



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
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ATLANTA, GEORGIA 30303-8931

April 30, 2001

Framatome ANP
ATTN: Mr. J. E. Matheson
Vice President, Operations
Lynchburg Manufacturing Facility
P. O. Box 11646
Lynchburg, VA 24506-1646

SUBJECT: NRC INSPECTION REPORT NO. 70-1201/2001-02

Dear Mr. Matheson:

This refers to the inspections conducted on March 26 through 30, 2001, and April 2 through 4, 2001, at the Lynchburg Manufacturing Facility. The purpose of the inspection was to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements. At the conclusion of the inspection, the findings were discussed with those members of your staff identified in the report.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress.

Within the scope of the inspection, violations or deviations were not identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Record (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Should you have any questions concerning this letter, please contact us.

Sincerely,

/RA/

Edward J. McAlpine, Chief
Fuel Facilities Branch
Division of Nuclear Materials Safety

Docket No. 70-1201
License No. SNM-1168

Enclosure: (See Page 2)

Enclosure: NRC Inspection Report

cc w/encl:
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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-1201

License No.: SNM-1168

Report No.: 70-1201/2001-02

Licensee: Framatome ANP

Facility: Lynchburg Manufacturing Facility

Location: Lynchburg, VA

Dates: March 26-30, 2001

Inspectors: R. E. Swatzell, Fuel Facilities Inspector
A. Gooden, Health Physicist

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

Enclosure

EXECUTIVE SUMMARY

Framatome ANP NRC Inspection Report 70-1201/2001-02

These routine unannounced inspections involved observation of work activities, a review of selected records, and interviews with plant personnel pertaining to the licensee's environmental, waste management, radiation protection, and waste shipping programs. The report covers a one week period and a two-day inspection effort by regional-based fuel facility inspectors.

Based upon the results of these inspections, the licensee's environmental protection, waste management, radiation protection, and waste shipping were acceptable. The inspections identified the following aspects of the program as outlined below:

ENVIRONMENTAL PROTECTION

The licensee adequately met the environmental monitoring requirements as set forth in Chapter 5 of Special Nuclear Material License-1168 (SNM-1168). Environmental samples indicated that environmental radioactivity concentrations were not significantly affected by plant operations (Paragraph 2.a).

WASTE MANAGEMENT

The licensee had an effective program for monitoring radiological constituents in plant gaseous effluents which met the implementation requirements of SNM-1168 and the radiological release criteria of 10 CFR Part 20 (Paragraph 3.a).

The licensee's program for the shipping of low level radioactive wastes (LLRW) for disposal met the classification and packaging requirements of 10 CFR 61.55 and 61.56 (Paragraph 3.b).

Minor calculational errors were identified in one LLRW shipping manifest due to errors in an internal procedure (Paragraph 3.b).

LLRW storage was performed in a manner as to prevent area contamination (Paragraph 3.b).

RADIATION PROTECTION

The licensee's external exposure control program was adequate for evaluating and monitoring personnel exposures (Paragraph 4.a).

The licensee's internal exposure control program was adequate for evaluating and monitoring personnel exposures. Administrative dose limits were established and all assigned exposures were well below the regulatory limits. The collective exposures for calendar year (CY) 2000 were less than CY 1999 (Paragraph 4.b).

The contamination survey program was appropriately implemented to protect workers and to identify potential work areas posing a radiation hazard to workers. Sealed sources were leak tested as required. Positive controls were in place such that only authorized users could gain access to the sources (Paragraph 4.c).

The licensee's As Low As is Reasonably Achievable Program was properly implemented. The licensee's evaluation of the pellet loading room (PLR) heating, ventilation, and air conditioning system, and proposed modifications to reduce the source of airborne contamination problems inside the PLR, was indicative of an active program working to reduce exposures (Paragraph 4.d).

Attachment:

List of Persons Contacted

Inspection Procedures Used

List of Items Opened, Closed, Discussed

List of Acronyms Used

REPORT DETAILS

1. **Summary of Plant Status**

This report covered the efforts of regional inspectors during a one week period and a two-day period. Fuel manufacturing processes were shutdown and routine Service Equipment Refurbishment Facility (SERF) operations were ongoing at Framatome during the inspection periods. There were no plant upsets or unusual operational occurrences during the inspections.

2. **Environmental Protection (IP 88045) (R2)**

a. Monitoring Program Results (R2.02)

(1) Inspection Scope

The inspector reviewed the licensee's environmental surveillance program for compliance with the monitoring requirements as set forth in Chapter 5 of Special Nuclear Material License-1168 (SNM-1168). Monitoring results for surface water, soil, vegetation, sediment and environmental air samples were reviewed to assess radiological accumulations in the environment as a result of plant operations.

