

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

NRC Inspection Report: 50-267/89-10

Operating License: DPR-34

Docket: 50-267

Licensee: Public Service Company of Colorado (PSC)  
P.O. Box 840  
Denver, Colorado 80201-0840

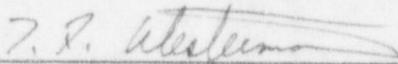
Facility Name: Fort St. Vrain Nuclear Generating Station (FSV)

Inspection At: FSV, Platteville, Colorado

Inspection Conducted: May 1-31, 1989

Inspectors: R. E. Farrell, Senior Resident Inspector  
P. W. Michaud, Resident Inspector

Approved:

  
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T. F. Westerman, Chief, Project Section B  
Division of Reactor Projects

6-15-89  
Date

Inspection Summary

Inspection Conducted May 1-31, 1989 (Report 50-267/89-10)

Areas Inspected: Routine, unannounced inspection of onsite followup of licensee event reports (LERs), licensee action on previously identified inspection findings, operational safety verification, monthly surveillance observation, and monthly maintenance observation.

Results: Within the areas inspected, no violations or deviations were identified. During this inspection period, the following occurred:

- The licensee successfully replaced two control rod drive assemblies in the reactor.
- The electronic and mechanical governor were replaced on the alternate cooling method (ACM) diesel generator.
- The reactor was returned to power operation.
- Primary coolant oxidant levels returned to below LCO 4.2.10 limits.

DETAILS

1. Persons Contacted

- D. Alps, Supervisor, Security
- \*L. Brey, Manager, Nuclear Licensing and Resources
- \*P. Burck, Supervisor, QA Engineering
- \*M. Cappello, Central Planning & Scheduling Manager
- \*R. Craun, Nuclear Site Engineering Manager
- \*C. Crawford, Vice President, Nuclear Operations
- \*J. Eggebrotten, Technical Projects Manager
- \*D. Evans, Operations Manager
- \*M. Ferris, QA Operations Manager
- \*C. Fuller, Manager, Nuclear Production
- \*J. Gramling, Supervisor, Nuclear Licensing Operations
- M. Holmes, Nuclear Licensing Manager
- \*T. McIntire, Superintendent, Material Management
- M. Niehoff, Nuclear Design Manager
- F. Novachek, Nuclear Support Manager
- \*W. Rodgers, Nuclear Comp. Services Manager
- \*R. Schenderlein, NED Special Projects
- \*D. Scott, QA Services Manager
- \*N. Snyder, Maintenance Department Manager
- \*P. Tomlinson, Manager, Quality Assurance
- \*D. Warembourg, Manager, Nuclear Engineering
- \*S. Willford, Nuclear Training

The NRC inspectors also contacted other licensee and contractor personnel during the inspection.

\*Denotes those attending the exit interview conducted June 7, 1989.

2. Plant Status

The replacement of control rod drive (CRD) assemblies for Regions 3 and 7 was completed on May 2, 1989. This was performed due to the inability of Rod 3 to scram and Rod 7's operation at higher-than-normal temperatures.

The reactor was brought critical on May 5, 1989, and the turbine generator was synchronized to the grid on May 7, 1989. Power level was then raised slowly while surveillance testing was performed. A steam leak from a hot reheat steam drain line was discovered on May 19, 1989. The leak was from a 1-inch drain line socket weld which had a crack around approximately 1/3 of the circumference. A leak repair contractor was utilized to install a collar and sealant on the pipe to stop the steam leak. This was completed on May 28, 1989, after which time the licensee continued the power ascension. In consideration of the 82 percent license limitation, 80 percent power was established by the licensee's station manager as the operating power level. The plant achieved 80 percent power on May 30, 1989, and remained at this level at the end of this report period.

3. Onsite Followup of Licensee Event Reports (LERs) (92700)

The NRC inspectors reviewed selected LERs to determine whether corrective actions, as stated in the LERs, are appropriate to correct the cause of the event and to verify that these corrective actions have been implemented.

