



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

Report No. 70-1113/c-2-16

Licensee: General Electric Company  
Wilmington, NC 28401

Facility Name: Wilmington Manufacturing Department

Docket No. 70-1113

License No. SNM-1097

Inspection at Wilmington, North Carolina

Inspector: *W. Seery*  
for C. M. Hosey

8/19/82  
Date Signed

Accompanying Personnel: A. Soong, NMSS

Approved by: *W. Seery*  
for K. P. Barr, Section Chief  
Technical Inspection Branch  
Division of Engineering and Technical Programs

8/19/82  
Date Signed

SUMMARY

Inspection on July 26-30 and August 3-4, 1982

Areas Inspected

This routine, unannounced inspection involved 49 inspector-hours on site in the areas of radioactive waste management, transportation of radioactive material, radiation protection, and followup on previous enforcement and inspector followup items.

Results

Of the four areas inspected, no violations or deviations were identified in three areas; one violation was found in one area (exceeding contamination limits for release of material to unrestricted area).

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## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*J. L. Harmon, Manager
- \*\*\*M. G. McLain, Manager, Nuclear Safety Engineering
- \*J. W. Currier, Acting Manager, Fuel Quality
- \*\*W. J. Hendry, Manager
- \*\*\*C. M. Vaughan, Manager, Licensing and Nuclear Materials Management
- \*R. J. Keenan, Acting Radiation Protection Supervisor
- \*R. Foleck, Senior Licensing Engineering Specialist
- \*R. C. Pace, Manager, Fuel Support Operation
- \*R. M. Inver, Manager, Facilities
- G. Narine, Environmental Protection Engineer
- \*S. P. Murray, Nuclear Safety Engineer
- D. Barbour Radiation Protection Shift Supervisor
- R. G. Lewis, Radiation Protection Shift Supervisor

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

#### Other Organizations

- S. L. Alper, Southern Iron and Metal Co., Wilmington, NC
- C. Brown, Health Physicist, State of North Carolina

- \*Attended exit interview on July 30, 1982
- \*\*Attended exit interview on August 4, 1982
- \*\*\*Attended both exit interviews

### 2. Exit Interview

The inspection scope and findings were summarized on July 30 and August 4, 1982, with those persons indicated in paragraph 1 above. During the exit interview on July 30, the inspector discussed the status of two inspector identified items and one unresolved item. The inspector identified one apparent violation (exceeding contamination limits for release of material to unrestricted area). The inspector stated that the licensee should survey the maintenance contractor's area for additional radioactive material in a timely manner. The inspector also stated that the plant should reevaluate their procedures for unconditionally releasing material from the controlled area, retrain radiation protection personnel in proper techniques for surveying material for unconditional release, and reevaluate equipment used for the survey. The senior manager present acknowledged the inspector's comments.

On August 2, a telephone conversation was held between E. A. Lees, Manager, Quality Assurance, and A. F. Gibson of the Region II office concerning the radioactive material which was found outside the controlled area of the plant. Plant management agreed to perform additional radiation surveys at the facilities of the scrap metal dealer who receives metal scrap from the plant.

During the exit interview on August 4, the inspector discussed the results of the on-site and off-site radiation surveys performed by the licensee and the results of a confirmatory survey performed by the inspector at the facilities of the scrap metal dealer. No radioactive material associated with the licensee's operation was found during the licensee's or inspector's surveys.

3. Licensee Action on Previous Enforcement Matters

Closed (Unresolved) 82-10-02. Air Sampling During Filter Changes. A review of high volume air sample results performed during routine change out of ventilation system prefilters indicates that the plant's stationary air samplers satisfactorily monitor air concentrations in the work area. Therefore, the requirement for making measurements of concentrations of radioactive material in air specified in 10 CFR 20.103(a)(3) are being met. The inspector stated that, while the stationary air system may be suitable for routine operations, the radiation protection staff should evaluate each non-routine job and determine the need for special air samples. The inspector had no further questions.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Licensee Action on Previous Inspector Followup Items

a. (Open) IFI 82-10-03, Respiratory Protection Training. Plant Procedure NSI No. 0-1.0, Rev. 7, was issued June 24, 1982, revising the respiratory protection training to include a discussion of airborne contaminations that the wearer is protected against and a discussion of the construction, operation, purpose, type, and limitations of each mask. The licensee is in the preliminary stage of having a consultant prepare a respiratory protection training video tape to standardize the training. This item will remain open pending further review during a subsequent inspection.

b. Closed (IFI) 81-10-04, General Employee Training. The general employee training has been modified to better emphasize the worker's responsibility for radiation and nuclear safety and appropriate procedures for removal of radioactive material from the controlled area. The inspector had no further questions.

