



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

DEC 17 1985

Report No.: 70-1113/85-16

Licensee: General Electric Company
Wilmington, NC 28401

Docket No.: 70-1113

License No.: SNM-1097

Facility Name: General Electric Company

Inspection Conducted: September 24-26 and October 7-11, 1985

Inspector:

T. R. Collins
T. R. Collins

11/25/85
Date Signed

Accompanying Personnel: C. M. Hosey (September 24-26, 1985)

Approved by:

C. M. Hosey
C. M. Hosey, Section Chief
Division of Radiation Safety and Safeguards

11/26/85
Date Signed

SUMMARY

Scope: This routine, unannounced inspection entailed 74 inspector-hours in the areas of followup on allegations, program to maintain radiation exposures as low as reasonably achievable (ALARA), IE Information Notices, and followup on previous inspector identified items.

Results: No violations or deviations were identified.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *W. W. McMahon, Manager, Quality Assurance
- **C. M. Vaughan, Manager, Regulatory Compliance
- *L. A. Sheely, Manager, Fuel Quality
- *T. P. Winslow, Manager, Chemet Laboratory
- *T. Brechtlein, Manager, Fuel Chemical Quality Control
- *R. L. Torres, Manager, Radiation Protection
- C. Schmidt, Medical Director
- S. P. Murray, Nuclear Safety Engineer
- P. S. Stansbury, Nuclear Safety Engineer
- D. T. Barbour, Radiation Protection Shift Supervisor
- R. G. Lewis, Radiation Protection Shift Supervisor
- E. D. Nance, Radiation Safety Monitor
- D. C. Whaley, Radiation Safety Monitor
- C. G. Kerr, Radiation Safety Monitor
- S. D. Smith, Radiation Safety Monitor
- R. L. Brown, Chemet Lab Test Operator - A
- M. Savage, Chemet Lab Technician
- G. M. Coranado, Chemet Lab Technician

*Attended exit interview on October 10, 1985

**Attended exit interview on September 26 and October 10, 1985

2. Exit Interview

The inspection scope and findings were summarized on September 26 and October 10, 1985, with those persons indicated in paragraph 1 above. The inspector discussed with licensee management the results of allegation followup and the program for maintaining radiation exposures As Low As Reasonably Achievable (ALARA). The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

3. Licensee Action on Previous Enforcement Matters

Not reviewed during this inspection.

4. Allegation Discussions and Findings

NOTE: The pronoun "he" is used throughout this report without regard to the sex of the individual to protect the identity of confidential sources of information to the maximum extent possible.

a. Allegation

Alleger stated that an individual was contaminated in 1982 or early 1983 while working in a controlled area. Alleger stated that this person also had his finger cut off and is still working at the plant. Accident occurred while individual was grinding small pellets on a grinding machine. Alleger is concerned that the incident was not reported to the NRC or OSHA and that the incident was not reported in the individual's medical records at the plant.

Discussion

The inspector discussed the contents of the individual's medical record with the licensee's medical director. The inspector noted that the event referred to by the alleger occurred in 1981 and is documented in the individual's medical record. The end of one of his fingers was smashed and the tip was amputated. The record indicates Radiation Safety surveyed the wound at the emergency room and found it not to be contaminated. The individual was escorted to the emergency room by Radiation Safety.

Finding

The allegation was not substantiated. Although the event occurred as noted in the allegation, it was described in detail in the individual's medical record. There is no NRC reporting requirement for injuries occurring within restricted areas at licensed fuel facilities. No violations or deviations were identified. The allegation was also referred to Occupational Safety and Health Administration (OSHA) to determine if there were any OSHA notification requirements violated.

b. Allegation

Alleger stated that he was contaminated when someone dumped a container of liquid uranium down the sink and it splashed him. He claimed that he was contaminated on a small area on the bridge of his nose. The event occurred in 1978 in the Wet Lab. Alleger stated that the liquid uranium caused a small burn on the bridge of his nose when the material got up under the bridge of his glasses. Alleger stated that his concern was that this information is not in his medical records and he feels that the injury was intentionally not reported. Alleger was seen by a doctor in the dispensary. He was sent to a skin specialist who did not mention the nose injury in his letter to the plant.

Discussion

The inspector discussed the contents of the alleger's medical record, with the licensee's medical director. The inspector noted that the event which occurred May 28, 1974, is documented in the alleger's medical record. On August 1974, he was referred to a dermatologist who diagnosed his condition as contact dermatitis which was caused by

ultraviolet light. The specialist also indicated that the condition was not caused by radiation exposure received at GE. Contamination surveys were performed by Radiation Safety before the alleged was released to the medical clinic for treatment. The alleged was not contaminated when released.

