

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-1201

License No.: SNM-1168

Report No.: 70-1201/96-03 4

Licensee: B&W Fuel Company
d/b/a Framatome Cogema Fuels

Facility: Commercial Nuclear Fuel Plant

Location: Lynchburg, Virginia

Dates: September 10, 13, and 23, 1996

Inspectors: W. B. Gloersen, Sr. Radiation Specialist
C. H. Bassett, Sr. Radiation Specialist

Approved by: E. J. McAlpine, Chief
Fuel Facilities Branch
Division of Nuclear Materials Safety

Enclosure 2

EXECUTIVE SUMMARY

B&W Fuel Company - Lynchburg Manufacturing Facility NRC Inspection Report 70-1201/96-04

This routine, unannounced inspection was conducted to review the programs pertaining to radioactive solid waste management, radioactive airborne effluents, and the environmental management and protection.

Solid Radwaste

- The controls, procedures, and waste management program for solid radioactive waste were acceptable and capable of accomplishing its safety objectives. There was one non-cited violation identified for failure to list the volume of material and the quantity of four isotopes (H^3 , C^{14} , Tc^{99} , and I^{129}) as required on the waste manifest.

Effluents

- The program to monitor and control gaseous radioactive effluents and to maintain the radioactivity released in those effluents to concentrations which were below the limits specified in 10 CFR 20 for release of radioactive material to unrestricted areas. The calculated effective dose to individuals offsite that were the most likely to receive the exposures was less than one percent of the limit specified in 10 CFR 20.1301 indicating that the licensee's releases of radioactive material in gaseous effluents were as low as reasonably achievable (ALARA).

Environmental Monitoring Program

- The licensee's overall environmental monitoring program demonstrated that releases of radioactivity to the environment were minimal. However, the retrieval of certain environmental sample records was less than adequate. As a result of the less than adequate records management, a violation was identified for the failure to evaluate environmental sample data against internal action levels.

Report Details

1. RADIOACTIVE SOLID WASTE MANAGEMENT (84850)

1.1 Discussion

The inspector reviewed and discussed with licensee representatives activities associated with the storage of low-level radioactive waste (LLRW) generated from onsite operations and its transfer to a licensed waste processor for disposal. Specifically, the inspector reviewed the licensee's program as it pertained to the requirements of 10 CFR 20.2006 and Appendix F to 10 CFR Part 20.

1.1.1 Onsite Storage

Section 3.3.5 of the license application requires that waste in the restricted area is to be stored in a manner that provides adequate protection from deterioration and/or the elements.

The inspector toured and examined the licensee's storage areas for LLRW and noted that the licensee maintained two storage locations for LLRW. The licensee temporarily stored all LLRW generated from the Service Equipment Refurbishment Facilities (SERF) and fuel handling areas into a dedicated SeaVan container for each facility. The solid waste consisted primarily of packaging material, floor sweepings, filters, decontamination materials, contaminated equipment, and evaporator sludge. For the LLRW generated from the SERF area, the licensee performed a 100% surface scan of each plastic bag containing the waste to determine the maximum dose rate before placing the solid radwaste into the SeaVan container. The dose rate data were then used in conjunction with the most recent isotopic analysis of a representative waste stream composite sample to determine the radionuclide content.

For LLRW originating from the fuel handling areas, the licensee scanned each container (a 55-gallon drum with 2-3 bags of contaminated waste) with a sodium iodide (NaI) detector and a SAM-2 counting system. The material controls and accountability personnel provided the assay results to the health physicist responsible for shipping radioactive materials so that the total quantities of uranium could be included with the shipping papers.

Once the SeaVan containers were filled, the licensee shipped the containers to a licensed waste processor (American Ecology Recycle Center, formerly Quadrex) for sorting and compaction before the waste was buried at a licensed disposal facility. The licensee shipped approximately two containers per year to the waste processor.

The inspector did not identify any concerns regarding storage, housekeeping, or radiological controls of the LLRW storage areas.

1.1.2 Procedures

The inspector reviewed selected sections of the procedures listed below that pertained to waste control, handling, processing, and shipment.

