

APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-482/88-06

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, Burlington, Kansas

Inspection Conducted: January 25-29, 1988

Inspectors: *M. E. Skow* 2/11/88
M. E. Skow, Reactor Inspector, Test Programs
Section Date

T. O. McKernon 2/11/88
T. O. McKernon, Reactor Inspector, Test
Programs Section Date

Accompanied by W. C. Seidle, Chief, Test Programs Section on January 28-29, 1988

Approved: *W. C. Seidle* 2/11/88
W. C. Seidle, Chief, Test Programs Section Date

Inspection Summary

Inspection Conducted January 25-29, 1988 (Report 50-482/88-06)

Areas Inspected: Routine, unannounced inspection of events associated with the reactor pressure vessel water level and the RHR system, verification of containment integrity, and containment local leak rate testing.

Results: Within the three areas inspected, one violation was identified (failure to have procedures appropriate to the circumstances, paragraphs 2 and 3).

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DETAILS1. Persons Contacted

- *B. D. Withers, President
- *F. Rhodes, Vice President, Nuclear Operations
- *P. M. Grant, Vice President, Quality
- *G. D. Boyer, Plant Manager
- *M. G. Williams, Superintendent, Regulatory Compliance
- *C. E. Parry, Manager, Quality Assurance
- *A. L. Payne, Supervisor, Quality Plant Support
- *J. S. Allen, ISEG Engineer
- *W. M. Lindsay, Supervisor, Quality Systems
- *G. W. Reeves, Superintendent, Quality Control
- *C. J. Hoch, Quality Assurance Technician
- *O. L. Maynard, Manager, Licensing
- *J. W. Johnson, Chief of Security
- *R. K. Steinbrock, Engineer
- *A. A. Freitag, Manager, Nuclear Plant Engineering, WCGS
- *J. M. Pippin, Manager, Nuclear Plant Engineering
- *G. J. Pendergrass, Licensing Engineer
- *H. Chernoff, Licensing Engineer
- *J. Houghton, Operations Coordinator
- C. G. Patric, Superintendent, Quality Evaluation
- R. Sims, Technical Staff Engineer
- L. A. Gabryelski, Technical Staff Engineer
- V. MacTaggart, Supervisor, Results Engineering
- K. Petersen, Supervisor, Licensing
- M. Estes, Superintendent of Operations
- W. Drogemuller, Reactor Operator
- R. Ruttler, Maintenance Supervisor
- D. Jacobs, LLRT Coordinator

The NRC inspectors also interviewed other licensee employees during the course of the inspection.

*Denotes those present during the exit interview held on January 29, 1988.

2. Reactive Inspection-Tygon Tube Reactor Pressure Vessel Level Error Review (90711B)

The purpose of this portion of the inspection was to review the Tygon tube reactor pressure vessel (RPV) level error event. The purpose was also to ascertain whether responsibilities have been assigned for the review of the event. Additionally, the NRC inspectors were to verify that the licensee's system for identification and review of the event was functioning.

At the time of the event, the licensee had lowered RPV coolant level to approximately 1 foot below the RPV flange in preparation for removing

the RPV head. The RPV level instrumentation system (RVLIS) had been disconnected also, in preparation for removing the RPV head. The licensee was monitoring water level in the vessel by visually observing the water level in a Tygon tube. This tube ran from a connection near a reactor coolant pump to a connection near the top of the pressurizer. Another tube ran from a tee just beyond the pressurizer connection of the first tube to a connection at the RPV head vent. From the other direction of the tee, the two tubes were vented via the pressurizer relief tank. The licensee had performed this partial system drain using Procedure GEN-00-007, Revision 8, "Mode 5-RCS Drain Down."

