

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
DIVISION IV

Docket No.: 50-267
License No.: DPR-34
Report No.: 50-267/97-01
Licensee: Public Service Company of Colorado (PSCo)
Facility: Fort St. Vrain Nuclear Generating Station (FSV)
Location: Platteville, Colorado
Dates: March 10 through 11, 1997
Inspector: L. C. Carson II, Health Physicist
Approved by: D. Blair Spitzberg, Ph.D., Chief
Nuclear Materials Licensing Branch
Division of Nuclear Materials Safety
Attachment: Supplemental Inspection Information

EXECUTIVE SUMMARY

Fort St. Vrain Nuclear Generating Station NRC Inspection Report 50-267/97-01

This announced inspection was conducted to assess the licensee's implementation of the radiation protection program and Decommissioning Plan in preparation for license termination. This inspection included reviews of the status of the radiation protection, environmental monitoring, and radwaste management programs.

The following is a summary of the findings of this inspection:

- The licensee had conspicuously placarded in accordance with license requirements and licensee commitments, reactor building locations containing grout filled pipes embedded in concrete that had known residual contamination (Section 2).
- The inspector's exposure rate measurements of on-site and off-site facilities were in close agreement with licensee measurements and met the Decommissioning Plan release requirements (Section 2).
- The licensee's radiation protection program met the requirements of the Decommissioning Technical Specifications, 10 CFR Part 19, and 10 CFR Part 20. All radiation sources and waste had been removed from the site and properly disposed (Section 3).
- The licensee had implemented the radiological environmental monitoring and radwaste management programs as required by the Decommissioning Technical Specifications. The 1996 Annual Radiological Environmental Operating Report and the 1996 Annual Radioactive Effluent Release Report met the Decommissioning Technical Specifications requirements (Section 4).

Report Details

1 Plant Status

On November 23, 1992, the NRC issued an Order which authorized the decommissioning of FSV. As of November 1, 1996, decontamination and decommissioning at FSV were complete. On November 7, 1996, PSCo submitted to the NRC a "Request to Terminate the FSV Facility Operating License," which is a 10 CFR Part 50 possession-only license.

PSCo's objective was to dismantle, decommission, and release the FSV site for unrestricted use; however, the FSV facility will be largely left intact following decommissioning. The Prestressed Concrete Reactor Vessel, reactor building, turbine building, liquid waste system, and the radioactive balance-of-plant equipment were dismantled or decontaminated as described in the FSV Decommissioning Plan.

During this inspection, the primary activities in progress at FSV consisted of terminating and phasing out the 10 CFR Part 50 license radiation protection and decommissioning activities. This final NRC inspection of the 10 CFR Part 50 licensed activities at FSV was to verify that residual radioactivity and radiation exposure rates were at the levels described in the Decommissioning Plan.

2 Closeout and Inspection Survey (83890)

2.1. Inspection Scope

This inspection activity involved touring the FSV site and performing exposure rate surveys. The purpose of this inspection was to measure radiation levels on site and off site. The inspector was to determine the residual exposure rate levels remaining on site and if any sources of radioactive material remained with the licensee.

2.2 Observations and Findings

a. Residual Radioactivity Plaques

The natural radiation background at FSV on site and off site was 15 microRoentgen/hour ($\mu\text{R/hr}$). The FSV Decommissioning Plan established a site residual radioactivity and exposure rate release criteria from licensed material of 5 $\mu\text{R/hr}$ above background when averaged over 10 square-meters, and no single measurement could be 10 $\mu\text{R/hr}$ above background.

Reactor building tours were conducted to observe the location of grouted embedded piping. According to NRC correspondence dated June 18, 1996, the licensee had to place warning plaques around the reactor building and Prestressed Concrete Reactor Vessel. Since the last inspection, the licensee had mounted the caution plaques as required before license termination. The inspector observed each of the seven

plaques and concluded that the plaques were mounted in conspicuous locations. The plaques read as follows:

"Caution: Grout-filled pipes embedded in concrete contain fixed radioactive contamination on inner surfaces as follows:

- Typical radionuclides include cobalt-60, cesium-137, tritium, iron-55, and europium-152, -154, and -155
- Contamination levels are 2,800 disintegrations per minute/100 centimeters squared (dpm/100 cm²) average, 87,000 dpm/100 cm² maximum.

