



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

MAY 16 1985

Report No.: 70-1113/85-02

Licensee: General Electric Company
Wilmington, NC 28401

Docket No.: 70-1113

License No.: SNM-1097

Facility Name: Nuclear Fuel Manufacturing Department

Inspection Conducted: January 7-11, 1985, and March 14, 1985

Inspector: C. M. Hosey
C. M. Hosey

5/14/85
Date Signed

Approved by: D. M. Collins
D. M. Collins, Branch Chief
Division of Radiation Safety and Safeguards

5/14/85
Date Signed

SUMMARY

Scope: This special, unannounced inspection entailed 50 inspector-hours on site in the areas of followup on worker concerns and transportation of radioactive material.

Results: Four violations - failure to properly label a shipment of radioactive material, failure to instruct all individuals who may frequent a restricted area in all the subjects specified in 10 CFR 19.12, failure to follow procedures and failure to post the documents, notices and forms required by 10 CFR 19.11(d).

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REPORT DETAILS

1. Licensee Employees Contacted

- *W. McMahon, Manager, Quality Assurance
- *J. E. Bergman, Manager, Fuel Manufacturing
- *W. C. Peters, Manager, Nuclear Safety Engineering
- **C. M. Vaughan, Manager, Regulatory Compliance
- *T. P. Winslow, Manager, CHEMET Lab
- *R. L. Torres, Manager, Radiation Protection
- D. T. Barbour, Radiation Protection Shift Supervisor
- *S. P. Murray, Nuclear Safety Engineer
- *P. S. Stansbury, Nuclear Safety Engineer
- E. L. Jeffords, Nuclear Safety Engineer
- G. M. Coronado, CHEMET Lab Technician
- H. W. Fields, CHEMET Lab Technician
- L. W. Brown, CHEMET Lab Test Operator-A
- W. A. Wells, CHEMET Lab Technician
- C. G. McLamb, CHEMET Lab Shift Supervisor
- W. Lacewell, CHEMET Lab Shift Supervisor
- J. R. Sutton, CHEMET Lab Test Operator-A
- R. G. Lewis, Radiation Protection Shift Supervisor
- F. C. Eschenlauer, Supervisor, Metallurgical Laboratory
- P. F. Hand, CHEMET Lab Shift Supervisor
- V. P. Moore, Senior Specialist, Nuclear and Hazardous Material Transportation
- J. C. Lewis, CHEMET Lab Technician

*Attended exit interview on January 11, 1985

**Attended exit interview on January 11 and March 14, 1985

2. Exit Interview

The inspection scope and findings were summarized on January 11, 1985, and March 14, 1985, with those persons indicated in paragraph 1 above. The violations involving failure to properly label a radioactive material shipment (paragraph 5), failure to instruct all individuals who may frequent a restricted area in all the subjects specified in 10 CFR 19.12 (paragraph 6), failure to follow procedures (paragraph 4) and failure to post the documents, notices and forms required by 10 CFR 19.11(d) (paragraph 6) were discussed in detail. Licensee management acknowledged the findings. 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

This subject was not addressed in the inspection.

4. Allegations, Discussions and Findings

Note: The pronoun "he" is used through 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

Leaks around the microwave oven used for quick dissolution of uranium samples in crucibles created an airborne hazard from uranium gas vapors.

Discussion

The current revision (7/25/84) and all previous revisions of licensee procedure Calibration and Operation Instruction (COI) 409, Isotopic and U/O Preparation using Gravimetric Techniques, required that a watch glass be placed over each crucible after the addition of nitric acid and prior to placing the crucible in the microwave oven for dissolution of the sample. The licensee used an industrial microwave oven which had been equipped with an exhaust system for removing fumes generated during the dissolution process. The exhaust drew air from the oven and discharged it into the filtered exhaust system serving the laboratory hoods.

The inspector observed the dissolution of several trays of samples and did not note the emission of fumes from the microwave during this process.

During the inspection of November 27-30, 1984, (Inspection Report 70-1113/84-17) the inspector interviewed CHEMET Lab personnel (10 workers and 2 supervisors) concerning the evolution of fumes from the oven during the heating process. None of the twelve individuals interviewed indicated that they had noted the evolution of fumes from the microwave oven during the heating process. One individual indicated that once an employee thought the oven was leaking, however, it was checked and found to be working properly.

Evaluations of air flow around the microwave oven performed during the inspection of November 27-30, 1984, using a smoke tube indicated that the air flow in the immediate vicinity of the oven door was into the oven. The general air flow from the work area which included the microwave oven was toward the intake of the recirculation system. A review of results of contamination surveys performed in 1983 and 1984 indicated that contamination had not been found along the path of the air toward the air recirculation system intake. At the request of the inspector and under the direct observation of the inspector, the licensee performed a surface contamination survey in the recirculation system intake ducts prior to the high efficiency filters. This area was normally only entered to change the HEPA filters and then with coverage by Radiation Protection personnel. The highest survey result was 300 dpm/100 cm². The recirculation system had been in operation since the lab started up. Licensee representatives stated that the

duct work had never been decontaminated. These results indicated that general airborne radioactivity levels in the lab had been minimal. The contamination levels were very low, in fact license conditions would permit this duct work to be released for unrestricted use. Part I, Section 1.8.2, Annex A, of the License Application authorizes the release of equipment and materials from the restricted area for unrestricted use that meet the contamination limits specified in Annex A. Annex A requires that for materials or equipment to be released the removable alpha contamination levels be less than 1000 dpm/100 cm² and the average contamination levels (fixed and removable) be less than 5,000 dpm/100 cm². The contamination levels on the interior surface of the ventilation ducts were significantly below the limit.