The following event description was determined by the NRC inspectors based on interviews with licensee personnel. During the event, a technician was attempting to disconnect a "Cono seal" (seal) from the RPV head. When the seal was disconnected, moisture and gas were discharged from the vessel under some pressure. The technician reconnected the seal. At this time, the water level in the Tygon tube used to monitor vessel water level decreased by approximately 20 inches. The licensee attempted to vent the vessel by connecting a vent rig downstream from the head vent valve and opening the vent valve. No discharge was observed and the technician disconnected the seal. Gas was discharged a second time from the seal, and the technician reconnected the seal. A vent rig was then connected at the RVLIS connection to the head. The head was vented through this rig. Little pressure appeared to remain, and venting appeared to have been accomplished. The technician then successfully disconnected the seal. It appeared that the water level in the tube was in error and high relative to the vessel because of the pressure in the vessel. While actual vessel water level did not appear to have changed during this event, it was apparently already lower by 20 inches than the licensee expected.

The NRC inspector noted that the procedure did not appear to require that the Tygon tube from the vessel head vent to the Tee be monitored during the portion of the drain down when a level would have been visible. This observation was discussed with the licensee. No indication was given that the licensee had considered and rejected monitoring the drain down from both tubes. As part of the corrective action, the licensee issued a change on January 24, 1988, to Procedure GEN-00-007. This change was to vent the head via the two means described above that were utilized after the initial "Cono seal" disconnection. The change appeared adequate to prevent recurrence of this particular event. The NRC inspector found that the change did not appear to address the effects of the blockage in question or other potential blockages on water level indications relative to actual vessel water level. The failure to have a procedure appropriate to the circumstances is an apparent violation (482/8806-01).

The root cause of the event had not been determined by the licensee during this inspection period. The valve on the reactor vessel head vent was suspected by the licensee as having been blocked. The licensee stated that radiography of the suspect valve in both the open and shut positions did not show any apparent defects. The efforts by the licensee to

determine the root cause(s) of the event appeared to be routine efforts. It was not evident to the NRC inspectors that management had become sufficiently involved to assure a complete and timely analysis and corrective action.

3. Reactive Inspection - CCW Water Hammer Event (90711B)

The NRC inspector responded to the licensee's report of a water hammer event in the CCW system which occurred at 11:40 a.m., January 22, 1988, during startup of RHR "A" train. The NRC inspector performed a walkdown inspection of the CCW system in the area of observed piping vibration, interviewed licensee personnel, and reviewed operating procedures. The Reactor Operator (RO) present during the event observed piping vibrations lasting about 25 seconds. The RO stated that the CCW Valve EG HV-101 had initially been positioned to the 10 percent open position. Upon subsequent instruction to throttle the valve, another operator present throttled the valve closed. When the RO noted the valve in the closed position, the valve was opened. Upon noting the water hammer event, the RO closed the valve. The RO reported Valve EG-HV-101 to have been opened for about 5 seconds. The control room operators began procedures to isolate RHR "A" train and to bring RHR "B" train on line. A review of control room alarm records indicated the event lasted about 7 minutes having begun about 11:40 a.m. and lasting until about 11:47 a.m. at which time RHR "B" train was brought operational.

A system walkdown of the CCW system in the area of observed piping vibration was conducted by licensee representatives and the NRC inspectors. Pipe rub was observed in the area of a whip restraint adjacent to Valve EG-HV-101. Indications on the pipe showed possible pipe movement of 1/2- to 3/4-inch. No other observable damage to piping, piping supports, hangars, snubbers, fillet welds, or piping in wall penetration areas was noted.

A review of Operations Procedure EJ-120, Revision 9, dated October 2, 1987, showed that instructions for Operating Valve EG-HV-101 were not clear, concise, and presented in a manner which could have precluded erroneous RO action and inadvertent closure of the valve. On January 22, 1988, the licensee revised Operations Procedure EJ-120, Revision 9, to incorporate more specific instruction concerning the throttling of Valve EG-HV-101. Further, the revision clarified operation of RHR Heat Exchanger Bypass Valve EJ-FCV-618 to control RHR system heatup. The procedure revision appears adequate and should assist in precluding similar future occurrences.

As followup action to the CCW water hammer event, the licensee had consulted with Westinghouse Electric Corporation, Power Systems Division, concerning the event. A Westinghouse written response, dated January 28, 1988, cited a 1976 study, "Thermal Transient and Fatigue Study of Residual Heat Exchanger," Report TM-188, as a basis for analysis. The licensee was in the process of analyzing the CCW system to ascertain areas of potential high stress concentrations. The licensee stated that followup NDE

examination of the piping would be based on the analysis results, snubber inspection, and visual inspection of piping and supports. The NRC inspector noted that the Westinghouse response stated that, "... based upon the duration of the event and without extensive evaluations thermal loads and vibrations in the vicinity of the RHR Heat Exchanger would not be significant and impact the structural integrity of the Heat Exchanger or piping."