These levels of radioactive contamination have been accepted by the U.S. Nuclear Regulatory Commission for building occupancy and dismantlement."

b. Site Tours and Exposure Rate Surveys

The inspector conducted exposure rate surveys of the reactor building which included Level 11, around the Prestressed Concrete Reactor Vessel, reactor building basement sump area, new fuel storage area, and the liquid radwaste system. Radiation levels in the reactor building measured 5-15 μ R/hr.

The inspector conducted surveys during tours of the turbine building and radiochemistry laboratory. Radiation levels in these two areas measured 15-20 μ R/hr. The inspector toured and surveyed the areas inside and outside the FSV security fence line, and the radiation levels in these two areas measured 10-15 μ R/hr.

Finally, the inspector toured and surveyed the Farm Pond, Goosequill Ditch, and Jay Thomas Ditch. This area included licensee property inside and outside the FSV owner controlled area where the licensee had conducted extensive sampling, radioisotopic analysis, and exposure rate measurements which included, soil, pavement, water, and basin sediment. Radiation levels in the Farm Pond, Goosequill Ditch, and Jay Thomas Ditch areas measured 10-15 μ R/hr.

2.3 Conclusion

The licensee conspicuously placarded locations in the reactor building with known residual contamination contained in pipes embedded in concrete in accordance with license requirements and licensee commitments. The inspector's exposure rate measurements of on-site and off-site facilities were in close agreement with licensee measurements and met the Decommissioning Plan's exposure rate release requirements.

3 Occupational Exposure During SAFESTOR and DECON (83100)

3.1 Inspection Scope

The purpose of this inspection activity was to review FSV's radiation protection program through the completion of the decommissioning project. The inspector reviewed the licensee's radioactive material controls.

3.2 Observations and Findings

a. Control of Radioactive Materials

Since the last inspection, the licensee found four check sources that were left in plant radiation instruments. These check sources included two americium-241 sources (0.027 and 0.05 microcuries), a barium-133 source (0.932 microcuries), and a cesium-137 source (24.1 microcuries). The licensee documented their findings in Problem Report 97-01-001, which included a memorandum dated February 20, 1997. The memorandum stated all remaining radiation check sources received by the licensee's contractor Scientific Ecology Group had been sent to the Hanford, Washington, radwaste disposal site. The inspector determined that all radiation sources associated with FSV's 10 CFR Part 50 operations had been transferred to authorized recipients.

b. Solid Radwaste Storage and Processing

As previously documented in NRC Inspection Report 50-267/96-05, no solid radwaste exists at FSV. However, the inspector had determined that some FSV solid radwaste shipped to off-site processors had not been buried at an authorized disposal facility. Licensee management updated the inspector on the status of all radwaste shipped from FSV in 1996. The inspector reviewed FSV's certificate of disposal dated January 23, 1997, for radwaste shipment No. 706-01-001 to the processor Envirocare of Utah. The certificate stated that 172.5 cubic feet (ft³) of mixed low-level radwaste were processed and disposed of at the Envirocare facility on December 3, 1996. According to the radiation protection manager, only contaminated lead ingots remained to be buried at the Envirocare facility, approximately 40 ft³ at less than 1 millicurie. The licensee addressed this matter in the licensee's final Annual Radioactive Effluent Release Report of 1996 that was submitted on March 11, 1997. On March 24, 1997, the radiation protection manager notified the inspector that Scientific Ecology Group shipped the contaminated lead to the Envirocare facility, and this represented the only remaining FSV radwaste.