(Closed) LER 87-019, "Damage in Helium Circulator S/N C-2101 Resulted in Excessive Shaft Wobble." The licensee performed substantial engineering evaluations and metallurgical tests of the failed bolting involved. As a result of these tests and studies, the subject bolts were changed in all four circulators during an extended maintenance outage in 1988. This matter is closed.

(Closed) LER 87-024, "Reactor Scram on Neutron Flux Rate of Change High," and LER 88-018, "Wide Range Nuclear Channel Upscaled From Noise Source and Actuated Scram."

The scrams described in LERs 87-024 and 88-018 occurred with the plant shut down and all rods fully inserted. The licensee has an ongoing program for reducing electronic noise as sources of this noise are identified. This noise reduction program has been previously inspected and found satisfactory. These items are closed.

4. Licensee Action on Previously Identified Inspection Findings (92701 and 92702)

(Closed) Violation 8708-03, "Inadequate 10 CFR 50.59 Review of Modification." The licensee installed a modification to an instrument circuit which did not meet Technical Specifications (TS) requirements. There was no safety significance and the TS requirement was deleted through a formal TS amendment. The licensee reemphasized the importance of detail and thoroughness in safety reviews and has shown increased sensitivity and high quality in 10 CFR 50.59 reviews performed since this violation was issued. This item is closed.

(Closed) Violation 8717-02, "Excessive Overtime for Licensed Operators." Two licensed reactor operators worked hours in excess of TS AC 7.1.1.2.i limits. The licensee subsequently implemented a comprehensive program reviewing the hours worked by all nuclear production performance level employees, including contract security personnel. The NRC inspectors have observed implementation of this program and found it effective. This item is closed.

(Closed) Open Item 8714-002, "Temporary Changes are Several Years Old," and Violation 8717-04, "Temporary Changes Left for Years as Permanent Changes." The licensee modified the temporary change program requiring a maximum life of 90 days for temporary changes, enhancing required engineering reviews prior to implementation of a temporary change, and defining management level and information requirements for extending a temporary change. Additionally, the licensee has carried out an extensive

program to eliminate the long standing "temporary" changes in the plant. These items are closed.

(Closed) Violation 8725-001, "Failure to Follow the FSV Medical Emergency Plan." Management notifications required by the licensee's medical emergency procedure were not made when a contractor employee was injured. The injured worker received prompt medical attention. The violation involved only management notifications. The licensee revised the procedure, retrained the shift supervisors, and emphasized the requirements of the procedure to inform management of medical emergencies. The NRC inspectors have observed good licensee performance in this area. This item is closed.

(Closed) Violation 8734-01, "Inadequate Procedural Controls." In a 2-week period, the new emergency lighting batteries became permanently inoperative and, separately, the site suffered a loss of offsite power due to inadequate procedures. Additionally, during this time, a reactor scram signal with the reactor shut down was caused by incorrect termination of relay leads in violation of a procedure. In response to this violation, the licensee has reemphasized the importance of quality work in all activities. Additionally, an independent operations review of postmaintenance testing is required to preclude adverse impacts on the plant. The licensee has formalized the program for controlling lifted leads and jumpers to better assure correct termination. Licensee performance observed by the NRC inspectors has been satisfactory. This item is closed.

(Closed) Open Item 8812-001, "Method for Verifying CRD Purge Flow is Inadequate." The licensee has modified the reactor equipment operator's log sheet to require logging of both subheader and individual CRD purge flow daily. The log sheet includes minimum values for these flows. This item is closed.