(2) Observations and Findings

The inspector reviewed the licensee's 2000 annual results for surface water, soil, vegetation, and sediment samples and observed that samples were acquired at the prescribed frequency and that the gross alpha and gross beta activity levels were consistently below the licensee established action level limits. In addition, the inspector also reviewed licensee environmental air sampling results and observed that the gross alpha and gross beta results were consistently below the long term action levels. No increasing trends were distinguishable in the reviewed environmental results as the reported activity levels for environmental samples remained consistent with the results reported for previous monitoring periods.

(3) Conclusion

The licensee adequately met the environmental monitoring requirements as set forth in Chapter 5 of SNM-1168. Environmental samples indicated that plant operations had not significantly affected radiological concentrations in the environment.

b. Followup on Previously Identified Issues (02.08)

(1) Inspection Scope

The inspector reviewed corrective actions taken in response to Inspector Followup Item (IFI) 70-1201/00-03-0, which involved reported gross alpha and gross beta minimum detectable levels (MDLs) for sediment, soil, and vegetation samples consistently above the MDLs (1.0 picocurie/gram(pCi/g)) specified in the license.

(2) Observations and Findings

The licensee had investigated this condition and had determined that the specified MDL of one pCi/g was not practical based on unrealistic sample times coupled with residue mass attenuation considerations limiting sample mass. The inspector reviewed the licensee's proposed license amendment revising the MDL for soil, sediment, and vegetation samples to five pCi/g. The inspector agreed with the licensee's assessment that the proposed MDL was a consistently achievable level, with reasonable sample masses and count times, that would still allow statistically based determinations of environmental concentrations below licensee action levels.

(3) Conclusion

Based on this review, IFI 70-1201/00-03-01 is closed.

3. **Waste Management (IPs 88035, 84900, and 84850) (R3)**a. Airborne Effluent Controls, Instrumentation, and Monitoring Results (R3.03 and R3.04)(1) Inspection Scope

The inspector reviewed the licensee's gaseous effluents program for compliance with the requirements of 10 CFR Part 20 and the license requirements of Chapter 3 of SNM-1168. The inspector also toured the licensee's gaseous effluent sampling stations and observed the acquisition of samples for monitoring purposes.

(2) Observations and Findings

The inspector reviewed the licensee's semi-annual gaseous effluent reports for 2000. These results are given in Table 1 in comparison with the results reported for 1999.

Table 1: Radioactivity in Gaseous Effluents for 1999 and 2000 (microcuries)

ISOTOPE	1999	2000
U ²³⁴	3.62	2.38
U ²³⁵	0.20	0.13
U ²³⁶	0.00	0.00
U ²³⁸	0.84	0.55
Co ⁶⁰	59.52	61.07

Monitoring results for 2000 indicated that plant radiological effluents for this period were consistent with or below those reported for previous monitoring periods. The inspector also toured the individual gaseous effluent sampling stations and observed the acquisition of routine samples. The inspector noted that sampling equipment was properly calibrated. The inspector also observed that the SERF-2 sampling station was

inoperable (no flow as vacuum pump was not energized) and that the equipment was degraded. There were no operations in the area at the time. The licensee acknowledged these conditions and implemented appropriate corrective actions.

(3) Conclusions

The licensee had an adequate program for monitoring radiological constituents in plant gaseous effluents which met the implementation requirements of SNM-1168 and the radiological release criteria of 10 CFR Part 20.

b. Radioactive Solid Waste (R3.05, R3.06, R3.08, and R3.09)

(1) Inspection Scope

The inspector reviewed the licensee's program for the classification, packaging, shipping, and tracking of low level radioactive waste (LLRW) pursuant to the requirements of Appendix G of 10 CFR Part 20 and 10 CFR 61.55 and 61.56. The inspection involved the review of shipping manifests, tracking of radioactive shipments, and instrumentation calibration and quality control records. The inspector also conducted a tour of the site and assessed the licensee's storage of (LLRW).