The inspector reviewed the bioassay data for selected personnel assigned to the CHEMET Lab. During the review of results of the weekly urinalysis for personnel in the CHEMET Lab for 1983 and 1984, the inspector noted that most of the results were less than the minimum detectable level for the counting system of 5 micrograms per liter. The highest value noted was 19 micrograms per liter. Although this value exceeded the licensee's action level of 15 micrograms per liter, it is well below NRC internal exposure limits. The licensee took the action required by the License when an action level is exceeded. A review of whole body counts indicated that depositions of radioactivity by CHEMET Lab personnel have been less than the minimum detectable level of the whole body counter of approximately 55 micrograms of uranium 235.

The licensee's bioassay program is conducted in accordance with the guidelines contained in Regulatory Guide 8.11, June 1974. The frequency of sampling (weekly or daily) and action levels have been selected to ensure detections of an uptake of soluble uranium compounds which would result from the inhalation of a quantity of material in excess of the intake limits specified in 10 CFR 20.103(a)(2). An elimination rate of 15 µg/l (the licensee's action level) measured on the last day of the work week from an intake of uranium received on the first day of the work week represents approximately 25 percent of the NRC limit.

The frequency of whole body counts and action levels have been selected to ensure the detection of an intake of insoluble uranium compounds which would result from the inhalation of a quantity of material in excess of the intake limits specified in 10 CFR 20.103(a)(1). A whole body count result of 55 micrograms uranium-235 (normally the current minimum detectable level of the counter) represents less than 25 percent of a maximum permissible lung burden (MPLB). A maximum permissible lung burden is that quantity of uranium deposited in the lungs which, if continuously present, would result in the maximum permissible annual dose to the lungs of 15 rems after long term exposure. A whole body count result of 55 micrograms uranium-235 would also represent an intake of approximately 40 percent of the NRC limit.

Finding

The allegation was not substantiated. The inspector could find no evidence which would substantiate the allegation that an airborne hazard was created by the dissolution of samples in the microwave oven. Bioassay data indicated that uptakes of radioactivity by CHEMET Lab personnel had been less than NRC limits and in most cases not significantly greater than the minimum detectable level for the instrument used for the analysis.

Interviews with lab personnel and observations by the inspector failed to disclose any evidence that an airborne hazard from uranium gas vapors was present during the operation of the microwave oven. The evolution of fumes would be kept to a minimum as a result of the watch glass covering the crucible and the fumes that were released should be quickly removed from the oven by the exhaust system.

During the inspection of November 27-30, 1984, (Report No. 70-1113/84-17) a Notice of Violation was issued because the licensee failed to make suitable measurements of concentrations of radioactive material in air in that air samplers in the CHEMET Lab were not located where the sample collected would be representative of airborne radioactivity concentrations breathed by the workers in the laboratory.

Although the air samples collected were not representative of the radioactivity concentration breathed by the workers in all areas of the CHEMET Lab, the air sample data collected by the licensee did indicate that the general airborne radioactivity concentrations in the lab were less than one percent of the concentration specified in 10 CFR 20, Appendix B, Table I, Column 1.

No violations or deviations were identified.

b. Allegation

There were poor or sloppy contamination control practices in the analytical lab, i.e., contamination on floors and bench surfaces from spills, which were not cleaned up, and no or inadequate supervisory attention to the problem.

The only time that lab personnel were told to clean up contamination by supervision was when word came that NRC inspectors were on site.

Uranium powders were dumped from crucibles outside hoods causing airborne contamination and surface area contamination and supervision was reluctant to correct it.

Discussion

License Condition 9 requires that licensed material be used in accordance with statements, representations and conditions of Part 1 of the licensee's application. Paragraph 3.2.4.6 of Part 1 requires the

licensee to have a surface contamination monitoring program and specifies minimum survey frequencies and action levels for removable contamination. Plant Procedure Nuclear Safety Instruction 0-6.0, Rev. 14, Contamination Measurement and Control, provided guidelines for conducting a contamination measurement program, including evaluation and documentation of the results and required action based upon the contamination survey findings. Paragraph 2.2.1.1 of Part 1 of the licensee's application requires that the area manager assure the preparation and issuance of written operating procedures. Nuclear Safety Release/Requirement documents specify the radiological control requirements for the CHEMET Lab and are therefore considered plant procedures.

On January 7, 1985, the inspector made an unannounced visit to the CHEMET Lab to assess work practices and the presence of visible contamination on work benches. During this visit, the inspector had the licensee perform fixed and removable contamination surveys under the direct observation of the inspector. The inspector observed a small amount of uranium powder in two weighing enclosures while visiting the lab (near #10 hood in Spectrographic Lab and in the gadolina area). A review of the results of the special contamination survey performed at the inspector's request indicated that previous spills had occurred in other parts of the lab that were not completely cleaned up. Nuclear Safety Release/Requirement 6.1.0, Radiological Safety Requirement for CHEMET Lab, required that the spill be cleaned up immediately. Nuclear Safety Release/Requirement 6.1.0 contained no requirements to notify lab management or Radiation Protection to initiate a survey of the area to ensure that, in fact, the area had been cleaned. Although Job Hazard Analysis CL-JHA-01, Nuclear Materials, stated that Radiation Protection was to be notified in the event of a spill, this document was prepared within the lab, is not reviewed or approved by Nuclear Safety or Radiation Protection Personnel, and was not a document implementing NRC requirements or license conditions. Therefore, failure to follow the JHA did not constitute a violation of NRC requirements or license conditions.

