UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Report No: 70-1113/83-06

Licensee: General Electric Company
Wilmington, NC 28401

Docket No: 70-1113

License No: SNM-1097

Facility Name: General Electric Company

Inspection at Wilmington, North Carolina

Inspector: C. M. Hosey — 4/7/83 Date Signed

Approved by: K. P. Barr, Section Chief — 4/7/83 Date Signed
Operational Programs Branch
Division of Engineering and Operational Programs

SUMMARY

Inspection on March 7-11, 1983

Areas Inspected

This routine, unannounced inspection involved thirty-six inspector-hours on site in the areas of radiation protection instruments, notification and reports, internal exposure control, external exposure control, radioactive waste management, posting, labeling and control of radiological areas, radiological surveys, followup on an unplanned radioactivity release, and followup on previous inspector followup items.

Results

Of the nine areas inspected, no violations or deviations were identified in eight areas; one apparent violation was found in one area (Failure to take air samples).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*W. J. Hendry, Manager, Regulatory Compliance
*M. E. McLain, Manager, Nuclear Safety Engineering
*W. B. Smalley, Manager, Environmental Protection
*D. W. Brown, Manager, Powder Production Unit
*C. M. Vaughan, Manager, Licensing and Nuclear Materials Management
*R. L. Torres, Radiation Protection Supervisor
R. G. Lewis, Radiation Protection Shift Supervisor
D. T. Barbour, Radiation Protection Shift Supervisor
*B. J. Beane, Senior Engineer
*S. P. Murray, Nuclear Safety Engineer
*E. L. Jeffords, Nuclear Safety Engineer
*R. Foleck, Senior Licensing Safety Engineer
P. R. Jasinski, Chemistry Supervisor
J. T. Sauvinet, Control Room Foreman

Other licensee employees contacted included construction craftsmen, four technicians, five operators and two office personnel.

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on March 11, 1983, with those persons indicated in paragraph 1 above. The inspector identified one apparent violation (Failure to perform air sampling during the removal of HEPA filters in the chemical area ventilation system). The inspector stated that the completion of the licensee's investigation and the initiation of corrective action following the UF6 release in the hydrolysis area on February 3, 1983, has taken over five weeks, which appears to be an excessive amount of time. The inspector also stated that one item would remain unresolved (releasing air from the facility without passing it through a HEPA filter with an efficiency of 99.97% for 0.3 micrometer particles) pending completion of the licensee's investigation and a determination of the cause of the reduced filter efficiency. The Manager, Regulatory Compliance acknowledged the inspector's comments.

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. New unresolved items identified during this inspection are discussed in paragraph 13.

5. Licensee Action on Previous Inspector Followup items

a. (Closed) IFI (82-16-04) Training of Technicians in Survey Techniques. The inspector reviewed the instructions given to radiation protection technicians for performing surveys of material for uncontrolled release. The inspector also reviewed the records of training received by technicians. The inspector had no further questions.

b. (Closed) IFI (83-01-01) Revised Procedure for Implementing Procedural Changes. The inspector reviewed the method established to insure that changes to radiation protection procedures are implemented in a timely manner and had no further questions.

6. Instruments and Equipment

The inspector observed a variety of radiological survey instruments in use, checked calibration stickers and performed battery and source checks for selected portable instruments available for use. The inspector selectively reviewed survey instrument calibration records for instruments in use.

No violations or deviations were identified.

7. Posting of Notices

10 CFR 19.11 requires, in part, that each licensee post current copies 10 CFR 20 or if posting of the documents is not practicable, the licensee may post a notice which describes the document and states where it may be examined. 10 CFR 19.11 further requires that copies of any Notice of Violation involving radiological working conditions be conspicuously posted within two working days after receipt of the documents from the Commission. The inspector observed the posting of notices required by 10 CFR 19.11 and had no questions.

8. Internal Exposure Control

The inspector selectively reviewed the procedure and records for daily urinalysis performed in 1983 for individuals who worked in the vaporization and hydrolysis area. Routine samples were being collected and corrective actions taken in accordance with licensee procedure NSI No. 0-2.0, Bioassay-Urinalysis Program. The inspector reviewed Analytical Test Method 1.2.21.10, Measurement of Uranium in Urine Using the Scintrex UA-3 Analyzer and discussed with licensee representatives the analysis of urine samples, calibration of the analyzer and periodic functional checks to ensure continued satisfactory performance of the analyzer.

The inspector selectively reviewed the whole body counting procedures and results of counts performed between November 1982 and February 1983 and discussed the program with licensee representatives.

By review of records, observations, and discussion with licensee representatives, the inspector evaluated the licensee respiratory protection program, including routine air sampling, engineering controls, MPC-hour controls, use of respirators and the medical qualification of respirator user. The inspector also toured the licensee's industrial medical facilities and discussed with the medical staff the frequency and scope of the physical exams given to wearers of respirators.