(2) Observations and Findings

The inspector reviewed documentation (shipping manifests) for three recent LLRW shipments. It was observed that wastes were classified correctly per 10 CFR Part 61 requirements. The inspector did observe that the shipping manifest for one shipment of enriched uranium contaminated material did not list the individual activity for the uranium-234 (U^{234}) isotope as required by 10 CFR Part 20, Appendix G, and that the individual activities for uranium-235 (U^{235}) and uranium-238 (U^{238}) were incorrect due to a calculation mistake involving the multiplication of the correctly determined total uranium (alpha) activity by inappropriate individual activity fractions. The inspector determined that the amounts in question were insignificant and concluded that this was not a safety concern. The licensee acknowledged these manifest errors and made procedural changes in order to correct computational errors associated with shipping manifest individual radionuclide activities. The licensee's implementation of the procedural changes will be tracked as IFI 70-1201/01-02-01 to ensure that individual radionuclide activities are correctly recorded on LLRW shipping manifests.

The inspector additionally noted that the licensee had notified the licensed waste receipt facility prior to shipment of the radioactive material and had established an adequate system for tracking of waste shipments. The inspector also reviewed the calibration records for the drum counter system (used for determining U^{235} content) and observed that the required calibrations and system checks (standards and background) were performed properly and at the designated frequency.

The inspector also toured LLRW storage areas and observed that waste containers were labeled properly and no significant container degradation was observed. Waste storage was conducted in a manner as to prevent area contamination.

(3) Conclusions

The licensee's program for the shipping of LLRW for disposal met the classification and packaging requirements of 10 CFR 61.55 and 61.56. Minor calculational errors were identified in one LLRW shipping manifest due to errors in an internal procedure. LLRW storage was performed in a manner as to prevent area contamination.

4. **Radiation Protection (83822) (R1)**

a. External Exposure Control (R1.04)

(1) Inspection Scope

The inspector reviewed licensee procedures to determine if controls were in place to monitor occupational doses, and verify that administrative limits were established to control occupational doses as low as is reasonably achievable (ALARA). Personnel exposure data for 2000 and thus far 2001 were examined to determine if exposures were in compliance with 10 CFR Part 20 limits.

(2) Observations and Findings

Based on procedural reviews, and interviews, the licensee's monitoring program was consistent with requirements in 10 CFR 20.1502 for ensuring that occupational exposure limits were not exceeded. Procedures contained action limits, and dose goals were established to ensure that exposures were less than the limits in 10 CFR Part 20.

Since the last inspection of this area, a change in the type of dosimetry used for monitoring external exposure was under evaluation by the licensee. The licensee had initiated a study comparing the sensitivity of the previous dosimeters (thermoluminescent dosimeters) to the current dosimeters (optically stimulated luminescent dosimeters) for accuracy in responding to the types of radiation resulting from fuel manufacturing. Based on the study results, the licensee indicated that changes may be made to a different type of dosimeter and processor as certified by the National Voluntary Laboratory Accreditation Program.

The inspector reviewed and compared assigned exposures for calendar year (CY) 99 and 2000 (see Table 2). All exposures were less than occupational limits in 10 CFR 20.1201. External exposures were significantly less than occupational limits in 10 CFR 20.1201. The collective exposure for CY 2000 resulted in an approximate 29 percent decrease when compared to CY 1999. The maximum assigned total effective dose equivalent (TEDE) (1.42 rem) for CY 2000 was slightly less than the ALARA goal of 1.50 rem. So far in CY 2001, the maximum estimated TEDE was 0.214 rem.

Table 2. Annual Exposures

Year	Deep Dose Equivalent (DDE)	Shallow Dose Equivalent (SDE)	Total Effective Dose Equivalent (TEDE)	Collective TEDE (person-rem)	Committed Effective Dose Equivalent (CEDE)
1999	0.500 rem	1.90 rem	2.19 rem	31.49	1.82 rem
2000	0.581 rem	1.27 rem	1.42 rem	22.30	0.99 rem

(3) Conclusions

Based on the exposure records and interviews, the inspector concluded that the licensee's external exposure control program was adequate for evaluating and monitoring personnel exposures.

(b) Internal Exposure Control (R1.05)(1) Inspection Scope

The inspector reviewed controls for assessing internal exposure to verify that administrative and physical controls were in place to control occupational dose ALARA. Exposure data based on air sampling results were reviewed to determine if exposures resulting from various plant operations exceeded limits in 10 CFR Part 20.

(2) Observations and Findings

Table 2 above presents the maximum assigned CEDE exposure data for CY 1999 and 2000. The maximum assigned CEDE in CY 2000 (0.99 rem) was approximately 46 percent less than the CY 1999 exposure (1.82 rem) and significantly less than occupational limits in 10 CFR 20.1201. The collective exposures for CY 2000 (22.30 person-rem TEDE and 6.78 person-rem CEDE) were less than CY 1999 (31.49 person-rem TEDE and 15.17 person-rem CEDE).