6. Followup on IE Bulletins, Circular and Notices

Notice 82-21, Buildup of Enriched Uranium in Effluent Treatment Tanks. The inspector discussed the notice with licensee representatives and toured the radioactive waste processing facilities. All of the licensee's radioactive liquid waste tanks have bottom discharges and most have conical bottoms to minimize buildup of solids in the tanks. In addition, the tanks are routinely opened, inspected, and cleaned. The inspector had no further questions.

7. Radioactive Liquid Effluents

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, reviewed the procedure for sampling of liquid effluents, and observed the collection of samples from the various waste lagoons at the plant. During a review of possible liquid release paths from the plant, the inspector questioned how the licensee samples rain water runoff from the box storage pad located outside. Licensee representatives stated that they thought the runoff went to a lagoon and was sampled prior to release offsite; however, the one individual who would know would not be present on-site during the inspection. The wooden boxes on the storage pad contain burnable waste which will be incinerated when the licensee completes testing of their new incinerator. Some of the boxes have been stored outside for more than three years and are deteriorating. Leakage of radioactivity out of a few boxes has occurred. Radiation protection personnel perform monthly surveys and inspections of the box storage pads and decontaminate any areas found to be contaminated. The inspector stated that the licensee should evaluate the possible release of radioactivity off-site through this pathway. Licensee representatives stated they thought the release path was monitored. The inspector stated that he would follow-up on this item during a subsequent inspection (82-16-01). No violations or deviation were identified.

8. Radioactive Airborne Effluents

The inspector selectively reviewed the radioactive airborne effluent release records for June and July 1982, toured the facility and visually checked each stack sampler, observed the changeout and analyses of air samples removed from selected plant stacks, and discussed the air sampling program with licensee representatives. During tours of the facility the inspector noted that the air sample probes for stacks CHMN0546, CHM0541, CHMS0546, and CHMS0541 were installed within two feet of the exhaust fans. Appendix A of ANSI Standard N13.1-1969, Guide for Sampling Airborne Radioactive Materials in Nuclear Facilities, discusses the design and use of air sampling probes to ensure that the sample collected is representative of the actual concentration in the air stream. The inspector stated that the close proximity of the sample probe and fan would possibly result in a non-uniformity in

radioactive material concentration at the cross section of the stack where the probe is located, and that the velocity distribution across the stack should be known. The velocity distribution must be known to maintain isokinetic flow for the sample probe and to provide information to permit the integrated flow through the stack to be determined from the sample taken. Licensee representatives stated that they thought a velocity traverse had been performed but could not produce the results or an evaluation which indicated that the samples withdrawn are representative. The inspector stated that the stack sampling should be evaluated and action taken, as necessary, to ensure that the samples collected are representative. The results of this evaluation should be formally documented. The inspector stated that he would follow-up on this item during a subsequent inspection (82-16-02).

The inspector had the licensee remove several sample probes from exhaust ducts and verified the probes were in the proper orientations. The inspector also had the licensee remove the inspection plate from the high efficiency particulate (HEPA) filter housing for the chemical area and verified that the filters were properly installed and had no apparent damage or dust loading. Differential pressure gauges across the HEPA filter banks indicated the pressure drop across the filters was less than the value at which the filter would be replaced. No violations or deviations were identified.

#### 9. Surveys

The inspector selectively reviewed the records of radiation, contamination, and airborne radioactivity surveys performed during the current plant maintenance period, discussed the survey results with licensee representatives, and observed radiation protection personnel performing surveys. Surveys are performed at the frequency specified in Nuclear Safety Instruction No. 0-6.0, contamination measurement and control.

The inspector performed independent radiation and loose surface contamination surveys in the restricted area and in areas outside the restricted area but on the licensee property. Several air samples removed from the stationary air sampling system were analyzed by the licensee and returned to the Region II office for analysis to confirm the accuracy of the licensee's analyses. On July 29 the inspector, accompanied by a licensee representative, performed a survey in the licensee's maintenance contractor compound located outside the plant's restricted area. This survey was performed to verify that material and equipment removed from the restricted area met the limits specified in the license. During this survey the inspector identified several pieces of used 1½ inch pipe in a scrap metal dumpster that were internally contaminated. The highest removable alpha contamination level was approximately 9000 dpm/100 cm<sup>2</sup> (Enriched Uranium).