10 CFR 20.408(b) requires the licensee to provide the NRC with a report of an individual's exposure to radiation and radioactive material when the individual terminates employment with the licensee. 10 CFR 19.13(d) also requires the licensee to provide the individual with a copy of the exposure report provided to the NRC. In discussions with licensee representatives, the inspector learned that the computer program used by the licensee to calculate the internal dose based on bioassay results and/or air concentrations, time in areas and respiratory protection devices worn is not well documented. The methodology used in parts of the program is available. The source of correction factors (e.g., dose conversion factors) or their technical bases are not available. The inspector stated that the licensee should review the computer program and ensure that the methodology used in the program is well documented (83-06-01).

9. External Exposure Control

The inspector discussed the dose monitoring program with licensee representatives. The inspector reviewed the computer printouts for the fourth quarter 1982 for whole body and extremity exposures and verified that the radiation doses recorded for plant personnel were well within the NRC limits. The inspector also reviewed the procedure used by the licensee to investigate and estimate exposures for lost or damaged TLDs and the capability of the licensee to retrieve previous exposures and prepare termination reports required by 10 CFR 20.408.

A licensee representative stated that the licensee has just completed a new time and touch study and derived new factors for estimating extremity doses based on job function and time in area, and that in the fourth quarter 1983 ring badges will be used to check the validity of the new factors. The inspector stated he would review the results of the time and touch study after it has been reviewed by licensee management (83-06-02).

No violations or deviations were identified.

10. Posting, Labeling and Control

The inspector reviewed the licensee's posting and control of radiation areas, airborne radioactivity areas, contamination areas, and radioactive material areas and the labeling of radioactive material during tours of the plant.

No violations or deviations were identified.

11. Radiological Surveys

The inspector selectively reviewed records of radiation and contamination surveys performed in 1983, discussed the survey results with licensee representatives and observed radiation protection technicians performing surveys. The inspector also reviewed the results of airborne radioactivity surveys performed in 1983 using the approximate 160 fixed station air samplers installed throughout the controlled area. Air samples are removed and analyzed each shift. Results that exceeded administrative controls were investigated and appropriate corrective actions taken.

The inspector performed independent radiation surveys in the area where clean trash is sorted and compacted and in the scrap metal dumpsters in the licensee's maintenance contractor compound; both locations are outside the plant's restricted area. These surveys were performed to verify that material and equipment removed from the restricted area met the limits specified in the license. The inspector also performed loose surface contamination surveys in areas immediately outside the restricted areas.

No violations or deviations were identified.

12. Radioactive Waste Management

The inspector toured the licensee's facilities for processing and disposal of liquid effluents from the plant, discussed the operation of the system with licensee representatives, and reviewed the procedure for sampling of liquid effluents.

The inspector selectively reviewed sample analysis records of nitrate-bearing liquids transferred to an off-site liquid treatment system during 1983. Transfer of this material is authorized by License Condition 16. The inspector observed the collection and analysis of a sample collected from the tank truck during the loading operation.

The inspector selectively reviewed the radioactive airborne effluent release records for the period July 1982 through February 1983, toured the facility, visually checked selected stack samplers and discussed the routine effluent monitoring program with licensee representatives. The inspector also reviewed the latest revision to plant procedures NSI No. 0-26.0, Laboratory Analysis of Air Sampling Filters, and EPI No. 0-6.0, Stack Sampling Program.

License Condition 17 requires the licensee to perform an investigation of any single air sample which exceeds 10 CFR 20, Appendix B, Table 1 and to conduct daily surface contamination surveys during the first 30 operating days (incineration, ash removal and contaminated maintenance) for the new incinerator. The inspector reviewed the results of air sampling and surface contamination surveys performed during the period of August 12, 1982 and September 29, 1982. All air sample results were less than the 10 CFR 20, Appendix B Table 1 limit. The average air concentration was less than two percent of the limit. The thirty day average surface contamination result was 200 dpm/100 cm^2, with only four smears (total of 729) exceeding the limit of 5000 dpm/100 cm^2 established in the license condition. A licensee representative stated that the licensee had completed the incinerator startup survey requirements of the license and would change the surface contamination survey frequency to weekly.

10 CFR 70.59 requires that a licensee authorized to possess special nuclear material for processing and fuel fabrication, or conversion of uranium hexafluoride submit a semiannual effluent monitoring report to the NRC, specifying the quantity of each specific radionuclide released to the unrestricted area in liquid and gaseous effluents. The inspector reviewed the effluent monitoring report for the period of July 1, 1982 through December 31, 1982, and selectively reviewed the data used to prepare the report.

No violations or devations were identified.

13. Airborne Radioactivity Release

On February 3, 1983, a UF6 release occured in the FMO hydrolysis area as a result of the failure of the valve controlling the feed of UF6 to the line 3 hydrolysis receiver. The air operated ball valve failed to close completely after receiving the close signal from the control system sensing the upper specific gravity limit in the hydrolysis receiver. The same process controller that signaled the valve to close, also stopped the recirculation of the receiver water, limiting the amount of water available to react with with the incoming UF6. Unreacted UF6 gas flowed through the hydrolysis receiver into the line 3 hydrolysis unit scrubber and eventually into the receiver hood. The inspector reviewed area air sample results, bioassay results for personnel who were in the area or who entered during the event, stack sample results, a preliminary copy of the licensee's investigation report and discussed the event with licensee representatives. No NRC limits were exceeded. Personnel evacuated the area immediately. Personnel who reentered the area to stop the release wore appropriate respiratory protective equipment. Bioassay results for those involved in the event were below the licensee's action level.