During the inspection of November 27-30, 1984, (Report No. 70-1113/84-17) the inspector interviewed a total of twelve CHEMET Lab personnel (10 workers and 2 supervisors) concerning contamination control practices in the lab, promptness of cleanup of spills and supervisory and management attention to cleanliness in the lab. Seven of the twelve individuals stated that supervisors required the laboratory be kept clean. The remaining five individuals interviewed stated that supervisors did not emphasize keeping the lab clean. Two of those five stated that other workers did not promptly clean up spills which occurred as a result of their own work. Three of the twelve individuals stated that the only time that supervisors or management were interested in cleanliness in the lab was when visitors were coming to the lab or an NRC inspector was on site. All twelve individuals indicated when Radiation Protection identified a contaminated area in the lab, the lab was notified and the area was promptly cleaned and then resurveyed by Radiation Protection.

As noted in paragraph 4.a above, the inspector reviewed the bioassay data for selected personnel assigned to the CHEMET Lab.

Findings

The allegation was partially substantiated. The presence of visible contamination in the lab and the results of the special contamination surveys indicated that spills had occurred in the lab which had not been promptly cleaned. The failure to clean up spills in the CHEMET Lab immediately, as evidenced by the presence of visible contamination in the weighing enclosures and the results of the special survey were identified as an additional example of failure to follow procedures discussed in the Notice of Violation issued with Inspection Report 70-1113/84-15 (84-15-01).

Weaknesses in the licensee's contamination monitoring program for the CHEMET Lab were discussed in Inspection Reports 70-1113/84-17 and 70-1113/84-15.

Air sampling in the CHEMET Lab was discussed in Inspection Report 70-1113/84-13 and a Notice of Violation for inadequate air sampling in the CHEMET Lab was issued with Inspection Report 70-1113/84-17. However, as indicated in Paragraph 4.a of this report, bioassay data collected in 1983 and 1984 indicated that uptakes of radioactivity by CHEMET Lab personnel have been small compared to NRC limits.

The inspector found no substantive evidence which would indicate that supervisors or managers did not take action to clean up known spills. In fact, interviews with the lab personnel mentioned above indicated that prompt decontamination occurred when surveys indicated that areas were contaminated. The only evidence which supported the allegation that cleanup of contamination was carried out only when NRC inspectors were on site was the statements made by three of twelve lab personnel interviewed. The presence of visible contamination in the lab during the inspections reported in Region II Inspection Reports 70-1113/84-15 and 84-17 indicated that in these instances the licensee took no special actions because the NRC was on site.

The inspector could find no evidence which would substantiate the allegation that an airborne hazard was created by the dumping of crucibles outside of hoods. Bioassay data indicated that uptakes of radioactivity by CHEMET Lab personnel have been small and in most cases not significantly greater than the minimum detectable level for the instrument used for the analysis. In all cases the uptakes were below license action points and NRC limits.

Although dumping powders inside hoods might minimize the chance of accidental airborne uranium, it was not prohibited by plant procedures and there were no indications of personnel uptakes resulting from the practice.

c. Allegation

Personnel were eating, drinking, chewing gum, not wearing lab coats, safety glasses or safety shoes in violation of GE Procedures.

Discussion

Part I, Paragraph 3.2.4.4 of the license application specifies that the minimum clothing requirement for entry into the Wet Lab and Spectrographic Lab was a lab coat and safety glasses.

Nuclear Safety Release/Requirement 6.1.0 required that all personnel working in the CHEMET Lab wear lab coats and safety glasses. This procedure also prohibited eating and smoking in the Wet Lab and Spectrographic Lab.

During interviews, three lab supervisors stated they would correct an employee if they observed the employee eating or smoking in the lab or not wearing the appropriate clothing.

In discussions with the inspector, lab workers indicated that eating, drinking, chewing or not wearing the proper protective clothing or equipment occurred very infrequently in the lab, and that employees generally were quick to correct the problem when it was brought to their attention. They also stated that employees who ate, drank, chewed or failed to wear the appropriate protective clothing or equipment did so unintentionally.

The inspector made unannounced tours of the lab, to determine if lab personnel were eating, drinking or chewing in the controlled area of the lab or wearing protective clothing or equipment improperly. During tours on January 8, 9, and 10, the inspector observed an individual on each day working with his lab coat completely unbuttoned. In each case, the lab supervisor stated that he did not observe the improper wearing of protective clothing prior to it being pointed out by the inspector.

Finding

The allegation was partially substantiated. The inspector did not observe lab personnel eating, drinking, chewing or smoking in the controlled area of the lab. Although drinking and chewing were not specifically prohibited by procedure, good radiation protection practice would not permit such actions in the controlled area of the lab to minimize the possibility of ingesting radioactive material. Through interviews with technicians and supervisors, the inspector did not find any evidence that lab supervisors would not correct the problem if brought to their attention.

