Statement 3.8.1.1d.1 requires that with one DG inoperable, the required systems, subsystems, trains, components, and devices that depend on the remaining DG be operable or if such conditions cannot be satisfied within 2 hours, be

in at least "Hot Standby," within the next 6 hours, followed by placing the plant in "Cold Shutdown" within the following 30 hours. Diesel Generator "A" was considered to be administratively inoperable because the airconditioning unit that supplies cooling to the Train "A" DG switchgear was out of service for maintenance. The plant safety review committee (PSRC) met at 8 a.m. to discuss the situation and evaluate the criteria for requesting a temporary waiver of compliance from TS 3.8.1.1d.1, while DG Room Supply Fan "B" was troubleshooted.

Electrical maintenance personnel continued work on air conditioning Unit SGK-05A and determined that a problem existed on the thermal overloads associated with the molded case circuit breaker. As work proceeded on both components, licensee management contacted RIV to request a temporary waiver of compliance. A conference call with RIV, Office of Nuclear Reactor Regulation (NRR), and licensee management was held at approximately 10:30 a.m. Since the licensee did not restore DG "A" to operable status within 2 hours, a shutdown of the plant was required. The licensee planned to initiate reducing power at 11:09 a.m., 2 hours after entering the 6-hour power reduction requirement. This was based on the ability to conduct an orderly shutdown within 4 hours. A temporary waiver of compliance was not required, however, because the breaker for SGK-05A was replaced and an operability run was successfully performed.

The troubleshooting efforts on the DG Room Supply Fan "B" continued. The control circuit was monitored and no further instances of the breaker tripping occurred. On the basis of previous troubleshooting (WR 04839-90) results, the nuclear plant engineering group reviewed and approved a change to increase the instantaneous trip setting of the breaker from 2 to 3. The PSRC approved the change at 10:50 p.m. on October 5, and the breaker was declared operable on October 5, 1990, at 3 p.m. Additionally, a modification was being pursued by the licensee to eliminate the potential for a high starting current, which may have tripped the breaker.

Notwithstanding the above, HP controls appeared to be effective during the inspection period. The involvement of HP personnel was evident during the plant tours and observation of the maintenance activities.

Plant security was found to be generally professional and in accordance with the security plan. The inspector observed portions of security drills conducted during both dayshift and backshift during this inspection period. Control of troubleshooting and maintenance activities were good.

4. Surveillance Observations (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.

The following surveillances were witnessed and/or reviewed by the inspectors:

- STS AL-201, Revision 9, "Auxiliary Feedwater System Inservice Valve Test," performed September 28, 1990.

During performance of STS AL-201, the licensee was testing the stroke time for the auxiliary feedwater system flow control valve to Steam Generator "D" (AL HV-5). Lack of procedural clarity resulted in initial problems during the test. First, during the closure of the valve, the operator was to observe an indicator light on the ESF status panel being lit. However, the indicator light was lit white while the valve was open and turned red when it began to close. The procedure did not specify which color to observe. The procedure also specified that the AL HV-5 (a two-speed valve) was to be slow closed to obtain the required stroke time. The procedure did not specify the open speed for the open stroke time. As a result, the operator opened the valve in slow speed and found that the stroke time was unacceptable before he realized the intent of the procedure was for AL HV-5 to be stroked open in fast speed. The inspector observed the operators prepare a procedure change to address the indicator light question, and the operators stated that they would verify which open speed was correct and initiate a procedure change to specify the correct opening speed of AL HV-5.

- STS SF-001, Revision 1, "Control and Shutdown Rod Operability Verification," performed October 12, 1990.

