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NUCLEAR REGULATORY COMMISSION
REGION II
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ATLANTA, GEORGIA 30303-8931

March 5, 2001

Global Nuclear Fuel - Americas, L.L.C.
ATTN: Ms. C.A. Reda, Manager
GNF-A Fuel Manufacturing
P. O. Box 780
Wilmington, NC 28402

SUBJECT: NRC INSPECTION REPORT NO. 70-1113/2001-02

Dear Ms. Reda:

This refers to the inspection conducted on February 5-9, 2001, at the Wilmington facility. The enclosed report presents the results of this inspection.

During the inspection period, your conduct of activities at the Wilmington facility was generally characterized by safety-conscious operations, sound engineering and maintenance practices, and careful radiological work controls.

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 Records (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. 70-1113
License No. SNM-1097

Enclosure: NRC Inspection Report

cc w/encl: (See Page 2)

cc w/encl:

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-1113

License No.: SNM-1097

Report No.: 70-1113/2001-02

Licensee: Global Nuclear Fuel - Americas, LLC

Location: Wilmington, NC 28402

Dates: February 5-9, 2001

Inspector: A. Gooden, Health Physicist

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

Enclosure

EXECUTIVE SUMMARY

Global Nuclear Fuel - Americas NRC Inspection Report 70-1113/2001-02

This routine, unannounced inspection involved observation of radiation protection work activities, a review of selected records, and interviews with plant personnel involving the area of radiation protection. The report entails one week of inspection effort by a regional-based inspector. The inspection results disclosed the following aspects of the program:

- The radiation protection program was implemented in a manner to ensure the safety of workers and compliance with the license and regulatory requirements (Paragraph 2.a).
- The revised procedures to calculate the committed dose using the annual limit on intake (ALI) and derived air concentration (DAC) limits based on International Commission on Radiological Protection (ICRP) Publication 68 appeared to provide an adequate level of safety to the plant workers, public, and the environment (Paragraph 2.b).
- The external exposure control program was adequate for evaluating, monitoring, and maintaining exposures less than 10 CFR Part 20 limits (Paragraph 2.b).
- The revised procedure for calculating the internal dose based on ICRP 68 model, appeared to provide an adequate level of safety (Paragraph 2.c).
- Plant tours disclosed housekeeping improvements were needed in the powder pressing, pelleting, and rod loading areas (Paragraph 2.d).

Attachment:

Persons Contacted

Inspection Procedures

List of Items Opened, Closed, and Discussed

List of Acronyms

REPORT DETAILS

1. Summary of Plant Status

Powder production was temporarily shut down during the period of the inspection due to the loss of steam delivery system. No other plant upsets occurred during the period.

2. Radiation Protection (83822) (R1)

a. Radiation Protection Program Implementation (R1.01)

(1) Inspection Scope

The inspector conducted interviews and reviewed licensee documentation to ascertain the status of program implementation.

(2) Observations and Findings

Based on an interview and documentation associated with a system modification request, the inspector determined that radiological assessments were included in the change review/request process. Pending the results of the review, radiological requirements were identified and incorporated into the operations procedure. Audits were performed quarterly to determine if the program was being implemented in accordance with license commitments and regulations. On a daily basis the licensee was reviewing air sampling and other data to assist in decision-making associated with plant operations and maintaining exposures as low as reasonably achievable (ALARA). The periodic reviews identified areas of exposure and trends, and in those cases where exposures were elevated, consideration was given to ways for reducing exposures.

(3) Conclusions

The inspector concluded that the radiation protection program was implemented in a manner to ensure the safety of workers and compliance with the license and regulatory requirements.

b. External Exposure Control (R1.04)

(1) Inspection Scope

The inspector reviewed personnel exposure data, and discussed the external monitoring requirements to determine if the licensee's monitoring program was consistent with requirements in 10 CFR Part 20, and if controls were in place to maintain occupational dose ALARA.