However, the inspector did find that failure of the lab personnel to wear the lab coats fully buttoned prevented the coat from providing the protection for which it was intended and would be considered a failure to follow the clothing requirements of Part 1, Paragraph 3.2.4.4 of the

licensee's application and a violation of License Condition 9 (85-02-01).

The wearing of safety equipment such as safety shoes was an industrial safety concern and outside the purview of NRC regulations. However, this aspect of the allegation has been referred to OSHA.

d. Allegation

Weighing of uranium samples was not done in a hood or a properly vented hood in violation of the lab practice method.

Standards (plastic vials) are opened outside of approved hoods in violation of lab procedures.

Discussion

The inspector reviewed Nuclear Safety Releases which specified the radiological control requirements for the various activities in the CHEMET Lab and discussed the requirement for weighing of samples in a vented hood with licensee representatives. The licensee representatives stated that balances for weighing were placed in plexiglass enclosures to minimize the effects of air currents on the balance and that weighing in a vented hood which had significant air flow and vibration would be difficult. During the review of Nuclear Safety Releases, the inspector noted that Nuclear Safety Releases 6.1.7.14, 6.1.7.29, and 6.1.7.41 each required that loose uranium powder be sampled in a hood in the rare earth preparation area of the Spectrographic Lab.

During tours of the lab the inspector noted that most balances were located in plexiglass enclosures including the one in the rare earth preparation area; however, some were out in the open. During one visit to the lab, on January 10, 1985, the inspector observed a lab worker transferring powder from one container to another while seated at the balance in the rare earth preparation area.

Finding

The allegation was substantiated as it applied to the rare earth preparation area. However, the inspector found no evidence which would indicate that a general requirement existed for all balances to be under a hood. Neither NRC regulations nor license conditions require balances for weighing radioactive material to be located under vented hoods.

With regards to the activities in the rare earth preparation area, the failure of the licensee to perform sampling in a hood as required by nuclear safety releases 6.1.7.14, 6.1.7.29 and 6.1.7.41 was identified as a violation of License Condition 9 (85-02-01).

e. Allegation

The alleged asked for his bioassay results and was "given the run around" by his supervisor. Another CHEMET Lab technician has not had a bioassay in 14 years.

The company would not give whole body count results to the alleged.

Discussion

Plant Procedure 1CR-09, Urinalysis/WBC Programs, Rev. 2, 7/22/81, stated that personnel may obtain urinalysis or whole body count (WBC) information at any time by contacting their immediate supervisor. NSE (Nuclear Safety Engineering) maintained records of those results for continual personnel protection. Revision II to Nuclear Safety Instruction E-6.0, Personnel Dose Reporting, added the requirement to provide a worker with his radiation exposure record within 30 days after it is requested.

During the inspection of November 27-30, 1984 (Inspection Report 70-1113/84-17), eleven laboratory personnel (9 workers and 2 supervisors) were asked if they were aware that they could ask for their radiation exposure history and whether or not they had ever asked for the history. Ten of the individuals interviewed stated that they knew they could request their exposure history; one stated he did not know it could be requested and the licensee was required to provide the history. One of the individuals interviewed stated that approximately a year ago he requested his radiation exposure history and received it within 30 days. This request was made to a representative of the licensee's Nuclear Safety Engineering group rather than his immediate supervisor.

The inspector discussed with licensee representatives the availability of exposure histories and the mechanism used by the licensee to ensure that the request is honored. A licensee representative stated that, although not established in writing, the worker is asked to make a written request for his exposure history so that compliance with 10 CFR 19.13 can be formally documented. A review of licensee records indicated the alleged made a request for his exposure history shortly before his termination and that request was promptly honored. A licensee representative in Nuclear Safety Engineering stated that no other request for exposure records had been received from the alleged. The alleged's supervisors and the manager of the CHEMET Lab were questioned concerning the alleged's request for his exposure history including whole body counts. Each indicated that the alleged did not ask him for his exposure history.

The inspector reviewed the exposure record for the individual identified by the alleged as not having a bioassay in 14 years.

Part I of the License Application, Paragraph 3.2.4.3.2, established the bioassay requirements for the licensee. Routine bioassays are to be

based upon the potential exposure levels of work stations as indicated by room air sample results and/or other appropriate criteria.

The license also permits the licensee to substitute an annual whole body count for urinalysis when the individual is exposed to insoluble uranium compounds. Plant Procedure Practices and Procedures 40-19, Rev. 5, June 1, 1983, established the minimum frequency for bioassay at the plant. Nuclear Safety Instruction 0-2.0, Bioassay-Urinalysis Program, Rev. 6, November 17, 1982, further defined the bioassay program in that it required that a minimum of ten individuals assigned to the CHEMET Lab who were representative of all shifts and areas where work with soluble uranium compounds occur, submit a urine sample weekly. In discussion with licensee representatives, the inspector was informed that all individuals working in the isotopic area of the lab were scheduled for a weekly urinalysis and everyone working in the Wet Lab and the Spectrographic Lab received an annual whole body count. The inspector reviewed the schedule for urinalysis for lab personnel and compared the schedule with the actual results. Lab personnel appeared to be submitting the samples as required.

The sampling frequency for urinalysis and whole body counts were based on the frequencies recommended by Regulatory Guide 8.11 to ensure the detection of an intake of radioactivity in excess of regulatory limits and to verify the adequacy of the air sampling program. The difference in the sampling frequency was based on the class of uranium compounds (soluble or insoluble) to which an individual had been exposed and the elimination rate of the compound from the individual.