5. Operational Safety Verification (71707)

The NRC inspectors made daily tours of the control room during normal working hours and at least once per week during backshift hours. Control room staffing was verified to be at the proper level for the plant conditions at all times. Control room operators were observed to be attentive and aware of plant status and reasons why annunciators were lit. The NRC inspectors observed the operators using and adhering to approved procedures in the performance of their duties. A sampling of these procedures by the NRC inspectors verified current revisions and legible copies. During control room tours, the NRC inspectors verified that the required number of nuclear instrumentation and plant protective system channels were operable. The operability of emergency AC and DC electrical power and meteorological and fire protection systems was also verified by the NRC inspectors. The reactor operators and shift supervisor logs were reviewed daily along with the TS compliance log, clearance log, operations deviation report (ODR) log, temporary configuration report (TCR) log, and operations order book. Shift turnovers were observed at least once per

week by the NRC inspectors. Information flow was consistently good, with the shift supervisors soliciting comments or concerns from the reactor operators, equipment operators, auxiliary tenders, and health physics technicians. The licensee's station manager, operations manager, and superintendent of operations were observed to make routine tours of the control room.

The NRC inspectors made tours of all accessible areas of the plant to assess the overall conditions and verify the adequacy of plant equipment, radiological controls, and security. During these tours, particular attention was paid to the licensee's fire protection program, including fire extinguishers, firefighting equipment, fire barriers, control of flammable materials, and other fire hazards.

A walkdown of the nuclear instrumentation, prestressed concrete reactor vessel (PCRv) moisture monitoring, liquid waste, and portions of the reactor plant cooling water system was performed by the NRC inspectors. Valve and breaker positions were verified where possible. When affected by a clearance, the valves or breakers were verified to be positioned in accordance with the clearance requirements. Power supplies for components in these systems were verified, but were also subject to clearances in some cases. During these system walkdowns, the NRC inspectors verified the operability of standby or backup equipment when components or portions of systems were inoperable due to clearances.

The NRC inspectors observed health physics technicians performing surveys and checking air samplers and area radiation monitors. Contamination levels and exposure rates were posted at entrances to radiologically controlled areas and in other appropriate areas and were verified to be up to date by the NRC inspectors. Health physics technicians were present to provide assistance when workers were required to enter radiologically controlled areas. The NRC inspectors observed workers following the instructions on radiation work permits concerning protective clothing and dosimetry and using proper procedures for contamination control, including proper removal of protective clothing and whole body frisking, upon exiting a radiologically controlled area.

The NRC inspectors observed what appeared to be QA documentation inside a contaminated area. Specifically, the controlled work procedures including sign off sheets for the refurbishment of the fuel handling machine were sitting on a table with the contaminated fuel grapple and mast. Interviews with the health physics supervisor and the maintenance manager ascertained that the observed documentation was a working copy and that all data including signatures was maintained in a record copy of the documentation outside the contaminated area boundary.

The NRC inspectors randomly verified that the number of armed security officers required by the security plan were present. A lead security officer was on duty to direct security activities on each shift. The NRC inspectors verified that search equipment, including an x-ray machine,

explosive detector, and metal detector, was operational or a 100 percent hands-on search was conducted.

The protected area barrier was surveyed by the NRC inspectors to ensure it was not compromised by erosion or other objects. The NRC inspectors observed that vital area barriers were well maintained and not compromised. The NRC inspectors also observed that persons granted access to the site were badged and visitors were properly escorted.

The licensee placed the backup bearing water system in partial service on May 10, 1989. The system was aligned to supply makeup water to the bearing water surge tanks and for the accumulator purge flow. The isolation valves on the backup bearing water supply to each helium circulator remained shut. The system is not safety related but is described in the Final Safety Analysis Report (FSAR). The licensee decided to run without the backup bearing water system in service to the helium circulators because, historically, the system has resulted in a less reliable configuration. The normal bearing water system and the helium circulator auxiliaries are operating satisfactorily and more consistently than when the backup bearing water system has been in service. The licensee plans to continue operation with this system alignment.