(2) Observations and Findings

Based on procedural reviews, and interviews, the licensee's monitoring program was consistent with requirements in 10 CFR Part 20. Procedures contained action limits, and dose goals were established to ensure that exposures were less than the limits in

10 CFR Part 20. The inspector reviewed assigned exposures for calendar years (CYs) 1999 and 2000. Table 1 displays the maximum assigned exposure data for CY 99 and projected data for CY 2000 based on estimated year-end thermoluminescent dosimeter (TLD) results, and air sampling data as of December 2000. Since the last inspection, the licensee's procedures were revised for calculating the committed dose equivalent (CDE) and committed effective dose equivalent (CEDE). By letter dated August 28, 2000, the licensee requested and was granted a license amendment from NRC to use the annual limit on intake (ALI) and derived air concentration (DAC) values based on dose coefficients adopted by the International Commission on Radiological Protection (ICRP) as published in ICRP Publication 68. The results shown in Table 1 for CY 2000 were calculated based on both ICRP 68 and the previous methodology (ICRP 30 models) to allow for comparing the two methods. Differences in the results of the two methods were within expected ranges. No regulatory or license limits were exceeded using either method.

Table 1. Annual Exposures

Year and ICRP Model	Deep Dose Equivalent (DDE)	Total Effective Dose Equivalent (TEDE)	Collective TEDE	Committed Effective Dose Equivalent (CEDE)
1999 ICRP 30	0.84 rem	1.42 rem	192 person-rem	1.09 rem
*2000 ICRP 30	*0.81rem	*1.12 rem	*225 person-rem	*1.02 rem
*2000 ICRP 68	*1.20 rem	*1.20 rem	*122 person-rem	*0.40 rem

*NOTE: The maximum exposures were based on air sampling data as of December 2000 and estimated TLD results based on six months of data.

TLD results for 75 employees assigned to manufacturing activities with the highest potential for extremity exposure showed that monitoring and reporting of the extremity dose was not required. The annual extremity exposure was projected based on TLD results covering a four week monitoring period. No individual met the limit (5 rem extremity dose) requiring monitoring.

(3) Conclusions

Based on the records review and interviews, the inspector concluded that the licensee's external exposure control program was adequate for evaluating, monitoring, and maintaining exposures less than 10 CFR Part 20 limits. The results indicated that no regulatory or license limits were exceeded. The revised procedures to calculate the committed dose using the ALI and DAC limits based on ICRP 68 appeared to provide an adequate level of safety.

c. 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 and bioassay results were reviewed to determine if exposures resulting from various plant operations exceeded limits in 10 CFR Part 20.

(2) Observations and Findings

Based on interviews and documentation reviewed, the results from stationary air samplers (SAS) and bioassays were evaluated daily, and in the event action limits were exceeded, actions were taken in accordance with procedures to investigate causative factor(s) and take the appropriate actions. Procedures contained action limits which were set below federal limits to ensure personnel exposures did not exceed limits in 10 CFR Part 20. When CY 2000 maximally assigned exposures were calculated based on ICRP 68 and compared to ICRP 30 calculations, differences in the results of the two methods were within expected ranges. Table 1 above presents the maximum assigned CEDE exposure data for CYs 99 and 2000. An approximate 13 percent increase was noted in the collective CEDE for CY 2000 (158 person-rem) when compared to CY 99 (140 person-rem) using the ICRP 30 dosimetry model. The licensee attributed the increase to material throughput.

The inspector reviewed the licensee's documentation resulting from the particle size distribution studies for CYs 99 and 2000 and determined that the studies were technically correct and consistent with the guidance for making adjustments to the ALI and DAC values.

(3) Conclusions

The licensee was effectively tracking and trending occupational exposures. Administrative dose limits were established and when action limits were exceeded, an investigation into the causal factor(s) was initiated. The revised procedure for calculating the internal dose based on ICRP 68 model, appeared to provide an adequate level of safety.

d. 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.