The allegation concerning incomplete exposure data received by the allegor discussed in Inspection Report 70-1113/84-17 continues to be an unresolved item pending further review during a subsequent inspection.

According to licensee records reviewed by the inspector, the individual, who was alleged not to have had a bioassay in 14 years, received a whole body count in 1974, the year he left the Wet Lab and went to Metallurgical Lab for a period of approximately eight years. He began working with uncontained uranium materials again in 1981. From 1982-1984 the individual received a whole body count annually. Licensee records also indicated that urinalyses in 1972 and 1973 were performed for the individual and then discontinued until 1984 when the individual was assigned to the Isotopic Area.

Finding

The allegation that the allegor asked for his exposure history and was "given the run around" by his supervisor could not be substantiated. Interviews with lab personnel and discussions with licensee representatives failed to provide any evidence that the licensee intentionally prevented individuals from seeing their radiation exposure record.

The allegation concerning the individual who had not received a bioassay in 14 years was not substantiated. From the review of

licensee records, it appears that appropriate bioassays had been performed when the individual was exposed to uncontained uranium material in the CHEMET Lab.

No violations or deviations were identified.

f. Allegation

Up until about three years ago there had been uranyl gas releases in the area of the plant where gas is converted to powder.

Discussion

The inspector reviewed the licensee's unusual incident reports for 1981-1984 which pertained to releases in the plant's vaporization, hydrolysis and calciner areas.

During this review, the inspector noted that most of the releases were the result of equipment failure and each release appeared to be unique and unrelated to the corrective action taken to prevent previous releases. The licensee investigated the releases in accordance with Practices and Procedures 40-12, Nuclear and Environment Incident Investigation, and Nuclear Safety Instruction 0-22.0 and took appropriate corrective action to prevent a recurrence. Action taken by the licensee immediately following the releases to minimize exposures and to stop the releases appeared to be appropriate.

During tours of the vaporization, hydrolysis and calciner areas, the inspector noted that air samplers were positioned at several locations throughout the UF₆ process area. The inspector reviewed the results of air samples collected during the release which showed results within NRC limits.

Finding

The allegation was substantiated. Releases of gas and powder from the chemical conversion area have occurred in the past; however, reviews of licensee records indicate the frequency and magnitude is declining. Releases within the production area do not in themselves constitute a violation of NRC regulations or license conditions. The principal cause of these releases has been equipment failure. The reviews by the inspector indicated that the actions taken by the licensee to mitigate the consequences and to prevent a recurrence were appropriate and that personnel exposures did not exceed NRC limits or license conditions. Releases of radioactivity from the facility have not exceeded NRC limits or license conditions. In addition, the inspection found that equipment maintenance was adequate.

g. Allegation

The hood in the isotopic area is ineffective and constitutes an unsafe work environment. Workers are between the material being handled and the hood.

Discussion

Laboratory hoods are generally designed to keep hazardous material handled in the hood from escaping into the general laboratory environment. The work area which was the subject of the allegation had a laboratory hood against the wall with a powder weighing station located approximately three feet away. The weighing station balance and work table surface were enclosed in a plexiglas enclosure designed to minimize the effects of air currents on the balance. The enclosure was open on the hood side. Air flow studies performed by the inspector using a smoke tube during the inspection of November 27 - 30, 1984, (Inspection Report 70-1113/84-17), indicated that the flow of air from the weighing table was not toward the hood, but was rather stagnant. The studies indicated that airborne radioactivity, if it occurred, would remain in the general area of the balance. Air flow tests also indicated that unless the smoke was released at the face of the hood, the smoke tended not to move into the hood, but generally moved toward the return duct for the recirculation system.

The inspector reviewed the bioassay data for 1983 and 1984 for personnel who worked in the CHEMET Lab. The weighing table is in the same general area as the microwave oven. (See paragraph 4.a for a discussion of the bioassay data and air sampling.)

Finding

The allegation was not substantiated. The inspector found no evidence which would indicate that a worker performing weighing operations in the isotopic area would be working in an unsafe work environment. As stated above, smoke tests indicated that airborne radioactivity, if generated, would generally remain within the plexiglass enclosure, and there was little movement of air towards the hood. Thus, the fact that the worker at this station was placed between the weighing station and the exhaust hood was not significant. (See paragraph 4.a for a discussion of the bioassay data and air sampling.)

h. Allegation

Balances are not under hoods as required by Nuclear Safety Release/Requirement 6.1.7.28 dated June 27, 1984.

Discussion

Nuclear Safety Release/Requirement 6.1.7.28 dated June 27, 1984, provided specific radiological control instructions for the rare earth area in the Spectrographic Lab. It was not applicable to the entire CHEMET Lab.

During a review of Nuclear Safety Release 6.1.7.28, the inspector did not note a specific requirement for balances in the rare earth section of the Spectrographic Lab to be in hoods. Additional nuclear safety requirements for the rare earth area of the Spectrographic Lab were contained in separate nuclear safety releases. Review of

weighing/sampling operations in the rare earth area is discussed in paragraph 4.d of this report.

The inspector discussed the location of balances with licensee representatives. Licensee representatives indicated that it would not be feasible to locate balances in vented hoods due to the air flow in the hood and the excessive vibration due to the hood's exhaust flow.