- Health-Safety Procedure, AS-1110, "Waste Control", Revision 18, December 16, 1994
- Radiation Protection Procedure, RP-007, "Shipment and Receipt of Radioactive Materials", Revision 3, August 11, 1994
- Radiation Protection Procedure, RP-019, "Isotopic Activity Calculational Methods", Revision 1, November 2, 1993

In general, the inspector did not observe any significant safety concerns with the procedures. However, the inspector reviewed the licensee's procedures and shipping records to determine that a system had been established to verify that acknowledgement of receipt of the manifest from the waste processor had been received and that procedures were in place to effect an investigation in any instances wherein acknowledgement of receipt of the shipment had not been received within the time period specified in 10 CFR 20, Appendix F. As noted during a previous inspection, Inspection Report No. 95-02 and again during this inspection, the procedures did not provide the following: (1) a formalized system to ensure that the manifest was received within the required time limits; (2) the initiation of an investigation for a manifest not received; and (3) the means to report such investigations to the appropriate NRC Regional Office. A review of two of the licensee's shipping records for waste shipments made to a waste processor during the 95-96 time frame, indicated that the licensee had received from the processor a signed copy of one of the shipping papers but not for the other. This issue was again discussed with the licensee and the licensee acknowledged the inspector's comments.

1.1.3 Waste Manifests

Appendix F to 10 CFR Part 20 specifies the requirements for low-level waste transfer for disposal at land disposal facilities, including waste manifests, waste generator certification, and control and tracking.

From a review of the records for solid waste disposals made in 1995 and 1996, it was noted that the licensee predominantly transferred its waste to a licensed waste processor. The licensee shipped the LLRW as a radioactive materials shipment to the waste processor, who subsequently segregated, processed, and reanalyzed the material to determine the appropriate quantities of radionuclides. The inspector verified that the licensee provided an acceptable level of information in the shipping papers to determine quantities of individual radionuclides shipped. The distribution of radionuclides provided in the shipping papers was based on semi-annual radiochemical analyses of SERF-3 and SERF-1 filter composite samples. The semi-annual isotopic analyses of the composite filter samples was required by RP-007, Step 14.1.1. The inspector reviewed the results of the last two composite filter samples collected and sent to the contract laboratory. The analyses

indicated a mixture of activation and fission products which was derived from the SERF equipment.

The inspector reviewed manifest records of two shipments of radioactive waste made since the last inspection (95-114 and 95-69). Both of these waste shipments involved the transfer of radioactive materials to a licensed waste processor for treatment and repackaging. The manifests were complete and met the applicable requirements of the regulation except that no volume of waste was listed for either of the shipments and no total quantity of radioactive material was listed for the four isotopes specified in Appendix F, i.e. tritium (H^3), carbon-14 (C^{14}), technetium-99 (Tc^{99}), and iodine-129 (I^{129}). When this issue was discussed with a licensee representative, the individual stated that the procedure governing waste shipments was in the process of being revised and that the revision would subsequently include instructions to list the volume for each waste shipment and instructions to specify the quantity of each of the stipulated isotopes. The licensee indicated that the corrective actions would be completed within 30 days. This failure constitutes a violation of minor significance and is being treated as a Non-Cited Violation consistent with Section IV of the NRC Enforcement Policy (NCV: 70-1201/96-04-01).

1.2 Conclusion

Although a non-cited violation was identified for failure to list the volume of material and the quantity of four isotopes (H^3 , C^{14} , Tc^{99} , and I^{129}) as required on waste manifests, the inspector concluded that the licensee's controls, procedures, and waste management program appeared acceptable and capable of accomplishing its safety objectives.

2. RADIOACTIVE WASTE MANAGEMENT (88035)

2.1 Discussion

Safety Condition S-1 of SNM-1168 required the licensee to use licensed material in accordance with the statements, representations, and conditions of Part I of the License Application dated June 22, 1990, and supplements thereto.

Sections 3.2.2 and 5.1.1 of the License Application specified the requirements for gaseous effluent controls. Section 5.1.2 specified the requirements for liquid effluent controls.

10 CFR 70.59 required the licensee to submit a report, within 60 days after January 1 and July 1 of each year, specifying the quantity of each of the principal radionuclides released to unrestricted areas in liquid and gaseous effluents during the previous six months of operation. Quantities of radioactive materials released during the reporting period significantly above the licensee's design objectives previously reviewed as part of the licensing action are to be reviewed specifically.

2.1.1 Program Changes

The inspector noted that the licensee's Health and Safety organization had changed since the last inspection, including the selection of a new Manager of Safety and Licensing and the addition of new health physics personnel. These changes were discussed in Inspection Report 70-1201/96-03.

In addition, the licensee had begun operations on April 18, 1996 in a new facility identified as the Service Equipment Refurbishment Facility (SERF-4) Building. This facility added an additional gaseous effluent release point. At present, the licensee was monitoring four gaseous effluent stacks.