Finding

The allegation was not substantiated. Although the event occurred as noted in the allegation, it was documented in the individual's medical record. The dermatologist did discuss the nose injury in the letter to the plant and attributed the injury to ultraviolet light. No violations or deviations were identified. The allegation was also referred to OSHA to determine if any OSHA reporting requirements were violated.

c. Allegation

Alleged stated that he was contaminated in the Fall of 1981, while preparing samples of liquid uranium in the %U titration area of the Wet Lab. When he turned a 500ml flask containing liquid uranium upside down for mixing, the neck of the flask broke and cut his right thumb to the bone. He stated that when the broken edge of the flask cut his thumb, the liquid uranium made contact with the wound. Alleged stated that his concern was that there were no entries on his medical records so that the plant would not have to report the accident.

Discussion

The inspector discussed the contents of the alleged's medical record with the licensee's medical director. The inspector noted that the event described by the alleged occurred on October 13, 1980, and is documented in the alleged's medical record. The wound was surveyed by Radiation Safety and found not to be radioactively contaminated. According to the medical record the alleged was seen by the clinic three times after the initial treatment; and in each case, the healing process was said to be progressing normally.

Finding

The allegation was not substantiated. Although the event occurred as noted in the allegation, it was documented in the individual's medical record. No violations or deviations were identified. The allegation was also referred to OSHA to determine if any OSHA reporting requirements were violated.

d. Allegation

Alleged's attorney provided the names, addresses and telephone numbers of three workers who were reportedly overexposed. The individuals are

referred to in the following discussions as A, B, C and D. Individual D was identified as being potentially overexposed.

Discussion

Through a review of records and discussions with licensee representatives the inspector evaluated the radiation exposure history of the individuals named in the allegation. In each case, the inspector reviewed the results of lung counts, urinalyses, and the assigned airborne radioactivity concentrations (MPC-hours) to which each was exposed. Individual A, B, and C are currently employed in the Chemet Laboratory. Individual D is no longer employed by GE; however, he was employed in the Metallurgical section of the Chemet Lab several years ago. Individual A's lung counts and urinalysis results are all less than minimum detectable value ($75 \mu\text{g U-}^{235}$ for lung counts and $5 \mu\text{g/L}$ for urinalysis) for the system performing the count. The assigned airborne data for Individual A appears to be typical for workers in the lab, and well below regulatory limits. A review of Individual A's external radiation exposure record (film badge/TLD) indicated that he received no significant external exposure while employed by GE.

Individual C's lung counts appear to be less than the minimum detectable value for the lung counter. On April 29, 1976, Individual C's urinalysis results indicated an exposure of 4344 micrograms Uranium per liter ($\mu\text{g/L}$) on a routine monthly urinalysis. According to the licensee's investigation the individual worked in the isotopic area and rare earth analysis area during the preceding weeks. The second sample collected on April 29, 1976, indicated a radioactivity concentration of $18.7 \mu\text{g/L}$. On April 30, 1976, the radioactivity concentration in the urine was less than $1 \mu\text{g/L}$. The licensee's investigation indicated that the individual had been working with small quantities of UO_2F_2 in 100cc of solution with a UO_2F_2 concentration of 0.11 gU/g solution. The work was being performed in a hood. Airborne concentrations in Individual C's breathing zone would have had to be between 12 and 193 times MPC ($121 \times 10^{-11} \text{ uCi/cc}$ to $1930 \times 10^{-11} \text{ uCi/cc}$) for the urinalysis results to have been valid. An air sampler located approximately 15 feet away indicated air concentrations of $0.5 \times 10^{-11} \text{ uCi/cc}$. Had the quantity of uranium present in this sample been excreted in the urine, the licensee determined that the intakes would have had to been between 11 and 174 mg of uranium. The individual was examined by a medical doctor and no kidney damage was noted. Single intakes of 9.8 mg uranium could result in kidney damage (9.8 mg U intakes could result in urine concentration of $2000 \mu\text{g/L}$). Based on the quantity of material handled, medical exam and air sample results the licensee concluded that no overexposure occurred, and assumed the sample had been cross contaminated during collections or analysis. A review of Individual C's external radiation exposure record (film badge/TLD) indicated that he received no significant exposure while employed by GE.