Finding

This allegation was not substantiated in that Nuclear Safety Release/Requirement 6.1.7.28 did not require balances to be under hoods. Although laboratory procedures do not require that balances be placed in hoods, procedures do require that loose uranium powder be sampled in hoods in the rare earth area of the Spectrographic Lab. The inspector's review indicated that, based on the operations and techniques in use, there was no radiation safety hazard from using balances that were not located in vented hoods.

No violations or deviations were identified.

i. Allegation

Sample solutions are dumped down the sinks in violation of lab procedures.

Discussion

The inspector reviewed Nuclear Safety Release 6.1.7.28, June 27, 1984, which provided specific radiological and criticality control requirements for the Spectrographic Lab (rare earth area) and Nuclear Safety Release 6.1.5, May 15, 1980, which provided general radiological and criticality control requirements for the CHEMET Lab (Wet Lab). The Spectrographic Lab (rare earth area) and the Wet Lab were sections of the CHEMET Lab. Nuclear Safety Release 6.1.7.28 stated that sinks may be used for cleaning of lab utensils and glassware only, sample solutions may not be dumped in sinks in the rare earth area. Nuclear Safety Release 6.1.5 stated that uranium powder or other material containing high levels of uranium may not be dumped into CHEMET Lab sinks or drains.

The inspector questioned five CHEMET Lab workers concerning the practice of pouring solutions down the sink drains. One of the five interviewed stated that no samples were poured down the sinks but instead were placed in carboys for return to the waste processing area. The other four stated solutions were poured down the sink drains in the Wet Lab. Three of the four individuals did not specify whether solutions were concentrated or diluted. However, one individual stated that only dilute solutions were poured down the drain.

The inspector discussed the consequences of pouring uranium solution down the drain with licensee representatives. The licensee representatives indicated from a radiological control standpoint the problems

would be minimal, since Nuclear Safety Release 6.1.5 required that appropriate protective clothing be worn when working with backed up sinks, drains or with the liquid waste sump, and that the sinks drained to a controlled radioactive waste system. In discussions with licensee representatives and an NRC criticality specialist, the inspector determined that the sinks were a safe geometry and of no concern from a radiological or criticality standpoint. A licensee representative stated that a work order was being processed to install cup sinks to provide a separate sink for the disposal of all sample solutions by this means.

During unannounced visits to the lab the inspector did not observe solutions being poured down the drains.

Finding

The allegation was partially substantiated. Solutions containing residual levels of uranium are sometimes disposed of by pouring them down the drain in the Wet Lab. However, this is not prohibited by plant procedures. The licensee had two different requirements for using the sinks to dispose of uranium-bearing and other radioactive solutions. Nuclear Safety Release 6.1.7.28 specified that sample solutions may not be dumped in sinks in the rare earth area of the Spectrographic Lab. The inspector did not find any evidence which would support the contention that samples in this area were being poured into the sink. A carboy for waste was located in the rare earth area hood and contained material. Nuclear Safety Release 6.1.5 stated that uranium powder or other material containing high (emphasis added) levels of uranium or radioactive materials may not be dumped into sinks or drains. Interviews with lab workers and licensee representatives indicated that only solutions containing residual amounts of uranium were poured down the drains in the Wet Lab and that concentrated samples were poured into carboys in the lab. All the sinks in the CHEMET Lab drained to a radioactive waste processing system which was designed to be radiologically and criticality safe. Releases from the plant have been within NRC limits. The inspector found no evidence which would indicate that solutions containing other than residual level of uranium were disposed of by pouring them down the drain. Based on discussions with licensee representatives, the inspector concluded that the consequences of disposing of samples in this manner appeared to have no radiological or criticality significance. No violations or deviations were identified.

j. Allegation

New tile in liquid uranium monitor (LUM) room was placed on the floor without decontaminating the floor.

Discussion

In December 1984, the licensee identified removable radioactive contamination in the LUM room during a contamination survey performed at the request of an NRC inspector (Inspection Report 70-1113/84-15).

As a result of that survey, the licensee removed the contamination, most of which was fixed to the tile, by replacing the tile. This survey also identified contamination on table tops and equipment.

During this current inspection, the inspector had the licensee remove several pieces of tile and perform removable and fixed contamination surveys to determine the extent of contamination remaining under the new tile. Licensee representatives, in discussions with the inspector, stated that decontamination of equipment took place and that the floor had been decontaminated by removing the tile. Visible contamination had not been observed on the walls during the survey in December 1984. Consequently, contamination survey of the walls were not performed. Some contamination was observed when equipment was moved to facilitate decontamination of equipment and the floor. The walls were wiped down and repainted without contamination surveys. A licensee representative also stated that tile was generally replaced in the controlled area without performing a specific post removal survey.

Finding

The allegation was not substantiated. The results of the contamination survey performed during the current inspection indicated that the contamination below the tile was less than the contamination action point for an uncontrolled area specified in procedure Nuclear Safety Instruction 0-6.0, Contamination Measurement and Control (220 dpm/100 cm²). Neither NRC regulations, License SNM-1097, nor specific licensee procedure establish specific contamination limits for this room, only action points at which cleanup is initiated. Action taken by the licensee to decontaminate the floor by removing the tile and decontaminating the equipment when required was appropriate. Assuming the contamination levels on the wall were equivalent to the maximum level identified on the floor or equipment during the surveys in December 1984, they would not represent a significant exposure source particularly if painted over because the paint would fix the uranium in place and remove its potential to become airborne as well as attenuate the alpha radiation. Painting over low level contamination which can not be easily removed was an acceptable method of assuring that the contamination remained fixed.