In discussions with the inspector, licensee representatives stated that the hydrolysis unit scrubber is equipped with a conductivity monitor to detect excessive UO2F2 buildup in the scrubber water. However, since the installation of the monitor several months before, the set point for the alarm has been so low as to alarm during normal hydrolysis operations. During a tour of the chemical process control room on March 11, 1983, the inspector noted that the conductivity monitor alarmed several times. The control room operator stated that previous alarms that day had been followed up and no problem existed. He also stated that the instrument shop had been notified and was working on the spurious alarms. The inspector stated that action should be taken to ensure that the set points were established such that an alarm was indicative of a problem. The inspector also stated that licensee should take action to ensure that problems of this type are promptly brought to management's attention and corrected (83-06-03).

The inspector noted that more than five weeks after the release, the investigation still was not completed and corrective action initiated. The inspector stated that investigations should be expeditiously completed and appropriate corrective action taken and that the licensee should consider establishing a time frame for completing investigations (83-06-04).

The inspector reviewed the procedures for hydrolysis and discussed the procedures with licensee representatives. The inspector noted and discussions with licensee representatives confirmed that the procedures did not contain actions to be taken by the operator if the scrubber water conductivity monitor alarmed. The inspector stated that the procedures for hydrolysis should include specific instructions for the operator if the conductivity monitor alarms (83-06-07).

Licensee Condition 9 requires that licensed material be used in accordance with statements, representation and conditions of Appendix A as contained in the licensee's application. Appendix A, Section 7.1.1(b) states that air through all exhaust systems from the uranium processing areas, in which unencapsulated uranium is processed, shall be discharged only after passing through air filters which are fire resistant and at least 99.97% efficient for removal of 0.3 micron particles. During the February 3, 1983 release, the CHMSO-546 ventilation system (water scrubber and high efficiency particulate air filter (HEPA)) was operating. Radioactivity concentrations in the stack reached 4.5×10^{-11} µCi/ml which was approximately 400 times the normal stack concentration. Calculations performed by the inspector indicate that if the HEPA filter was, in fact, 99.97% efficient, then the radioactivity concentration before the filter could have been as high as 1.5×10^{-7} µCi/ml although the highest concentration recorded on a stationary air sampler in the area was 3×10^{-10} µCi/ml. A licensee representative stated that exhaust from process hoods also enters this ventilation system and that the concentration before the HEPA filter could have been much higher than indicated by room concentrations. On February 4, 1983, the licensee inspected the HEPA filters in CHMSO-546 system and changed the HEPA filters.

A licensee representative stated that some of the hold down brackets for the filters were not torqued down to the level they should and perhaps some of the filters had been damaged by the highly corrosive nature of the effluent. In a review of stack sample results for past 18 months, the inspector noted that on previous occasions where high stack sample results were obtained, inspection by the licensee of the HEPA filters indicated that the filters were physically damaged (puncture holes) or damaged by the acid environment. A licensee representative informed the inspector that the licensee has no program for testing the filter system after installation of new HEPA filters or to periodically test the filters while installed to ensure their integrity. The inspector also noted that licensee records of differential pressure across the filter system indicated a decline in differential pressure from 2.5 inches of water on January 5, 1983, to 1.8 inches of water on February 3, 1983, which also may be indicative of filter failure. The inspector stated that failure to pass the exhaust air discharged from the chemical area on February 4, 1983, through air filters that were at least 99.97% efficient would be a violation of license condition 9. This item will remain unresolved pending further investigation by the licensee as to the cause of the elevated stack sample results following the UF6 release on February 3, 1983, and a review of the investigation by the inspector during a subsequent inspection (83-06-05).

10 CFR 20.103(a)(3) states in part, that for purposes of determining compliance with the requirements of this section the licensee shall use suitable measurements of concentrations of radioactive materials in air suitable measurements of concentrations of radioactive materials in air for detecting and evaluating airborne radioactivity in restricted areas.

On February 4, 1983, the licensee changed the HEPA filters in CHMSO-546 filter system following the UF6 release. Radiation protection personnel issued a radiation work permit, describing the safety requirements as well as protective clothing, dose monitoring and respiratory protection requirements for the job. A licensee representative stated that no air samples were taken during the job to determine the radiological status of the area while the filters were being changed. No special surveys were performed to determine the radiological conditions of the filters before the job began. A licensee representative stated that the licensee changes a large number of HEPA filters each year without creating airborne radioactivity and this filter change was not different from the others. The inspector stated that these filters had been exposed to unknown concentrations during the UF6 release and the radiological condition of the filter was unknown. Licensee personnel were permitted to work in an area where the radiological conditions were also unknown. The inspector stated that failure to make suitable measurements of concentration of radioactive material in air for detecting and evaluating airborne radioactivity during the removal of the HEPA filters from the CHMSO-546 filter system on February 4, 1983, is a violation of 10 CFR 20.103(a)(3) (83-06-06).