3.3 Conclusion

The licensee's radiation protection program met the Decommissioning Technical Specifications, 10 CFR Part 19, and 10 CFR Part 20. All radiation sources and waste had been removed from the site and properly disposed.

4 **Radiological Environmental Monitoring and Radioactive Waste Management (80721 & 84101)**

4.1 Inspection Scope

The radiological environmental monitoring and radioactive waste management programs were inspected to ensure that the license requirements in these areas were implemented in accordance with the Decommissioning Technical Specifications, Offsite Dose Calculation Manual, and Radiological Environmental Monitoring Program.

4.2 Observations and Findings

a. Radiological Environmental Monitoring Program and Operating Report

The licensee is required to have a Radiological Environmental Monitoring Program to comply with the Decommissioning Technical Specifications, Section 5.4.4.b. The Offsite Dose Calculation Manual, a supporting document of the Decommissioning Technical Specifications, provides the description of the Radiological Environmental Monitoring Program requirements.

Environmental monitoring consisted of the collection and analysis of samples of air, water, soil, biota (animal and plant life), and other media from the area around the site. Environmental monitoring was implemented to demonstrate that the facility complied with applicable standards and to assess FSV's effect on the local environment.

Section 5.5.1.b of the Decommissioning Technical Specifications requires that the licensee submit an Annual Radiological Environmental Operating Report to the NRC by May of each year. The inspector reviewed the licensee's 1996 Annual Radiological Environmental Operating Report that was submitted on January 13, 1997. The inspector noted that the food product analyses and the Land Census Report were not included in the 1996 environmental report because these reports were no longer relevant.

The 1996 environmental report was found to be adequate, and the inspector identified no concerns in this area.

b. Review of Annual Radioactive Effluent Release Report

The inspector reviewed the licensee's 1996 Annual Radioactive Effluent Release Report. This report was the final such report to be submitted under the license. The report summarized the gaseous effluent, liquid effluent, and solid radwaste released from the site during calendar year 1996. The licensee concluded that the releases were within the limits of 10 CFR Parts 20. The inspector identified no specific concerns during the review of the effluent release report.

c. Post Decommissioning Effluent and Environmental Monitoring

NRC Inspection Report 50-267/96-05 documented that on November 20, 1996, FSV sent a letter to the NRC regarding the reactor building sump groundwater releases being conducted pursuant to the National Pollutant Discharge Elimination System (NPDES). However, the inspector noted that licensee's gamma spectrum lower limits of detection did not match the limits of detection established in Table F-2 of the Offsite Dose Calculation Manual (ODCM). The radiation protection manager committed to collect a water sample from the RBS and have the samples analyzed by Colorado State University at the environmental limits of detection. During this inspection, the results of Colorado State University's analysis were reviewed and found acceptable.

Since the last inspection, the licensee found water in some reactor building piping that they had previously drained. Some water samples measured between 44,000 picocuries/liter and 118,000 picocuries/liter for tritium (H-3), levels well below the release concentration for tritium specified in 10 CFR Part 20 and the NPDES discharge permit. The licensee documented their findings in Problem Report 97-03-001. The licensee collected smear samples from the interior of the piping to determine if removable radioactivity existed above the licensee's limit of 40,000 dpm/100 cm² for removable tritium contamination. The maximum smearable contamination found was 2,194 dpm/100 cm². The licensee determined that they would drain the residual water into the reactor building sump and dilute the tritium to below the environmental lower limits of detection specified in the ODCM (2000 picocuries/liter). This water would then be discharged under the NPDES permit through the turbine building sump to the drain slew to St. Vrain Creek. The licensee discussed this matter with representatives of the Colorado Department of Public Health and Environment who found the plan acceptable.

4.3 Conclusion

The licensee had implemented the radiological environmental monitoring and radwaste management programs as required by the Decommissioning Technical Specifications. The 1996 Annual Radiological Environmental Operating Report and the 1996 Annual Radioactive Effluent Release Report met the Decommissioning Technical Specifications requirements.