The NRC inspector noted the licensee's Technical Specification (TS) requires the CCW system operability be verified prior to plant startup. A further review of the licensee's followup action to verify the CCW system's operability is warranted. The adequacy of the licensee's corrective and followup actions to verify system operability shall remain an open item pending further review (482/8806-02).

In summary, the NRC inspector noted several contributing factors resulting in the CCW water hammer event. The operating procedure lacked a quantitative acceptance criteria governing the throttling of a valve critical to the system evolution. The procedure did not incorporate cautionary statements alerting the RO to the significance of the action statement. In addition, there appeared to be a miscommunication between the control room and the RO performing the procedure. These contributing factors are indicative of inappropriate instructions and, as such, are an apparent violation of the Code of Federal Regulations, 10 CFR 50, Appendix B, Criterion V (482/8806-01).

4. Verification of Containment Integrity (61715)

The purpose of this inspection was to evaluate the adequacy and implementation of the licensee's procedures designed to ensure and maintain containment integrity and to mitigate contamination release in the event of a loss of a coolant accident.

The NRC inspectors reviewed Procedure STS GP-001, Revision 6, "Containment Penetration Integrity Verification." The specific completed procedures reviewed were performed November 18 and 24, 1987, and December 1, 1987. The procedures appeared to have imposed a weekly verification of containment penetration integrity during the refueling outage. The procedures appeared to be in conformance with TS and appeared adequate.

No violations or deviations were identified during this portion of the inspection.

5. Local Leak Rate Testing Review (61720)

During the inspection period, the NRC inspector performed detailed reviews of the following local leak rate test (LLRT) procedures and test results:

- ° STS PE-014, Revision 5, "Containment Air Locks Tests," to include LER 87-023-00 dated June 1, 1987, "Shaft Seal on Containment Air Lock Failure Causing Leakage Greater Than .6La"

- CKL PE-002, Revision 2, "Equipment Hatch"
- CKL PE-014, Revision 2, "EJ HV-24 and HV-26"
- CKL PE-022, Revision 3, "BB-V148 and BB-HV8315B"
- CKL PE-028, Revision 4, "EF HV-46, 48, 50," to include LER 87-033-00, "INOP Containment Isolation Valve EF HV-46"
- CKL PE-080, Revision 4, "BG-8381 and BG-HV-8105"
- ENG 09-004, Revision 2, "LLRT Acceptance Analysis and Trend Record"

These reviews were performed to assess technical and administrative adequacy and conformance to regulatory requirements, 10 CFR 50, Appendix J.

The review of LLRT procedures provided verification that the following attributes, considered necessary for the conduct of a successful test, were correctly addressed:

- a. All applicable containment penetration boundaries (CPB) and containment isolation valves (CIV) are subjected to local leak rate testing.
- b. LLRTs are performed at containment integrated leak rate test peak pressure, except where reduced pressure tests have received prior NRR approval in the TS.
- c. The LLRT program utilizes approved methods for testing CPB and CIV.
- d. Penetration leakage rates are determined using the maximum pathway leakage.
- e. The criteria and response for LLRT and combined leakage rate failure are incorporated in the test program procedures.
- f. The criteria and response for the leakage rate failure of components is specifically cited in the TS.
- g. Repairs/modifications to CPB and CIV were preceded and followed by LLRTs on the applicable penetrations.
- h. LLRT is performed at the correct frequency for CPB, CIV, and air locks.

Within the scope of this inspection, no violations or deviations were identified.

6. Exit Interview

The NRC inspectors conducted an exit interview on January 29, 1988, with the licensee personnel denoted in paragraph 1. The following NRC personnel were also in attendance:

W. C. Seidle (Chairman)
B. L. Bartlett
R. G. Taylor
L. E. Ellershaw
R. A. Caldwell

At this meeting, the scope and findings of the inspection were summarized.