No violations or deviations were identified.

k. Allegation

Chairs in the CHEMET Lab were checked by lab personnel and found to be contaminated.

Discussion

Inspection Reports 70-1113/84-15 and 70-1113/84-17 discussed weaknesses in the licensee contamination control program in the CHEMET Lab. These reports discussed the fact that the licensee's Radiation Protection personnel, although they performed the contamination surveys required by the license and procedure NSI 0-6.0, tended to always survey the

same areas. A review of contamination surveys for 1984 and discussions with licensee representative indicate that routine surveys did not include lab furniture, such as chairs and stools.

During an unannounced visit to the CHEMET Lab on January 7, the inspector requested radiation protection personnel to perform a special removable and fixed contamination survey under the direction of the inspector. As a part of that survey, thirteen chairs and stools in the lab were surveyed.

Only one chair exceeded the licensee's action level for fixed contamination of 2200 dpm. This chair had a fixed contamination level of 3000 dpm. The remaining twelve chairs had fixed contamination levels ranging between not detectable and 2000 dpm. The removable contamination levels on all the chairs and stools were less than the licensee's action level of 220 dpm/100 cm². It should also be noted that the chairs and stools in the Metallurgical Lab had no detectable fixed or removable contamination. The presence of contamination on lab chairs was evidence that spills have occurred and were not cleaned up and were identified as an additional example of failure to follow procedures discussed in Inspection Report No. 70-1113/84-15 (84-15-01).

Finding

The allegation was substantiated. Failure of the licensee to promptly clean up spills was discussed in paragraph 4.b of this report. The radiation dose to CHEMET Lab personnel from the low level fixed contamination on furniture was minimal. Nuclear Safety Release 6.1.0 required CHEMET Lab personnel to wear lab coats and gloves under specific conditions. This protective clothing was designed to minimize contamination of the worker's body or outer clothing. In addition, the licensee required personnel working in the lab to survey themselves immediately upon exiting the lab. These two provisions of the licensee's radiation protection program should minimize the possibility that individuals could become contaminated and take the contamination out of the lab. Although, as discussed in Paragraph 4.c of this report, personnel were not wearing protective clothing properly, they surveyed themselves upon exiting the lab and no contamination was found. The NRC has no specific limits for contamination in facilities such as the CHEMET Lab; neither are specific limits imposed on the licensee by license conditions, only action points. However, the licensee has elected to control the contamination levels in the lab to those used by the licensee for unrestricted areas.

1. Allegation

Potentially contaminated work shoes belonging to CHEMET Lab personnel are stored in an uncontrolled area.

Discussion

Nuclear Safety Release 6.1.0 requires that personnel monitor themselves upon exiting the controlled area of the CHEMET Lab.

The licensee, at the request of the inspector, had nine individuals (all of the evening shift and part of the day shift) who worked in the CHEMET Lab open their lockers in the uncontrolled area. No prior warning was given to the individuals selected. Radiation Protection personnel, under the direct observation of the inspector, performed a contamination survey of each individual's locker and contents. No detectable contamination was found.

Finding

The allegation was not substantiated. The inspector found no evidence that contaminated work shoes were being removed from the lab and stored in uncontrolled area.

No violations or deviations were identified.

m. Allegation

Technicians in the CHEMET Lab wash their hands in the same sink used for washing contaminated glassware and touch faucet handles after washing hands.

Discussion

Five CHEMET Lab personnel, in discussion with the inspector, stated that they often washed their hand after removal of protective gloves and prior to exiting the controlled area. They also stated they used the same sink used for washing contaminated equipment and glassware. One individual stated that he always used a paper towel to touch the faucet handle after washing his hands. The other four stated they took no special precautions.

Finding

The allegation was substantiated. However, since contamination levels in the lab were low, and an individual was required to monitor himself immediately before exiting the lab, the probability of an individual leaving the lab with contaminated hands was very low.

In discussions with the inspector, a licensee representative stated that the licensee would consider designating a sink to be used only for washing hands after the removal of rubber gloves. No violations or deviations were identified.

n. Allegation

Electric outlets are badly corroded from uranyl fumes constituting a safety and fire hazard.

Discussion

The inspector observed the condition of electric outlets in the lab and did not observe any that were corroded to the extent that they might constitute a safety hazard.

Finding

This allegation was not substantiated. Since this allegation concerned industrial safety which is not addressed in NRC regulations or license conditions, it is being referred to OSHA.

o. Allegation

Practice of dumping heated uranium pellets into open containers and allowing them to cool in uncovered containers outside a vented hood was unsafe.

Dichromate titrations were done in the open and not in a vented hood was a safety hazard.

Discussion

The allegations were originally discussed in Region II Inspection Report No. 70-1113/84-17.

During the most recent inspection, the inspector had the licensee take air samples, under the direct observation of the inspector, in the areas where the open containers for cooling pellets are located and where dichromate titrations are performed. In both instances the air sampler was positioned to be approximately 1 foot from the potential source of airborne radioactivity and in the normal air flow from the source. The samples were run during the performance of four titrations and four hydrogen determinations (including cooling of the uranium pieces). The number of titrations and hydrogen determinations were selected to insure sufficient air flow through the air sample filters such that the minimum detectable level was a small fraction of the minimum permissible concentration specified in 10 CFR 20, Appendix B, Table 1, Column 1.