2.1.2 Effluent Sampling and Monitoring Instrumentation

The inspector examined the licensee's program for sampling the gaseous effluent release points at the facility, as specified in RP-004, Airborne Radioactivity, Rev. 7, dated October 10, 1995. Included in the examination was a selected review of applicable records from January to August 1996. The inspector noted that the licensee discharged gaseous effluents from four release points: (1) Main Stack (the PLR area and SERF (PLR/SERF-1) controlled area); (2) SERF-2 radiologically controlled area; (3) SERF-3 radiologically controlled area, and (4) SERF-4 radiologically controlled area. The inspector verified that the controlled area effluents were continuously sampled for gross alpha and beta airborne radioactivity when the facilities were in an operational status and that samples were collected on a daily basis, except weekends and holidays.

The inspector toured the new SERF-4 facility and examined the gaseous effluent sampling equipment. On the SERF-4 continuous air particulate sampler, the inspector noted a 90 degree bend on the sampler inlet which was unnecessary in that a non-angled inlet tube could have easily been used. The licensee acknowledged the inspector's comment and agreed to address the problem.

The inspector also verified that the required in-place leak tests for the HEPA filtration units was performed as required by Procedure RP-004, Airborne Radioactivity, also specified the requirements for the in-place efficiency tests and isokinetic sample verification. In-place filter efficiency tests using nominal 0.3 micron dicetyl phthalate (DOP) particulates were required for new systems and after system maintenance or filter replacement. The inspector reviewed the in-place leak test results for the following systems: (1) High Bay East; (2) SERF-4 effluent; (3) SERF-4 RCA recirculation; and (4) High Bay West. The in-place leak tests were conducted on April 4, 1996 and the systems met the in-place filter leak criteria.

In addition, the inspector reviewed records and surveillance logs of the SERF-4 Building negative pressure checks and differential pressure checks from January 1996 to September 5, 1996 and verified that the checks were performed as required. The licensee was also required to perform isokinetic sample verifications. The inspector reviewed the records of these verifications which were performed in April and July 1996. The inspector noted that the tests and verifications were conducted as required and that the systems were operated within the specified operating parameters.

2.1.3 Gaseous Effluent Monitoring Results

The licensee's main gaseous release point discharged both uranium and byproduct radionuclides due to operations in the PLR area and SERF-1 through the same stack. The introduction of by-product materials (mixed fission products) into the waste stream was due to the licensee's increased field service operations at nuclear power plants. At the onset of the byproduct operations, the licensee began sampling for beta-gamma activity and attributed the beta activity to Cobalt-60 (Co^{60}). The licensee had three additional stacks (SERF-2, SERF-3, and SERF-4) which exhausted air from three facilities used primarily for field service operations of equipment used during maintenance activities at commercial nuclear power plants.

The inspector reviewed the Semiannual Effluent Reports for 1995 and the first half of 1996. The inspector noted that the reports contained the required information and were submitted within the time requirement specified in 10 CFR 70.59. A summary of the gaseous effluent releases from 1990 to the first half of 1996 is provided below.

Table 1: Summary of Gaseous Effluent Discharges

<u>Year</u>	<u>Total Uranium Released (μCi)</u>	<u>Co-60 Released (μCi)</u>
1990	4.7	25.7
1991	4.2	80.6
1992	5.1	64.3
1993	3.5	42.6
1994	5.2	49.2
1995	4.8	19.3
1996 (1/2)	4.1	17.8 ¹

¹ During this reporting period, operations began in a new facility identified as the Service Equipment Refurbishment Facility (SERF-4) Building on April 18, 1996.

The inspector verified that the airborne releases were well within the 10 microCurie per quarter ($\mu\text{Ci}/\text{quarter}$) release limit for total uranium as specified in the license application and RP-004, Airborne Radioactivity, Rev. 7, dated October 10, 1995.

The effective dose equivalent (EDE) based on the assumption that the gaseous effluents were released at the license application limit of 10 $\mu\text{Ci}/\text{quarter}$ for four quarters, was estimated to be $3.9\text{E-}02$ mrem/year. This dose assessment would have resulted in an EDE that was well below the limit of 10 mrem/year specified in EPA's generally applicable National Emission Standards for Hazardous Air Pollutants (NESHAP) of 40 CFR 61.102(a).

2.2 Conclusions

The licensee had implemented an effective program to monitor and control gaseous radioactive effluents and to maintain the radioactivity released in those effluents to concentrations which were below the limits specified in 10 CFR 20 for release of radioactive material to unrestricted areas. The calculated effective dose to individuals offsite that were the most likely to receive the exposures was less than one percent of the limit specified in 10 CFR 20.1301 indicating that the licensee's releases of radioactive material in gaseous effluents were as low as reasonably achievable (ALARA).