5 Followup on Corrective Actions for Violations and Deviations (92702)

5.1 (Closed) Violation Item 50-267/9604-01: Inadequate Procedures and Alarm Setpoints for Tool Monitor Operations.

On October 3, 1996, inspectors identified that licensee procedures for the release of materials and equipment from radiologically controlled areas were inadequate. The licensee wrote the procedures in such a way that materials and equipment could be released for unrestricted use with detectable amounts of radioactive material. Specifically, the procedures allowed for the use of tool contamination monitors with setpoints well above their minimum detectable activity, thereby allowing the release of equipment with radioactive material which the monitor had the capability of detecting. Further, once equipment alarmed the tool monitor, procedures allowed the use of less sensitive instruments (pancake probes) to determine whether radioactive material was detectable. Therefore, FSV potentially allowed equipment released with radioactive material which was detectable by the tool monitor.

The inspector concluded that this was a violation of the following:

- Decommissioning Plan, Section 3.2.6.8, states, in part, that procedures for the release of materials and equipment from Radiologically Controlled Areas will be developed. Materials will not be released for unrestricted use if it contains detectable amounts of radioactive material.
- Decommissioning Technical Specification, License Condition 5.4.1(a), "Procedure for License DPR-34," states, in part, that written procedures, plans, manuals, and/or programs shall be established, implemented, and maintained covering the Radiation Protection Program.

The inspector performed an on-site review of the licensee's corrective actions that were detailed in an FSV letter dated December 20, 1996, and concluded that FSV had implemented the commitment items in the letter. The licensee had taken the tool monitor out of operation when the violation was identified. The corrective actions appeared to have precluded recurrence of the violation.

5.2 (Closed) Violation Item 50-267/9602-02: Failure to Follow Scientific Ecology Group Quality Assurance Procedures

The inspectors examined the implementation of FSV's Quality Assurance program with respect to final site survey activities and found that Scientific Ecology Group's

Quality Assurance program implementation at FSV was violating requirements in the following areas:

- Inspections
- Nonconformance Reporting
- Corrective Action Report
- Audits

The inspector performed an on-site review of the licensee's corrective actions that were detailed in an FSV letter dated May 29 and July 3, 1996. The inspector concluded that FSV had implemented the commitment items in the letters. The corrective actions appeared to have precluded recurrence of the violations.

6 Exit Meeting

An exit meeting was conducted on March 11, 1997. During the meeting, the inspector reviewed the scope and findings of the inspection. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspector.

ATTACHMENT

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

T. Borst, Radiation Protection Manager
S. Chesnutt, Senior Project Assurance Engineer/Licensing & Compliance
M. Holmes, Project Assurance Manager
D. Seymour, Senior Quality Assurance Engineer

Contractor Personnel

J. Dickerson, Health Physics Engineer, Scientific Ecology Group
B. Dyck, Westinghouse Licensing Engineer
J. Rood, Final Survey Lead Engineer, Scientific Ecology Group

NRC Region IV Personnel

L. Carson II, Health Physicist, Division of Nuclear Materials Safety

INSPECTION PROCEDURES USED

IP	2560	"Decommissioning Inspection Program"
IP	80721	"Radiological Environmental Monitoring"
IP	83100	"Occupational Exposure During SAFESTOR and DECON"
IP	83890	"Closeout and Inspection Survey"
IP	84101	"Radioactive Waste Management"
IP	92702	"Followup on Corrective Actions for Violations and Deviation"

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

50-267/9604-01	VIO	Inadequate procedures and survey techniques to detect a minimal amount of radioactivity before material unconditional releases from Ft. St. Vrain.
50-267/9602-02	VIO	Failure to Follow Scientific Ecology Group's quality assurance procedures

LIST OF ACRONYMS USED

ALARA	As Low As is Reasonably Achievable
dpm	Disintegrations Per Minute
FSV	Fort Saint Vrain
PDR	Public Document Room
PSCo	Public Service Company of Colorado