U. S. NUCLEAR REGULATORY COMMISSION

REGION III

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License No:	SUB-526
Report No:	040-03392/97001(DNMS)
Licensee:	AlliedSignal, Inc.
Facility:	Metropolis Works
Location:	P.O. Box 430 Metropolis, IL 62960
Dates:	January 6-10, 1997
Inspectors:	Courtney Blanchard, Fuel Facility Inspector Robert Krsek, Fuel Facility Inspector Timothy Reidinger, Senior Fuel Facility Inspector
Approved by:	G. Shear, Chief, Fuel Cycle Branch Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

AlliedSignal, Inc., Metropolis Works
NRC Inspection Report 040-03392/97001(DNMS)

This inspection involved review and observation of selected aspects of licensee operations, fire protection, maintenance and surveillance, radiation protection, training, transportation, and radioactive waste management.

Operations Review (IP 88020)

- Operations were generally conducted in accordance with the applicable procedure for the specific task being performed. Operators demonstrated a clear knowledge of the hazards associated with the tasks being conducted. Lockout/tagout procedures were adequate.

- The "Standby Power Action Procedure" used during the December 3, 1996 loss of power event was generally out of date and marginally conformed to the current approved procedure. Although plant staff were very knowledgeable on all the actions required for a loss of power incident, they appeared to rely primarily upon on-the-job training or experience for the performance of work, as the location for the current procedure issued for plant use was not known.

- Safety controls appeared to be adequate in preventing overfill of cylinders. The licensee's review of License Conditions concerning independent process safety control methods was identified as an Inspection Followup Item (IFI).

- No root cause was identified in the cylinder movement or storage practices at the licensee's facility, which caused the cylinder rotations occurring at the Paducah Gaseous Diffusion Plant.

Fire Protection (IP 88055)

- The issue of smoking in certain areas of the plant was forwarded to the Occupational Safety and Health Administration (OSHA) and identified as an Unresolved Item (URI).

Maintenance and Surveillance Activities (IP 88025)

- The preventive maintenance program conformed with the requirements specified in the license.

Radiation Protection (IP 83822)

- The As Low As Reasonably Achievable (ALARA) program identified a trend of increased liquid and gaseous uranium effluent, due to an expanded number of process leaks. Management acted to identify and track repair of these leaks, and a corresponding reduction in liquid and gaseous effluent levels was noted.

- The licensee is adequately implementing a respiratory protection program. Plant employees appeared to be well trained and cognizant of respiratory protection requirements.

Training (IP 88010)

- The training program appears effective, plant employees were knowledgeable and adequately qualified to perform their assigned tasks.

Transportation (IP 86740)

- The licensee was effectively implementing its radioactive materials transportation program.

Radioactive Waste Management (IP 88035)

- General improvements and consistency in the licensee's overall program for managing radioactive solid wastes continue to be noted.

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

P. Gasperini, Customer-Linked Manufacturing Manager (CLMM)
*M. Kosmider, Plant Manager
H. Roberts, Supervisor, Safety and Health Physics
M. Shephard, Regulatory Affairs Manager
S. Stewart-Powers, Supervisor of Health Physics Technicians

*Senior licensee official at the exit meeting on January 10, 1997. Other licensee personnel were contacted as part of the reactive inspection.

NRC Personnel

C. Blanchard, Fuel Facility Inspector, Region III
J. Jacobson, Resident Inspector, Paducah Resident Inspector Office
R. Krsek, Fuel Facility Inspector, Region III
T. Reidinger, Senior Fuel Facility Inspector, Region III
G. Shear, Chief, Fuel Cycle Branch, Region III

Report Details

1.0 Operations Review (88020)

1.1 Facility Tours and System Walkdowns

a. Inspection Scope

The inspectors observed operations in the Feed Materials Building (FMB), on all three shifts, and in the following areas: ore sampling facility, drum and waste storage yards, ore preparation facility, fluorine production facility, potassium hydroxide (KOH) muds storage building, bed/filter fines and waste reprocessing building, maintenance building, calcium fluoride recovery facility and the uranium recovery facility. In particular, the inspectors observed the following activities:

- cylinder disconnect, weighing, and storage
- cooled cylinder movement in the cylinder yard
- lockout/tagout operations for confined space entry

The inspectors also compared observations of activities in progress during facility tours with selected written procedures from the Distillation Manual.

b. Observations and Findings

Filled cylinders are placed on a buggy prior to being towed to the cooling pads, by a forklift truck, for the appropriate cooling period. Inspectors observed yard operators move a cylinder buggy, which contained a cooled cylinder, a short distance with the straddle carrier on the cylinder cooling pad. Although not prohibited by procedure, the inspectors questioned whether utilization of the straddle carrier was appropriate for moving the cylinder buggy. The licensee explained that the purpose was to gain better access to the cylinder with the straddle carrier lifting arms prior to lifting the cylinder, rather then using a forklift truck to reposition the buggy. The practice of moving a cylinder buggy with the straddle carrier lifting arms will be reviewed by the plant staff.

The inspectors observed several operations in the cylinder fill area; several cylinder pigtail connects and disconnects, movement and weighing of full liquid uranium hexafluoride (UF_6) cylinders, the movement and taring of empty cylinders, and the re-heating of a liquid cylinder containing unsatisfactory product. These operations were conducted in accordance with applicable procedures for the specific work activities. Operators demonstrated a clear knowledge of the hazards associated with the tasks being conducted in this area and highlighted that, in their opinion, the training provided by the licensee was effective.