(2) Observations and Findings

The inspector accompanied radiation protection personnel during the performance of contamination surveys and observed both the collection and analysis of smear samples. In addition, contamination survey data for select locations covering the period January 2000 to February 2001 was reviewed. The results disclosed that the surveys were effective in the identification of potentially contaminated areas and decontamination was both timely and effective. The inspector's review of contamination survey forms for the Chemet Lab during the period February to December 2000, disclosed a hood location which frequently exceeded the action limits requiring prompt cleanup. In response, the licensee indicated that an evaluation of area operations and possible contributors will be performed for developing actions to address the incidence of hood contamination.

During plant tours, the inspector noted several examples of poor housekeeping as evidenced by used respirators improperly stored, rags potentially contaminated with oil, used gloves requiring disposal, and bags of trash left in control area.

(3) Conclusions

The contamination survey program was appropriately implemented to protect workers, and identify potential work areas posing a radiation hazard to workers. Plant tours disclosed housekeeping improvements were needed in the powder pressing, pelleting, and rod loading areas.

e. Follow Up On Previously Identified Issues (R1.12)(1) Inspection Scope

The inspector reviewed the actions taken by the licensee to correct a previous issue to verify that the corrective actions were adequate and had been completed.

(2) Observations and Findings

(Closed) Inspector Followup Item (IFI) 70-1113/2000-02-01: Verify the adequacy of corrective actions to resolve the Chemet Lab contamination control issues.

The inspector discussed with licensee personnel and reviewed documentation resulting from the licensee's cause and effect investigation associated with the Chemet Lab contamination issues. Based on the investigation, several items were identified for focusing attention. Corrective actions were initiated during May 2000. The licensee provided statistical data to demonstrate that the smear results for the period October 2000 to January 2001 if averaged and compared to the average for CY 1999, the number of smears in excess of the action limits were reduced approximately 58 percent.

(3) Conclusions

Based on the reduction in the number of smears exceeding the action limits, this item was considered closed.

3. Exit Interview

The inspection scope and results were summarized on February 9, 2001, with those persons indicated in the Attachment. Although proprietary documents and processes were occasionally reviewed during this inspection, the proprietary nature of these documents or processes has been deleted from this report. No dissenting comments were received from the licensee.

ATTACHMENT

1. List of Persons Contacted

- *D. Barbour, Team Leader, Radiation Protection
- *D. Brown, Team Leader, Environmental Programs
- *C. Buddin, Team Leader, Chemet Lab
- J. Cox, Systems Manager
- *T. Flaherty, Manager, Quality Assurance
- *R. Foleck, Program Manager, Facility Licensing
- *H. Knight, Manager, Emergency Preparedness and Site Security
- *A. Mabry, Program Manager, Radiation Safety
- *R. Pace, Manager, Facilities
- *L. Paulson, Manager, Nuclear Safety
- *E. Rouse, Monitor, Radiation Protection
- *E. Saito, Senior Radiological Engineer
- *H. Strickler, Manager, Site Environmental Health and Safety
- *D. Turner, Manager, Industrial Hygiene and Safety
- *C. Vaughan, Manager, Facility Licensing

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

*Attended exit meeting on February 9, 2001

2. Inspection Procedure Used

IP 83822 Radiation Protection

3. List of Item Opened, Closed, and Discussed

<u>Item Number</u>	<u>Status</u>	<u>Description</u>
70-1113/2000-02-01	Closed	IFI - Verify adequacy of corrective actions to resolve the Chemet Lab contamination control issues (Paragraph 2.e).

4. List of Acronyms Used

ALARA	As Low As Reasonably Achievable
ALI	Annual Limit on Intake
CDE	Committed Dose Equivalent
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulation
CY	Calendar Year
DAC	Derived Air Concentration
ICRP	International Commission on Radiological Protection
IFI	Inspector Followup Item
SAS	Stationary Air Sampler
TEDE	Total Effective Dose Equivalent
TLD	Thermoluminescent Dosimeter