The licensee continued to assess design and engineered controls to reduce the impact of uranium oxide dust from pellets as the source of airborne contamination problems inside the pellet loading room (PLR). During the inspection, the licensee was considering redesigning the pellet shipping trays, and making modifications to the PLR heating, ventilation, and air conditioning (HVAC) system air flow patterns and velocity.

(3) Conclusions

Based on the interviews and documentation reviewed, the inspector determined that the licensee's internal exposure control program was adequate for evaluating and monitoring personnel exposures. Administrative dose limits were established and all assigned exposures were well below the regulatory limits.

c. Surveys (R1.08)

(1) Inspection Scope

The contamination control survey program was reviewed to determine if surveys were effective in the identification of contamination and performed in accordance with procedures. The inventory, control, and periodic leak testing of sealed sources was reviewed to determine if program controls were in place to identify leaks and inaccurate inventories.

(2) Observations and Findings

Based on plant tours and randomly selected contamination survey data for select locations, the surveys were effective in the identification of potentially contaminated areas and when necessary decontamination was both timely and effective. Documentation was reviewed to show that the sealed sources were leak tested at six month intervals, and randomly selected sources were found at the locations as described on the inventory list report.

(3) Conclusions

The contamination survey program was appropriately implemented to protect workers, and to identify potential work areas posing a radiation hazard to workers. Sealed sources were leak tested as required. Positive controls were in place such that only authorized users could gain access to the sources.

d. Implementation of the ALARA Program (R1.10)

(1) Inspection Scope

The licensee's ALARA program was reviewed to determine if the program and ALARA goals were developed and implemented in accordance with the license. In addition, the program for reinforcing the ALARA concept among employees was assessed.

(2) Observations and Findings

On a quarterly basis, the Safety Review Board met to review action items, radiological deficiencies, contamination levels, and status of projects. The licensee's evaluation of the PLR HVAC system and proposed modifications to reduce the source of airborne contamination problems inside the PLR was indicative of an active program working to reduce exposures. The current copy of the Employee Safety Handbook included management commitment and philosophy regarding maintaining exposures ALARA and site implementation.

(3) Conclusions

Based on the review of records and interviews, the inspector concluded that the licensee's ALARA program was properly implemented.

5. **Exit Interview**

The inspection scope and results were summarized on March 30 and April 4, 2001, with those persons indicated in the Attachment. Although proprietary documents and processes were occasionally reviewed during this inspection, the proprietary information is not included in this report. Dissenting comments were not received from the licensee.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

- *#T. Allsep, Manager, Radiation Protection
T. Blanks, Radiation Protection Technician
- *#R. Freeman, Licencing and Nuclear Material and Accountability
*G. Lindsey, Health Physicist
D. Mayberry, Radiation Protection Technician
T. Osborne, Radiation Protection Technician
- #L. Tupper, Manager, Licencing and Compliance

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

*Attended exit meeting on March 30, 2001

#Attended exit meeting on April 4, 2001

INSPECTION PROCEDURES USED

IP 83822	Radiation Protection
IP 84850	Radioactive Waste Management
IP 84900	Low-Level Radioactive Waste Storage
IP 88035	Radioactive Waste Management
IP 88045	Environmental Protection
IP 92701	Followup

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Item Number</u>	<u>Status</u>	<u>Description</u>
70-1201/00-03-01	Closed	IFI - Gross alpha and gross beta minimum detectable levels (MDLs) for sediment, soil, and vegetation samples were consistently above the MDLs (1.0 pCi/g) specified in SNM-1168 (Paragraph 2.b.2).
70-1201/01-02-01	Open	IFI - Track implementation of procedural changes to ensure that future LLRW shipping manifests include the correct individual radionuclide activities (Paragraph 3.b.2).

LIST OF ACRONYMS USED

ALARA	As Low as is Reasonably Achievable
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulations
Co ⁶⁰	Cobalt 60
CY	Calendar Year
DDE	Deep Dose Equivalent
HVAC	Heating, Ventilation, and Air Conditioning
IFI	Inspector Followup Item
LLRW	Low Level Radioactive Waste
MDL	Minimum Detectable Level
NRC	Nuclear Regulatory Commission
pCi/g	picocurie/gram
PLR	Pellet Loading Room
SERF	Service Equipment Refurbishment Facility
SDE	Skin Dose Equivalent
SNM-1168	Special Nuclear Material License-1168
TEDE	Total Effective Dose Equivalent
U ²³⁴	Uranium-234
U ²³⁵	Uranium-235
U ²³⁶	Uranium-236
U ²³⁸	Uranium-238