On October 12, 1990, Procedure STS SF-001, "Control and Shutdown Rod Operability Verification," was being performed in accordance with TS 4.1.3.1.2. This surveillance verifies the operability of each full-length rod not fully inserted in the core by movement of at least 10 steps in any one direction. At 7:33 a.m., during the performance of the surveillance test, Control Bank A, Group 1 Rods, H-6 and H-10 digital rod position indication (DRPI), did not show movement when rod movement was demanded. No alarms were received. I&C personnel were sent to investigate the problem under Work Request (WR) 05061-90 and the surveillance test was terminated. At 8:57 a.m., I&C reported that the stationary grippers for rods H-6 and -10 were not releasing. Since Control Rods H-6 and -10 were still capable of being tripped because a trip signal would remove power from the stationary grippers, TS 3.1.3.1, Action 4, was defined at 9:12 a.m. Action 4 of TS 3.1.3.1 requires that the inoperable rods be returned to operable status within 72 hours or be in "Hot Standby" within the next 6 hours. Troubleshooting and repair work was accomplished and control room personnel performed STS SF-001 satisfactorily. At 5 p.m., TS 3.1.3.1 was exited.

The inspector witnessed the troubleshooting, card replacement, and surveillance test. The troubleshooting appeared to be well organized, preplanned, and performed by experienced personnel. One

inspector observation noted was the acceptance criteria for voltage measurements and traces were not specified in the steps developed prior to performing the troubleshooting but were verified from the vendor manual that was at the job site and documented in the WR.

- Mechanical Snubber Assembly Spare Parts Testing

On September 12, 1990, the licensee identified that three of five replacement parts for 1/2-inch size mechanical snubber assemblies had failed 20 percent load tests onsite. The onsite test is performed to 20 percent of the rated load of 650 pounds. One earlier failure occurred in 1987. There were two of these spare part assemblies installed in the plant and the licensee removed one of the snubbers. In the other case, previous analysis by the licensee showed that the snubber was not required and would not affect the piping by either locking up or by breaking free. The licensee returned the removed part assembly, as well as other representative samples of spares, from the warehouse and provided them to the vendor for further testing. The results of the vendor tests indicated that the parts were found to routinely fail below the expected 1500-pound acceptance point. The removed part failed at about 125-pounds, while four others failed at between 145 and 655-pounds. The failure mechanism appeared to be inadequate crimping of two rods into a cylindrical end piece. The rods pulled free of the end piece during tension tests. The crimp dents were described by the licensee as being shallow compared to similar parts from another lot. The licensee purchased the entire lot of 20 assemblies from the vendor. The licensee also stated that the vendor, PSA, issued a Part 21 report, but that they do not believe there are other defective parts in distribution.

- Spring Can Hanger Inspection

A spring can hanger was found pinned by the licensee, and was discussed in NRC Inspection Report 50-482/90-31. This condition restricted pipe movement on one side. The licensee issued a programmatic deficiency report, PDR OP 90-181. A review of documentation by the licensee did not reveal the need to have the spring can hanger pinned. As a result, the licensee was unable to determine the root cause of this deficiency. To assure that other hangers did not remain pinned, the licensee conducted a sample inspection of 32 of 198 safety-related hangers and 80 of 902 nonsafety-related hangers of similar configuration. There were no pins found installed in the inspected hangers.

Insufficient human factors considerations contributed to procedural weaknesses in Surveillance Test STS AL-201. Root cause analysis and quality verification were good regarding defects found in certain snubber parts and in response to a pinned spring can.

5. Maintenance Observations (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:

- Rework check valves in the auxiliary feedwater lines (WR 04333-89).
- "B" DG supply fan breaker tripped (WR 04941-90).

On October 8, 1990, troubleshooting was performed on Control Room Cabinet RP053BB to determine if there were variations in the voltage being supplied to the control circuitry for the DG supply fan. The troubleshooting activity involved the connection of two channels of a four-channel recorder to the ±15-volt power supply. Inadvertently, leads were swapped and the -15-volt supply was connected to a common terminal which shorted out the power supply. As a result, control of auxiliary feedwater (AFW) System Valves HV-7 and HV-12 shifted to the auxiliary shutdown panel. This condition was annunciated in the control room. The I&C technician removed the leads immediately and control room personnel were sent to the auxiliary shutdown panel to restore the switches to the remote position. The annunciator cleared and the indication showed control being in remote. Although the event was caused by personnel error, work controls appeared to be adequate for the circumstances. The same activity was observed by the inspector on October 9, 1990, and no problems were noted.