3. ENVIRONMENTAL PROTECTION (88045)

3.1 Discussion

Section 5.2 of the License Application specified the requirements for the environmental monitoring program. Section 5.2 also specified that environmental monitoring shall be conducted in accordance with approved procedures which requires the environmental data to be evaluated against internal action levels.

3.1.1 Monitoring Program Implementation

Selected environmental monitoring program areas were reviewed and discussed with cognizant licensee representatives. The review included evaluation of procedures, environmental data trends, quality control of analytical measurements, verification of sample equipment operability, and observation of sample location conditions.

Procedure RP-011, Environmental Monitoring, Rev. 3, dated June 21, 1995, specified the requirements for implementing the environmental monitoring program. The procedure also specified the sample collection frequency and action limits associated with each sample matrix. In a letter to NRC dated May 25, 1995, the licensee had requested certain modifications to its environmental monitoring program, including the authorization to reduce the frequency for environmental sampling for water and soil from quarterly to annually. The NRC staff considered an annual collection frequency acceptable and authorized the change in a letter dated July 10, 1995. The guidance specified in RP-011 was adequate to satisfy License Application requirements.

The inspector verified that the licensee had a total of three continuous air sampling stations located in the areas as indicated in Figure 5.1 of the License Application. The licensee had added a fourth air sampling station at the perimeter fence in the west quadrant. The verification included a tour of the four air sampling stations. The four air sampling units were operating adequately and the flow meters had all been calibrated within the prescribed frequency. On two of the air sampling units, the inspector had noted frayed electrical cords. The licensee made note of the units in question. The air samplers operated continuously and the air filters were collected once per seven days. The air samples were allowed to decay for 72 hours to reduce the interference from radon.

3.1.2 Monitoring Program Results

The inspector reviewed and discussed selected environmental sample results collected and analyzed in 1995, including direct radiation monitoring using thermoluminescent dosimeters (TLDs), environmental air particulate samples, vegetation, fish, surface water, sediment, and soil samples.

For the selected data reviewed, sample matrices were collected and analyzed in accordance with procedural requirements. The inspector noted that the soil samples collected in the vicinity of the wet weather stream continued to exhibit gross alpha and beta concentrations of 25 pCi/gram and 37 pCi/gram, respectively, which was slightly above the action level of 20 pCi/gram.

The inspector noted that the retrieval of certain environmental sample records was less than adequate. For example, the TLD data were not readily available for review until the end of the inspection and documentation of vegetation sample results for 1995 could not be located in the applicable file. The licensee had contacted its vendor laboratory to have a copy of the sample results faxed to the health physicist. After review of the vegetation sample results, the inspector noted that vegetation sample (V-F-5-95) indicated gross alpha and beta concentrations of 22 pCi/gram and 25 pCi/gram, respectively, which slightly exceeded the licensee's action limit of 20 pCi/gram specified in Exhibit B of Procedure RP-011. Slightly elevated vegetation sample results were also noted in 1994. Since the documentation of the vegetation sample data could not be located in the appropriate file, the licensee was unable to perform an adequate review of the sample results. Section 5.2 of the License Application requires that environmental monitoring shall be conducted in accordance with approved procedures which requires the environmental data to be evaluated against internal action levels. RP-011, Environmental Monitoring, Rev. 3, dated June 21, 1995, Step 14.1 requires the Health Physicist to evaluate the sample results which exceed the evaluation levels specified in Exhibit B and for trends. In addition, when the action levels are exceeded for individual samples, the possible reasons should be indicated on the sample result report and a request to recount the sample should be made. All corrective actions should be indicated either on the sample result report or on a separate document in the environmental sample results file. The licensee had failed to review and document the results of the review and appropriate corrective actions. This deficiency was identified as a violation of Section 5.2 of the License Application and Procedure RP-011 (VIO: 70-1201/96-04-02).

In a letter to the NRC RII Office dated September 23, 1996, the licensee identified the corrective actions that had and/or will take place. The immediate corrective actions included the following: (1) document the deficiency in the licensee's Radiological Deficiency Report (RDR) system (RDR 96-45); (2) increase the vegetation sample size at the location in question and collect the sample in October 1996; (3) review the sample results by the responsible technician and independently by the Health Physicist; and (4) perform further analyses and evaluations if the samples again exceed the action limits. To prevent recurrence, the technicians have been instructed to followup on all environmental samples after they have been submitted to the vendor to ensure a timely analysis. In addition, an independent review will

be performed by the Health Physicist to ensure sample results are reviewed in accordance with procedural requirements. The licensee also indicated that RP-011 will be revised to include the requirement of a review by the technicians and an independent review by the Health Physicist for all samples. The inspector noted that this violation had been corrected and that the actions taken by the licensee were acceptable.