The NRC inspectors monitored the licensee's compliance with TS LCO 4.2.11, "Loop Impurity Levels, Low Temperatures," and LCO 4.2.10, "Loop Impurity Levels, High Temperatures." At low temperatures (less than 1200°F core outlet), moisture levels in the reactor coolant system caused entry into the "limited acceptable" region of LCO 4.2.10. When core outlet temperature reached 1200°F, with increasing power, on May 11, 1989, LCO 4.2.10 became applicable and the limiting condition became total oxidants ( $H_2O$ ,  $CO$ , and  $CO_2$ ) in the reactor coolant system. The NRC inspectors daily monitored the licensee's operation while using "PPM-days" grace periods in accordance with LCO 4.2.10. At the end of this report period, the licensee had accumulated approximately 650 of an allowable 2700 "PPM-days." The NRC inspectors will continue to monitor the licensee's compliance with these LCOs.

On May 11, 1989, the temperature of the control rod drive for Region 30 exceeded 215°F. In accordance with TS Surveillance Requirement 4.1.1.A.1, the licensee performed a daily partial scram test of this control rod drive. The NRC inspectors verified these tests were performed successfully once every 24 hours, as required.

The licensee experienced problems with the flux controller, which automatically positions the Region 1 regulating control rod in response to an integrated control signal. On May 18, 1989, the regulating rod began driving in for no apparent reason. The control room operators immediately took manual control and restored the control rod to its proper position. Troubleshooting efforts determined that temporary instrumentation installed under TCR 89-04-01 appeared to be causing circuit impedance matching problems. This instrumentation had been installed to monitor the

flux controller's performance and was removed upon discovering this problem.

On May 19, 1989, the licensee's reactor side equipment operator discovered a steam leak from a drain line on the Loop 2 hot reheat steam header. The leak was due to a cracked weld on a 1-inch drain line, which is physically located on Level 2 of the reactor building. A leak repair service was called in by the licensee, as described in paragraph 7 below. The NRC inspectors verified the licensee actions to protect personnel, both from the existing steam leak and from the potential of an increased leak. The NRC inspectors also reviewed the licensee's evaluation of the effect of the increased heat load in the area of the steam leak. The licensee performed temperature surveys in the area and performed walkdowns to determine if any EQ-related equipment was operating in an elevated temperature environment. There was no equipment in the elevated temperature area that was adversely affected by this environment.

No violations or deviations were identified in the review of this program area.

6. Monthly Surveillance Observation (61726)

During the inspection period, the NRC inspectors reviewed the licensee's preparation for startup, including precritical surveillances. The inspectors monitored daily primary chemistry results for compliance with LCOs 4.2.10 and 4.2.11 as verified by Surveillance SR 5.2.12, "Primary Reactor Coolant Chemical Surveillance."

The NRC inspectors observed several performances of Surveillance SR 5.2.20, "ACM Diesel Driven Generator Surveillance," as the licensee pursued the cause of random load fluctuations. The licensee replaced the mechanical and electronic portions of the diesel governor. The ACM diesel generator passed its surveillance and should perform its design function, if required. The licensee has not yet been able to identify the cause of random, sporadic load swings of several hundred kilowatts when connected to the licensee's grid. The swings are not reproducible and no pattern or cause has as yet been identified. The licensee is pursuing the source of these fluctuations and is considering a substantial design change to the diesel generator control circuitry in an attempt to eliminate the load fluctuations. This design change would eliminate large unused portions of the existing "standard product" control circuitry.

The NRC inspectors also witnessed performance of portions of Surveillance SR 5.2.16a, "PCRV Closure Leakage Determination," and reviewed documentation from several performances of this surveillance during the inspection period. This is normally a quarterly surveillance but is performed any time purified helium flows to reactor vessel penetrations indicate a possible penetration seal leak.

No violations or deviations were identified in the review of this program area.