- "B" RHR pump breaker inspection and testing (WR 5196-90).
- Replace pipe insulation to condensate storage tank (WR 07062-90).
- Install valve for isolating BB-PCV-8034 (WR 02930-90).
- Control Rod Group 1 did not move (WR 05061-90).

With the exception of inattention to detail by a technician, which caused control of auxiliary feedwater valves to transfer to the auxiliary shutdown panel, control of troubleshooting and maintenance was good.

6. Prompt Onsite Response to Events at Operating Power Reactors (93702)

At 1:33 a.m., CDT, on October 23, 1990, the plant experienced a partial loss of offsite power. Four breakers in the switchyard opened automatically to isolate the east bus. The power supply from the east bus is used as the normal supply to the "A" train emergency bus, NB01. Upon loss of power to NB01, the "A" emergency diesel generator (EDG) automatically started and closed in on NB01 in 8 seconds. The shutdown

sequencer functioned properly to restore power to safety loads. The operators also manually started the "B" essential service water (ESW) pump in accordance with procedures. The loss of "A" train electric power causes the service water isolation valves to ESW to fail closed for both ESW trains. Operators then established an alternate lineup to power NB01 from another independent offsite power source at 4:25 a.m. and restored safety systems to their normal lineup. The plant remained at 100 percent power throughout the event, supplying power through the west bus.

Electricians from system operations initially found a Phase "A" fault in Breaker 345-90, one of three main breakers on the east bus. Breakers 345-60 and -120 opened to isolate the east bus and Breaker 345-80 opened to isolate 345-90 from the west bus. The operators and electricians next worked to open the disconnect links to isolate the faulted Breaker 345-90 and restored power to the east bus through 345-60 and -120. This in turn enabled the operators to restore Bus NB01 to the normal lineup at 6:15 a.m.

During the event, additional actuations occurred to the control room ventilation isolation system (CRVIS), fuel building isolation system, and containment purge isolation system (CPIS). These actuations occurred because power was lost to the associated radiation monitors. The licensee made a 4-hour nonemergency report to the NRC as required by 10 CFR Part 50.72(b)(2)(ii) because the automatic actuation of the ESF systems.

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

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

During this inspection period, the inspectors performed follow-up WCGS LERs. The LERs were reviewed to ensure that:

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

The LERs discussed below were reviewed and closed:

- a. (Closed) LER 482/90-007, "Feedwater Isolation Signal Because of Surveillance Test Requiring a High Feed Rate and Auxiliary Feedwater Actuation and Reactor Trip Signal During Recovery."

During the performance of STS AL-211, Revision 3, "Turbine Driven Auxiliary Feedwater System Flow Path Verification and Inservice Check Valve Test," the levels in Steam Generators A and C reached the high-high level. A feedwater isolation signal and main turbine trip signal occurred. The cause of the event was procedural inadequacy that led the operators to believe that the four check valves (one per each steam generator) were to be tested simultaneously. This required feeding 140,000 pounds-mass per hour which was higher than steam flow for the existing plant conditions. Procedure STS AL-211 was revised on June 28, 1990, to clarify that only one check valve be tested at a time. Operations personnel have been reminded of their authority to suspend testing if necessary to preclude plant transients. On the basis of these corrective actions, this LER is closed.

- b. (Closed) LER 482/90-003, "Control Room Ventilation Isolation and Containment Purge Isolation Caused by High Gaseous Activity During Containment Vent."

On March 20, 1990, shortly after initiation of a containment vent, CPIS and CRVIS isolation signals were received. The probable cause of the high activity was a vent line installed from the pressurizer relief tank (PRT) to the containment shutdown purge ductwork that had been left open while the purge was not in progress. This allowed an accumulation of higher activity air to build up in the duct. When the purge was started, the concentration of radioactivity in the air being exhausted was sufficient to generate the isolation signals.