The inspector reviewed the exposure record of Individual B and discussed the record with a licensee representative. Between June 1973 and February 1985 Individual B received 71 lung counts with the results ranging from less than minimum detectable value (approximately 75 μ g U-235 to 270 μ g U-235), with most values ranging from 120 to 170 μ g U-235. During this period Individual B worked in the chemical operations area of the fuel manufacturing facility. The licensee performed a detail review of the exposure record and on August 13, 1979, placed Individual B on permanent restriction and transferred him to the Chemet Lab. Since transferring to the Chemet Lab Individual B's lung counts have declined and have been less than minimum detectable value since April 8, 1981. A review of the records indicated that each time a lung count result was above the licensee action level, action required by the licensee was completed. Individual B's intakes of radioactive material was significantly below the NRC limit specified in 10 CFR 20.103(a)(1). A review of Individual B's external radiation exposure record (film badge/TLD) indicated that he received no significant external exposure while employed by GE.

A review of the exposure record (film badge/TLD, lung counts, urinalysis and assigned airborne data) of Individual D performed by the inspector indicated that he had received no significant exposure while employed by GE.

Finding

The allegation was not substantiated. The review of records and discussions with licensee representatives did not indicate any of the individuals mentioned in the allegation received any radiation exposure in excess of NRC limits. No violations or deviations were identified.

e. Allegation

Alleger stated that the scrubber on top of the isotopic lab had not been operational since last year and only recently had been made operational.

Discussion and Finding

The inspector reviewed records of scrubber operational checks and discussed the installation and operation of the new Chemet Lab ventilation exhaust system scrubber with licensee representatives. Prior to August 1984, the Chemet Lab ventilation exhaust passed through the chemical area scrubbers.

In August 1984 a separate scrubber for the Chemet Lab exhaust became operational. At that time, Chemet Lab activities involving the handling of radioactive material were temporarily stopped to permit connection of the exhaust to the scrubber system. Personnel in the licensee's ventilation section perform daily checks of the system and monthly periodic maintenance. The inspector reviewed the licensee's

daily check records for 1984 and 1985 and determined that air from the Chemet Lab was passed through a scrubber prior to release.

The allegation was substantiated in that the new Chemet Lab scrubber was positioned on the roof for an unspecified time before it was connected to the exhaust system. However, there was no indication that the licensee failed to pass the air exhausted from the Chemet Lab through an operational scrubber. No violations or deviations of NRC requirements were identified.

f. Allegation

Alleger stated that the three monitors installed in the lab on December 3, 1984, were 7-8 feet above the floor level and therefore, too high. No air monitor was installed to monitor hood where fluoride samples are prepared.

Discussion and Finding

The failure to locate air samples in the Chemet Lab such that the concentrations measured were representative of the concentration breathed by workers was identified as a violation of 10 CFR 20.103(a)(3) in Inspection Report No. 70-1113/84-17. The licensee denied the violation. However, in a letter dated September 23, 1985, they were directed to provide appropriate corrective action to ensure adequate air sampling is provided. The allegation was substantiated.

g. Allegation

Alleger stated that the criticality alarm had been giving false alarms and although it had been worked on, it was not evident to him that the alarm was operable at all.

Discussion and Finding

This allegation was discussed in Inspection Report No. 70-1113/85-04 and was not substantiated. No violations or deviations were identified.

h. Allegation

Alleger stated that technicians working in the Chemet Lab are not qualified to work in the Lab and could be falsifying records due to production pressure from management.

Discussion and Finding

The inspector reviewed training and qualification records for selected personnel that worked in the Chemet Lab and concluded after this review that personnel working in the Chemet Lab met the licensee's training

and qualification requirements. The allegation concerning qualifications of Chemet Lab personnel was not substantiated. No violations or deviations were identified. The allegation concerning falsifying records is being reviewed independently from this inspection.

i. Allegation

Alleger stated that hourly workers were not properly trained in the handling of gadolinium powder and may have unknowingly contributed to unnecessary contamination.

Discussion and Finding

The inspector concluded through discussions with Chemet Lab technicians and Chemet Lab supervision that no special training is required for personnel to handle gadolinium powder other than in Chemet Lab operating procedures. The inspector determined by his review of records that personnel working in the gadolinium area had been trained and had reviewed appropriate operating procedures for handling gadolinium. The allegation was not substantiated. No violations or deviations were identified.

j. Allegation

Alleger stated that he had heard that gloves and lab coats are coming out of the plant laundry still contaminated and that the laundry is not doing a good job washing contaminated laundry.

Discussion and Finding

The allegation was substantiated, in that gloves and lab coats do come out of the laundry contaminated. However a review by the inspector of survey results of protective clothing performed by the licensee for the period of January 1984 to September 1985 indicated that contamination levels on protective clothing after laundry were well within the plant administrative contamination limits of 2,200 DPM fixed and 220 DPM/100 cm² smearable. No violations or deviations were identified.

k. Allegation

Alleger stated that lab technicians are handling samples without gloves especially in the fluoride area. Alleger also stated that the samples are contaminated.