Findings

The allegation was not substantiated. The sample results indicate the airborne radioactivity concentrations were less than 1% of the maximum permissible concentration specified in 10 CFR 20, Appendix B, Table 1. The air sample results confirmed the conclusion reached in Region II Inspection Report No. 70-1113/84-17 that cooling of samples removed from the hydrogen analyzer and the performance of dichromate titrations were not radiological safety hazards.

5. Transportation of Radioactive Material

10 CFR 71.5 requires each licensee who transports licensed material outside of the confines of its plant or who delivers licensed material to a carrier for transport to comply with the applicable requirements of the regulations appropriate to the mode of transport of the Department of Transportation in 49 CFR Parts 170-189.

49 CFR 172.403 requires that each package of radioactive material be labelled with RADIOACTIVE YELLOW II labels, unless excepted from labeling by 49 CFR 173.421 through 173.425, if the radiation level at the package surface is greater than 0.5 mrem/hour and less than 50 mrem/hour.

On January 7, 1985, Region II received notification from Region V that an inspection of an export shipment of uranium powder from GE Wilmington to Japan Nuclear Fuel Company, had revealed twelve drums that were improperly labeled. Surveys by the Region V Inspector indicated that the surface dose rates on the twelve drums ranged from 0.8 mR/hr to 1.2 mR/hr. For the purpose of comparing the measured radiation levels with the limit, 1 mR/hr equals 1 mrem/hour. When GE Wilmington received notice of the improperly labeled drums, they contacted GE's facility in Vallecitos, CA. and had them perform another survey using the same type of instrument used for GE Wilmington's survey. This survey also indicated the twelve drums had surface dose rates of 0.8 mR/hr to 1.2 mR/hr.

The inspector reviewed the shipping papers and other licensee documents pertaining to the shipments of powder and discussed the shipment with licensee representatives. The licensee's surveys indicated that the highest radiation level on contact with each drum was 0.5 mR/hr. The inspector found no evidence that data recorded by GE Wilmington was incorrectly recorded or falsified.

The inspector reviewed the calibration records for the survey instrument used to perform the shipping survey (RO-3) and determined that the instruments had been calibrated. The type of instrument used for the survey was an ion chamber instrument, which was the appropriate type of instrument for this survey. The inspector also discussed survey techniques with licensee technicians.

The inspector found no explanation for the low readings recorded by GE Wilmington. However, the inspector stated that the readings on the drums measured by the NRC Inspector and confirmed by GE Vallecitos were considered correct.

The failure to label the twelve drums with RADIOACTIVE YELLOW II labels was identified as a violation of 49 CFR 172.403 and thus a violation of 10 CFR 71.5 (85-02-03). The exceptions of 49 CFR 173.421 through 173.425 did not apply.

6. Other Areas Inspected

- a. 10 CFR 19.12 requires all individuals working in or frequenting any portion of a restricted area to be instructed in a number of radiation

safety topics, including their responsibility to report promptly to the licensee any condition which may lead to or cause a violation of Commission regulations and licenses or unnecessary exposure to radiation or to radioactive material and to be advised as to the radiation exposure reports which workers may request pursuant to 10 CFR 19.13.

On January 9, 1985, the inspector attended an initial controlled area worker training class. Although the presentation was well organized, factual and included most of the information required by 10 CFR 19.12, the instructor failed to inform the workers of their responsibility to report promptly to the licensee any condition that may lead to or cause a violation of Commission regulations and license or unnecessary exposure, and to advise the workers as to the radiation exposure reports they may request pursuant to 10 CFR 19.13.

In reviewing the lesson plan for the course the inspector noted that the two missing elements were included in the lesson plan, however the instructor had overlooked them.

The failure to instruct the workers attending the controlled area worker training class on January 9, 1985, in all the required subjects specified in 10 CFR 19.12 was identified as a violation of 10 CFR 19.12 (85-02-04).

- b. Nuclear Safety Release 6.1.0 required that the CHEMET Lab radioactive waste be disposed of in containers that are labelled with a "radioactive material" or a "contaminated waste" label.

During tours of the CHEMET Lab on January 7-10, 1985, the inspector noted that containers for collecting radioactive waste in the CHEMET Lab were not labeled. The failure to label radioactive waste containers as required by NSR 6.1.0 was identified as another example of failure to follow procedure and a violation of License Condition 9 (85-02-01).

- c. 10 CFR 19.11(d) requires that documents, notices or forms posted pursuant to this section appear in sufficient number of places to permit individuals engaged in licensed activities to observe them on the way to or from any particular licensed activity location to which the document applies.

The inspector reviewed the following audits performed by the licensee's Licensing and Nuclear Material Management group.

84-07, 10 CFR 19 Requirements, April 30 - May 6, 1984

84-04, Bioassay, March 19 - 23, 1984

During this review, the inspector noted that the licensee had identified in audit 84-07 that the south gate entrance to the restricted area was not posted with the documents, notice or forms required by 10 CFR 19.11(d). On January 10, 1985 the inspector observed that the required documents, notices and forms still had not been posted. This gate was actively being used by contractors and visitors to the restricted area.

The failure to post the required documents, notices and forms at the south gate to the restricted area was identified as a violation of 10 CFR 19.11(d)(85-02-02).