An investigation performed by the licensee revealed that the pipe was a vent/overflow line on a waste treatment tank (V106) which is located outside the conversion and fuel fabrication building but within the controlled area (restricted area). The pipe had been removed from the tank on July 25, 1982. Radiation protection personnel performed external radiation surveys on the pipe on July 25 and released the pipe to the maintenance contractor for disposal. The pipe was surveyed for alpha contamination and beta-gamma contamination. In discussion with the technician who performed the survey, he stated that he surveyed the ends of the pipe for alpha contamination but performed no surveys for removable alpha contamination. The pipe was unconditionally released after the discussion between maintenance contractor personnel and the licensee radiation protection personnel. Both parties erroneously believed that the interior of the pipe had not been exposed to radioactive material.

Following discovery of the pipe by the inspector, the licensee took the following action:

- a) returned the contaminated material to the controlled area
- b) surveyed the other material in the scrap metal bin (no other radioactive material was found)
- c) performed a detailed radiation survey of the entire area assigned to the contractor. (Two additional contaminated items were found. However, the contamination levels on each were below the release limits for the plant)

On August 3, the licensee performed a detailed radiation survey at the Southern Iron and Metal Company facilities in Wilmington, NC. Scrap metal from the licensee's plant (including the maintenance contractor area) is shipped to this facility for disposal. No radioactive material associated with the licensee's plant was found during this survey. However, several small weights containing depleted uranium were found. It is believed that these devices were used as counter weights or for balancing in military aircrafts. Southern Iron receives scrap metal from several military air stations. The NRC inspector performed an independent survey of the scrap yard on August 3 and found no additional radioactive material.

The NRC informed the State of North Carolina and a team of health physicists performed an independent survey of the scrap yard. No additional radioactive material was found. Although the depleted uranium weights were not their material, the licensee agreed to take the material and properly dispose of it by transferring it to a waste burial facility.

License Condition 14 of the license authorizes the licensee to release materials and equipment from restricted areas that meet the contamination limits specified in its attached Annex C. Annex C states that the maximum amount of removable alpha radioactivity in disintegration per minute per 100

square centimeters should not exceed 1000. The inspector stated that the unconditional release of the V106 tank vent pipe with removable alpha contamination greater than 1000 dpm/100<sup>2</sup> was in violation of License Condition 14 (82-16-03).

The inspector also stated that the licensee should retrain radiation protection personnel in the release limits, with particular emphasis on releasing material with inaccessible surfaces, and the proper techniques for surveying materials for unconditional release. The licensee should also evaluate the instrumentation that is used for performing surveys and consider processing all waste removed from the controlled area through the recycle center. All material removed from the conversion and fuel fabrication building is sorted and resurveyed prior to release in accordance with procedure Planning and Projects Section - Admin. Routine 310-7, Trash handling operation.

During tours of the plant, the inspector noted that the metallurgical laboratory was posted with a sign which prohibited uranium in the lab except in the area of the scanning electron microscope. At the request of the inspector, smear surveys for loose surface contamination were performed in the lab, with particular attention given the grinding and polishing wheels. In addition, samples of cutting oil (used in conjunction with the grinder) were removed from reservoirs and analyzed for uranium. The cutting oil is reused. Sample results indicate that uranium has not been processed in the lab. In discussions with radiation protection and Met Lab personnel, they also stated that uranium samples are not prepared in the Met Lab, nor is material handled in the lab, except in the electron microscope area.

#### 10. Review of Vaporization and Ventilation System Modification

The inspector toured the vaporization area and observed the installation of the ventilation system modification, reviewed the design drawings and discussed the operation of the new system with licensee representatives. The modifications were made to provide better localization of the problem in the event of a UF<sub>6</sub> release in the vaporization area and to permit bringing the release under control without entering the area. It appears that the modifications will permit the licensee to better control UF<sub>6</sub> releases in the vaporization area and also to minimize the exposure of workers. The inspector had no further questions.

#### 11. Radiation Work Permits

The inspector reviewed radiation work permits which had been prepared for maintenance activities during the current shutdown period (July 25 - August 8) for appropriateness of the radiation protection requirements based upon work scope, location, and condition. During tours of the plant, the inspector observed the adherence of plant workers to the RWP requirements. No violations or deviations were identified.

## 12. Internal Exposure Control

The inspector selectively reviewed the procedures and records for daily urinalysis performed for individuals who worked in the vaporization and hydroanalysis area. Results for July 1982 were reviewed. Samples were being collected, analyzed, and corrective actions taken in accordance with licensee procedure N51 No. 0-20, Bioassay-Urinalysis Program.