Discussion and Finding

The inspector interviewed six Chemet Lab personnel (technicians and operators) and through discussions it was determined that Chemet Lab personnel had not in all cases worn protective clothing (gloves) while

handling potentially contaminated samples. Licensee procedure NSR 6.1.0, General Requirements for the Chemet Lab, did not specifically require personnel to wear gloves anytime they are handling samples. This problem had apparently occurred in the past; however, during this inspection as well as previous inspections in 1984 and 1985, the inspectors observed Chemet Lab personnel wearing gloves when handling samples. No violations or deviations were identified.

1. Allegation

Alleger stated that Radiation Safety would call ahead to the Labs to let the supervisor know that they were coming and the supervisors would have areas cleaned up before Radiation Safety personnel arrived.

Discussion and Finding

The inspector interviewed six Radiation Safety Monitors and Chemet Lab Technicians and through discussions with these personnel it could not be substantiated that Radiation Safety personnel would call ahead to the Chemet Lab to inform them that Radiation Safety were coming to perform routine contamination control surveys. No violations or deviations were identified.

m. Allegation

Alleger stated that personnel were improperly removing paper/notebooks from the Chemet Lab without proper surveys.

Discussion and Finding

The inspector interviewed eleven Radiation Safety Monitors and Chemet Lab Technicians and through discussions with these personnel it was determined that personnel have been observed in the past exiting the Chemet Lab without properly surveying personal items. However, failure to survey personal items was not observed in recent months. During this inspection, the inspector did not observe personnel exiting the Chemet Lab without surveying material prior to exiting. In discussions with licensee personnel this situation had occurred previously; however, corrective action taken by the licensee has apparently eliminated this problem. Radiation Safety has implemented a program to periodically monitor selected controlled areas on a weekly basis to assure personnel are properly surveying themselves and materials when exiting controlled areas. The inspector reviewed results of these surveillances. This allegation was substantiated. However, actions taken by the licensee to correct the problem appeared to be effective. No discrepancies have been identified where personnel were exiting controlled areas improperly. No violations or deviations were identified.

n. Allegation

Alleger stated that contaminated urine samples were being dumped down a semi-controlled area sink in the Environmental Laboratory. Alleger's concern was that these samples were dumped in uncontrolled sinks without proper sampling prior to release.

Discussion and Finding

The inspector reviewed a Chemet and Environmental Lab design drawing that revealed the exact location of each sink and its associated flow diagram. After review, the inspector determined that the effluents in each sink in the Chemet Lab flows to a controlled waste processing system and is sampled prior to each release. The inspector concluded after his review that no NRC requirements were violated. This allegation was not substantiated. No violations or deviations were identified.

o. Allegation

Alleger stated that the Chemet Lab ventilation system's intake was from a controlled area and that the filter and grill of the ventilation system was heavily contaminated.

Discussion and Finding

In February 1985, the licensee performed contamination surveys of the grill and roughing filter of the recirculation ventilation system and found contamination levels of 60 DPM/100 cm² smearable contamination and 800 to 2,000 DPM fixed contamination. These levels are below the licensee's controlled area limits for the Chemet Lab as stated in their License Application which are 1,000 DPM/100 cm² smearable and 2,200 DPM fixed. A review of previous contamination surveys in the Lab did not indicate any prior surveys of the ventilation systems grill. Calculations performed by the inspector indicated that the buildup of the contamination levels on the roughing filter could have been the result of normal operation of the recirculation system and the presence of airborne uranium concentrations in the Lab that are less than one-tenth of one percent the concentration specified in 10 CFR 20, Appendix B, Table 1, Column 1. Contamination of the filter and the grill at levels indicated by the licensee's surveys did not represent the presence of significant airborne radioactivity in the Chemet Lab.

This allegation was substantiated, in that, the ventilation system was found to be slightly contaminated above background levels; however, levels of radioactivity did not exceed the licensee's controlled area limits and did not exceed any regulatory limits. No violations or deviations were identified.

5. As Low As Reasonably Achievable (ALARA) Program (83822)

Paragraphs 2 and 3 of the Licensee's Application for License No. SNM-1097, dated 5/14/84, requires the licensee to conduct an ALARA Program to reduce radiation exposures to personnel. Licensee Procedure Policies and Procedures 40-31, Revision 0, Radiation Safety Committee, requires the Radiation Safety Committee to meet at least monthly to identify any ALARA concerns and to resolve previously identified problem areas. The committee consists of representatives from Fuel Chemical Operations, Fuel Fabrication Operations, Chemical and Ceramic Engineering, Components and Fuel Fabrication Engineering Facilities, Fuel Quality and Regulatory Compliance. The representatives from Regulatory Compliance (Manager, Radiation Protection) acts as the Chairman for the Radiation Safety Committee.