3.1.3 Decommissioning

The inspector discussed with licensee representatives and reviewed the operational history of the liquid effluent system discharges which eventually led to the contamination of a wet weather stream.

Until December 1, 1987, uranium contaminated liquid effluents generated from the manufacturing operations were released to a discharge area, known as the Wet Weather Stream (WWS). The WWS was located on B&W Fuel Company property, at least 450 feet from the nearest public road. In 1994, the licensee had remediated contaminated areas in the WWS. A summary of the characterization plan and surveys, decontamination efforts, and laboratory results was provided to the ONMSS/NRC in a letter dated December 1, 1994. In that letter, the licensee had requested that the WWS be "free released" by the NRC. The licensee had no future plans to release radioactive material into the WWS nor did licensed operations require its use. The inspector noted that the December 1, 1994 WWS remediation report had been forwarded the NRC's contractor (Oak Ridge Institute for Science and Education (ORISE)) for review. In a letter to the licensee dated September 27, 1995, the NRC had nine questions pertaining to the WWS remediation report which requested clarifications and additional information. The licensee responded to the NRC's request for further information in a letter dated May 15, 1996. The licensee had also requested that a confirmatory survey be performed. At the time of this inspection, no additional progress had been made.

3.2 Conclusions

The retrieval of certain environmental sample records was less than adequate. The less than adequate records management may have led to the violation for the failure to evaluate environmental sample data against internal action levels. However, the licensee's overall environmental monitoring program demonstrated that releases of radioactivity to the environment were minimal.

4. MANAGEMENT MEETINGS

The inspector met with licensee representatives indicated in Paragraph 1 at the conclusion of the inspection on September 13, 1996. The inspector summarized the scope and findings of the inspection, including details of the violation and non-cited violation. The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. Although proprietary documents and processes were occasionally reviewed during this inspection, the proprietary nature of these documents or processes have not been included in this report. Dissenting comments were not received from the licensee.

On September 23, 1996, the licensee provided a written response to the apparent violation which clarified the corrective actions that were discussed during the inspection. The corrective actions were acceptable.

ATTACHMENT

1. PERSONS CONTACTED

1.1 Licensee Personnel

*T. Allsep, Health Physicist
*G. Elliott, Manager, Safety and Licensing
W. Foot, Manager, Facilities and Maintenance
*D. Gordon, Sr. Health Physicist
*G. Lindsey, Health-Safety Instructor
L. Morrell, Compliance Officer

Other licensee employees contacted included engineers, technicians, production staff, security, and office personnel.

*Denotes those present at the exit meeting on September 13, 1996.

2. INSPECTION PROCEDURES USED

IP 84850 Radioactive Waste Management - Inspection of Waste Generator Requirements of 10 CFR Part 20 and 10 CFR Part 61.
IP 88035 Radioactive Waste Management
IP 88045 Environmental Protection

3. LIST OF ITEMS OPENED AND CLOSED

The following summarizes the items that were either opened, closed and/or discussed.

<u>Type</u>	<u>Item Number</u>	<u>Status</u>	<u>Description and Reference</u>
NCV	70-1201/96-04-01	Closed	Failure to list the volume of material and the quantity of four isotopes (H^3 , C^{14} , Tc^{99} , and I^{129}) as required on waste manifests.
VIO	70-1201/96-04-02	Closed	Failure to review, document the results of the review, and take appropriate corrective actions for a vegetation sample that exceeded the licensee's action limits.

4. LIST OF ACRONYMS AND ABBREVIATIONS

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
DOP	dioctyl phthalate
EDE	Effective Dose Equivalent
LLRW	Low-level radioactive waste
NaI	Sodium Iodide
NESHAP	National Emission Standards for Hazardous Air Pollutants
NCV	Non-cited violation
NRC	Nuclear Regulatory Commission
ONMSS	Office of Nuclear Material Safety and Safeguards
ORISE	Oak Ridge Institute for Science and Education
PLR	Pellet Loading Room
RDR	Radiological Deficiency Report
SAM	Stabilized Assay Meter
SERF	Service Equipment Refurbishment Facility
TLD	Thermoluminescent Dosimeter
uCi	microcurie
VIO	Violation
WWS	Wet Weather Stream