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

By review of records, observations, and discussion with licensee representatives, the inspector evaluated the licensee's program for air sampling, engineering controls, MPC-hr controls, use of respirators, and use of NIOSH approved equipment.

No violations or deviations were identified.

## 13. Posting, Labeling, and Control

The inspector reviewed the licensee's posting and control of radiation areas, airborne radioactivity areas, contamination areas, radioactive material areas, and the labeling of radioactive material during tours of the plant. No violations or deviations were identified.

## 14. Notification and Reports

The inspector reviewed the licensee's records (letters issued in June and July 1982) to determine if exposure data had been provided to terminated employees as required by 10 CFR 19.13(d) and discussed the records with licensee representatives. During these discussions the inspector was informed that the licensee had discovered, during a review of records that approximately 250 employees and contractors who terminated had not been sent a record of their exposure upon termination. The review was a part of an effort to convert the plant's exposure records from a manual system to a computer based system. The licensee representative stated that under the manual record system it was very difficult to identify individuals who terminated without going through the prescribed termination procedure. The new system will have the capability of identifying, in a timely manner, all people in the dosimetry system who terminate employment or assignment at the plant. The appropriate reports of verification of radiation exposure were prepared and sent to the individuals as well as the NRC. The licensee was informed that since: (1) the violation was identified by the licensee, and (2) the violation would be a Severity Level V, prompt corrective action was taken, no enforcement action would be taken by the NRC in accordance with Appendix C of the Enforcement Policy (10 CFR 2).



## 15. Audits

The inspector discussed the audit and surveillance program related to radiation protection, radioactive waste management, and transportation of radioactive material with licensee representatives. The inspector reviewed the following audits performed by the Licensing and Nuclear Material Management personnel and by Nuclear Safety Engineering personnel.

- 01-82, Bioassay, conducted May 17-21, 1982
- 02-82, Sealed Sources, conducted June 24, 1982
- 20-81, Shipping and Receiving Records, conducted December 14, 1981

The inspector evaluated the frequency, scope, and followup action and had no further questions.

No violations or deviations were identified.

## 16. Leak Test of Sources

License Condition 15 requires that plutonium sources be leak tested in accordance with an attachment to the license. License Condition 9 requires the licensee to operate the plant in accordance with the statements, representations, and conditions of Appendix A as contained in the licensee's application. Appendix A specifies the frequency and method for performing leak tests of other sealed sources.

The inspector selectively reviewed the records for leak tests of sealed sources performed in 1981 and 1982. No violations or deviations were identified.

## 17. Transportation of Radioactive Material

The inspector reviewed plant procedures for the shipment of radioactive material and discussed the procedures with licensee representatives.

10 CFR 71.62 specifies records the licensee is required to maintain for each shipment of more than Type A quantity of radioactive material in a single package. The inspector selectively reviewed the records of radioactive material shipments made in 1982. The inspector also verified that the licensee has a system for ensuring that the Department of Transportation is notified in the event of a fire, accident, leakage, or suspected contamination involving radioactive material when the licensee acts as the carrier. The State of South Carolina is routinely notified of the shipment of radioactive waste to the burial facility at Barnwell, South Carolina.

The licensee has assigned the responsibility for ensuring radioactive material leaving this site meets the appropriate requirements to a small number of people. These individuals have attended seminars and industry workshops on the shipment of radioactive material.

The inspector discussed the periodic maintenance of packages used for shipping radioactive material. The licensee ships Uranium powder in BV-7 containers (certificate of compliance No. 9019). The containers are inspected and refurbished after each use. In addition, each container is reinspected prior to loading. Cylinders in which UF<sub>6</sub> is received are owned by the licensee. These cylinders are inspected and refurbished at a vendor plant every five years; in addition, they are inspected by the licensee after each use.

No violations or deviations were identified.

18. Procedure Review

The inspector reviewed changes made to the following procedures and verified that the changes were properly made and were consistent with regulations, licensee conditions, and good health physics practices:

- NSI No. 0-1.0, Respiratory Protection - Training and Fitting
- NSI No. 0-5.0, Self-reading Dosimeter Program
- NSI No. 0-6.0, Contamination Measurement and Control
- NSI No. 0-9.0, Radiation Work Permits
- NSI No. 0-17.0, Shipment and Receipt of Radioactive Materials
- P/P 90-1, Receiving and Shipping Radioactive Materials

No violations or deviations were identified.