Caution statements have been added to Procedure GEN 00-007, Revision 13, "RCS Drain Down," dated July 26, 1990. These cautions state that when venting to the purge ductwork from the PRT or vessel head, the duration of time when the purge is shut down should be minimized. These changes to the procedure should prevent further events of this type. This LER is closed.

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

- a. (Closed) Unresolved Item 482/8920-02, Resolve Inadequacy of Containment Cooler Supports. This item concerned the delay from the time the licensee became aware of a question concerning the seismic qualification of the containment cooler supports and when the issue was resolved. The licensee initiated Programmatic Deficiency Report (PDR) NP 90-01, on November 18, 1989, after determining that personnel had failed to follow KGP-1311, Revision 2, "Industry Technical Information Program," that required placing applicable incoming vendor technical information in industry technical information program (ITIP). The licensee performed a review of other problem information requests (PIRs) provided by Bechtel and found that there were other PIRs that were not entered into the licensee's ITIP. Those items were subsequently entered in the ITIP for tracking. The failure to follow KGP-1311 is an apparent violation of TS 6.8.1.a (482/9032-01). Because the criteria specified in

Section V.A of the Enforcement Policy was satisfied, a cited violation will not be issued. The unresolved item and the noncited violation are closed.

- b. (Closed) Violation 482/8905-03, Failure to Update Drawing. This item concerned a drawing in the control room that had not been redlined to reflect field implementation and partial closeout of a plant modification. The licensee revised Procedure ADM 01-042, Revision 16, "Plant Modification Request Implementation," to require that drawings be marked with red lines to indicate changes before affected systems are returned to service. This includes modifications that are completely installed as well as partially installed. In addition, ADM 01-228, Revision 2, "Temporary Modifications," requires that control room drawings be marked with a green line to reflect installed temporary modifications. This item is closed.
- c. (Closed) Violation 482/8908-01, Inadequate Procedures. This item concerned failure to include consideration of a potential release of radioactive contamination in a fire hazards analysis. The licensee performed an analysis that found that the dose rate of the material in the area of consideration would have needed to be greater than 1000 mrem/hr to exceed 10 CFR Parts 20 and -100 limits. The licensee performed surveys of the areas and found the highest dose rate measured was 15 mrem/hr. Further, the inspector reviewed Procedure KPN-D-316, Revision 3, "Fire Protection Review," and associated Forms KEF-D-316-1 and -2. The procedure requires the use of the checklists in the forms during fire protection review applicability screening. Form KEF-D-316-2, Step 3.6, questions an increase in the amount of radioactive material that can be released in the event of a fire. This item is closed.
- d. (Closed) Violation 482/8927-01, TS Surveillance Requirement Improperly Performed. This item concerned performance of a surveillance test of service water flow through the containment coolers. Since the violation was issued, TS Surveillance Requirement 4.6.2.3.a.2 has been changed to verify a flow rate greater than 1,850 gallons per minute (gpm) rather than the previous minimum of 2,200 gpm. Procedure STS EF-925, Revision 3, "Containment Coolers Flow Verification," requires the new flow rate minimum. In addition, Precaution 2.2 states that system lineups other than those specified by the procedure would require an evaluation to determine the condition of the containment coolers. This item is closed.
- e. (Closed) Violation 482/9026-02, Failure to Follow Procedure. Post-trip reviews did not include strip charts that reflected real time, and Section 6 of the review was not completed. Section 6 documents the actual or suspected cause of the trip and any abnormal or degraded indications identified during the transient. These were required by Procedure ADM 02-400, Revision 7, "Post-trip Reviews." However, it was noted that Revision 7 of the procedure also lacked clarity. Revision 8 to the procedure, issued October 4, 1990, clarified both items of concern. In addition, a memo was issued September 11, 1990, to all shift supervisors discussing the ADM 02-400 changes and asking them to fill out a training attendance form

documenting that the information had been discussed with each crew. All licensed personnel in the training department were required to complete the training attendance form. On the basis of these corrective actions, this violation is considered closed.

9. Exit Meeting (30703)

The inspectors met with licensee personnel (denoted in paragraph 1) on October 24, 1990. 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.