7. Monthly Maintenance Observation (62703)

The licensee replaced CRD and orifice assemblies for Regions 3 and 7. This was done in response to the Region 3 control rod found unscrambled during surveillance testing on April 27, 1989, and because the Region 7 control rod had been operating above 250°F as discussed in NRC Inspection Report 50-267/89-07. The NRC inspectors observed portions of various activities in support of this effort. Station Service Request (SSR) 89502231 was reviewed by the NRC inspectors to verify the proper administrative approvals and controls and the general adequacy of controls over the activities. This SSR addressed the removal of the Region 3 CRD to the hot service facility for examination and the installation of a spare CRD into Region 3. The NRC inspectors verified that appropriate caution statements were included in the procedures to verify TS LCO compliance prior to performing certain steps. The CRD was installed in Region 3 and postmaintenance testing completed satisfactorily on May 1, 1989.

SSR 89502242 provided instructions for the removal of the CRD from Region 7 to an equipment storage well and its replacement with a spare CRD. Excure testing of the replacement CRD found the shim motor acting erratically. Nonconformance Report (NCR) 89-081 was issued and a hold tag attached to the CRD. The NRC inspectors reviewed the disposition of this NCR, which was to replace the shim motor. This action was completed satisfactorily. The CRD for Region 7 was installed and tested satisfactorily on May 2, 1989.

The ACM diesel generator developed load swings during surveillance testing on May 3, 1989, and was declared inoperable by the licensee. The governor assembly was replaced and adjusted on May 4, 1989. The postmaintenance verification test was to consist of three complete startup-run-shutdown cycles followed by the weekly 2-hour surveillance test. These tests were completed satisfactorily and the ACM was considered operable on May 5, 1989. The ACM developed similar load swing problems on May 30, 1989, and troubleshooting was in progress at the end of this inspection period. The NRC inspectors will continue to monitor the licensee's actions to determine the cause of and eliminate the load swing problem.

On May 12, 1989, the control room operators identified purified helium flow to PCRV penetration interspaces exceeding TS LCO 4.2.9 limits. Surveillance SR 5.2.16a-Q, Issue 35, "PCRV Closure Leakage Determination," was performed to identify the leak location. The surveillance identified the leak as the B Helium Circulator. After retorquing the bolts on the closure to this penetration, the leak was sealed as verified by a successful retest of SR 5.2.16a-Q. The NRC inspectors reviewed SSR 89502475 and 89502483 under which the work was performed.

During a routine tour of the reactor building on May 19, 1989, the licensee's equipment operator discovered a steam leak from a drain line on the Loop 2 Hot Reheat Steam Header. NCR 89-108 was written to document this and cause action to be taken. The interim disposition for this NCR was for a leak repair contractor to install an enclosure and sealant to stop the leak, which was from a cracked socket weld where a 1-inch drain line ties into the 11-inch hot reheat header. The NRC inspectors reviewed the disposition of this NCR and the associated engineering and safety evaluations. These evaluations included analysis of the enclosure, which is designed to ASME VIII requirements, and considered the possibility of the 1-inch line rupturing or separating at the cracked socket weld. Pressure and thermal stresses were evaluated as well as deadweight and seismic loads to verify the adequacy of existing pipe supports. The sealant material was evaluated for compatibility with system components. The NRC inspectors' review of the evaluation, associated with the interim disposition of NCR 89-108, showed a thorough and complete analysis of all appropriate considerations. The final disposition for this NCR is to perform permanent weld repair during a future shutdown.

The enclosure to contain this steam leak and sealant was fabricated by the contractor and arrived onsite on May 26, 1989. Because of the location of the steam leak and the physical size and arrangement of the enclosure, the contractors had a great deal of difficulty installing the enclosure. The leak was sealed on May 28, 1989, but began leaking again on May 29, 1989. According to the contractor, this is not uncommon, and this type of repair often requires two or three applications of sealant. The contractor returned to the site on May 31, 1989, and injected additional sealant, which proved successful.

No violations or deviations were identified in the review of this program area.

8. Exit Meeting (30703)

An exit meeting was conducted on June 7, 1989, attended by those identified in paragraph 1. At this meeting, the NRC inspectors reviewed the scope and findings of the inspection.