The inspector selectively reviewed the minutes of monthly Radiation Safety Committee meetings and annual ALARA reports required by the licensee's application for the period of 1979 to present. The results of these reviews revealed that the licensee has identified and corrected numerous ALARA concerns within specific controlled areas to reduce radiation exposures to personnel. The following areas are a selected number of the areas that were identified and corrected by the Radiation Safety Committee to reduce radiation exposures to personnel:

a. Install Blow-back Filters on Grinders

- (1) Averaged 30% of MPC before installation of filters
- (2) Averaged \leq 20% Of MPC after installation of filters

b. Install Red Cap Scrubbers

- (1) Averaged greater than 25% of MPC before installation of scrubbers
- (2) Averaged less than 10% of MPC after installation of scrubbers

c. "FMO" Stacker Pallet Modification

Stacker Pallet modification was done to prevent puncturing bottom of cans being stored on the stacker array. After modification was performed no reported indications of powder spills on pallets have been identified. This has eliminated spread of contamination and potential airborne problems.

d. Hydrolysis Scrubber Upgrade

After installing new scrubbers, the airborne levels of Fiscal Week 1-6 in 1981 were 47% of the 4th quarter 1980 airborne levels. The upgrading of new scrubbers in this area had been very effective in reducing airborne radiation levels.

e. Rad Cap Area

Rad Cap area exhaust was improved to reduce area airborne radioactivity levels in 1981. Modifications resulted in 75% reduction in the number of shifts where the concentration exceeded the concentration specified in 10 CFR 20, Appendix B, Table I, Column 1.

f. Calciner Area

Upgrade in calciner containment in 1983, which included installation of a new valve to eliminate air in leakage and the installation of heavy duty boots. In 1983, prior to the modifications, the plant experienced 72 reported perturbations (air concentration on one air sampler or in one area from one event exceeded the value in 10 CFR 20, Appendix B, Table 1, Column 1 for uranium). After the modifications only 9 perturbations have occurred. No ruptured boots have occurred since the 1983 modifications. New projects have been proposed in 1985 by the Radiation Safety Committee to further reduce the airborne radioactivity concentrations resulting from the calciners.

The above examples represent a selected number of projects initiated by the Radiation Safety Committee to reduce exposures at this facility to as low as reasonable achievable.

The inspector concluded after his review that the licensee's ALARA program is adequate and has been effective in controlling and reducing personnel radiation exposures. No violations or deviations were identified.

6. Fume Hood Face Velocities (83822)

Paragraph 3.2.2.1, of the Licensee's Application for License No. SNM-1097, dated 5/14/84, Inter-Area Air Flow Design and Table 3.1 requires that all fume hoods shall maintain a face velocity of ≥ 80 linear feet per minute (LFPM) and shall be checked monthly to assure these hoods meet the required face velocities.

The inspector selectively reviewed the required monthly checks of fume hoods, specifically in the Chemet Lab, from January 1985 to September 1985, and concluded that the face velocities met the required ≥ 80 LFPM.

No violations or deviations were identified.

7. IE Information Notices (92717)

The following IE Information Notices were reviewed to ensure their receipt and review by appropriate licensee management:

IN 84-24, Physical Requalification of Individuals to Use Respiratory Protective Devices

IN 84-34, Respiratory User Warning: Defective Self-Contained Breathing Apparatus Air Cylinder

IN 84-40, Emergency Worker Doses

IN 84-56, Respiratory Users Notice for Certain 5-minute Emergency Escape Self-Contained Breathing Apparatus

IN 84-59, Deliberate Circumventing of Station Health Physics Procedures

IN 84-60, Failure of Air-Purifying Respiratory Filters to Meet Efficiency Requirements

IN 84-72, Combustible Gas Mixtures in Solidified Radwaste

IN 84-75, Defective Detector Tubes Model No. 71623 for Eberline Analog Teletector Model 6112B

IN 84-82, Guidance for Posting Radiation Areas

IN 85-06, Contamination of Breathing Air Systems

IN 85-31, Build-up of Enriched U in Ventilation Ducts and Associated Effluent Treatment Systems

IN 85-46, Clarification of Several Aspects of Removable Radioactive Surface Contamination Limits for Transport Packages

IN 85-60, Defective Negative Pressure, Air Purifying Full Facepiece Respirators

No violations or deviations were identified.