During tours of the FMB Distillation control room area, the inspectors walked down with the operators the control room panel indicators, annunciators and alarms. The operators also explained logbook entries.

Operators appeared knowledgeable of their responsibilities and were cognizant of the locations of controlled copies of procedures, for routine and special operations.

The inspectors reviewed a work package and observed lockout/tagout operations for a confined space entry into a fluorinator. Work planning, hazards analysis, and barrier analysis was adequately performed for the work packages. However, during the independent verification of the isolation tags, the Site Safety Supervisor (SSS) and Customer-Linked Manufacturing Supervisor (CLMM) found that the work packages failed to administratively include all appropriate tags. The SSS and CLMM re-reviewed the work packages and all the tags to verify that every tag was installed properly and provided proper isolation. No further discrepancies were identified by the SSS and CLMM during the review. All tags were hung properly by the plant operators and all systems were properly isolated.

c. Conclusions

Operations were conducted in accordance with the applicable procedure for the specific task being performed. Operators demonstrated a clear knowledge of the hazards associated with the tasks being conducted. The licensee agreed to review the practice of buggy movement with the straddle carrier. The lockout/tagout program and procedures were adequate, and administrative controls functioned properly.

1.2 Process Safety Controls-Liquid UF_6 Cylinders

a. Inspection Scope

The inspectors reviewed the license, procedures and process safety controls used in filling and handling liquid UF_6 cylinders, to ensure that the controls provide a high degree of reliability for the prevention of an inadvertent overfill and cool-down of a product cylinder. The inspectors also interviewed electricians, engineers and operators, and reviewed process and instrumentation diagrams.

b. Observations and Findings

The inspectors determined that there are several systems for the measurement of material in UF_6 product cylinders when the cylinders are connected to the fill station, and two systems for the measurement of UF_6 when a cylinder is disconnected from the fill station. One method utilized for measurement of material in UF_6 product cylinders was a flow totalizer which measured the amount of material flowing through the system per unit time (i.e., pounds per hour (lbs/hr). The second system was load cell "A", sensors placed under the UF_6 cylinder, which measures

the actual weight of the UF_6 cylinder. The third system, load cell "B" utilizes a parallel set of sensors equivalent to load cell "A". Both load cell systems, "A" and "B" are energized by independent power supplies.

The flow totalizer and load cell "A" constitute part of an automatic warning and shutdown system in the control room. Discussions with the licensee indicated that the flow totalizer, used for one of the independent methods to check cylinder fill level, was unreliable in the sense that it needed periodic adjustments by the process engineer during daily cylinder fill operations; i.e., if the flow totalizer value differed from the load cell value by 300 pounds (lbs), a process engineer would manually adjust the flow totalizer value by 300 lbs, to match the load cell value. Consequently, if the flow totalizer value was greater than the load cell value, the process engineer would also lower the target weight of the cylinder by 300 lbs and conversely, if the flow totalizer value was less than the load cell value, the target weight of the cylinder would remain the same. After adjustment, the licensee stated that the flow totalizers were reliable for process flow measurements during fill operations. The inspectors agreed that the flow totalizers were adequate for fill operations after adjustment by the process engineer.

In response to anomalies between the flow totalizer and load cell, the licensee has been actively troubleshooting an alternative flow totalizer system and has installed a different type of flow totalizer (micromotion meter) to determine if it would be a more reliable type of flow totalizer. The licensee indicated that the micromotion meter was installed as another alternative for cylinder overfill protection and anticipated preliminary acceptance testing in the near future.

When a cylinder is disconnected from the fill manifold, it is lifted from its position by a crane which has a portable scale mounted to it and before the cylinder leaves the FMB for the cylinder storage yard, it is placed on a floor scale. The multiple types of equipment used to determine cylinder weight constitute a backup to the process instrumentation for cylinder weights.

Part I, License Conditions, Section 1.5.1.1, requires, in part, that cylinder filling operations are not conducted unless at least two independent methods exist for determining the amount of UF_6 filled into the cylinder. The inspectors noted and discussed with the licensee that the corresponding text in the License Conditions which define what methods are independent is unclear. At the exit meeting the licensee agreed to review the License Conditions to determine if a clarification or amendment is needed, in lieu of current conditions associated with the process safety controls. This issue was identified as an Inspection Follow up Item (IFI 040-03392/97001-01).

c. Conclusions

Safety controls appeared to be adequate in preventing overfill of cylinders. The licensee's review of License Conditions concerning independent process safety control methods was identified as an IFI.

1.3 Review of December 3, 1996 Power Outage

a. Inspection Scope

The inspectors reviewed the three minute power outage that occurred on December 3, 1996, which resulted in a uranium "dusting" of the FMB. The inspectors also reviewed bioassay results of the FMB employees exposed to the dusting.

b. Observations and Findings

On December 3, 1996, the plant experienced a complete loss of electrical power for approximately three minutes, when local grid power was lost. The loss of power caused the dust collectors in the FMB to lose vacuum and resulted in the release of natural uranium ore, "green salt" and spar dust into the FMB. This caused dusting around spar equipment from the fifth floor to the basement of the FMB.

The licensee conducted an investigation of the incident and found that spar dust, i.e., calcium fluoride, uranium tetrafluoride (UF_4) along with trace amounts of UF_6 and hydrogen fluoride (HF) were released. No uranyl fluoride (UO_2F_2) was detected.

In response to the "dust out", 19 employees submitted post-shift urine samples for analysis. Of these 19 employees, 13 were required to submit confirmatory samples because the results were above the plant action level of 15 micrograms per liter. Consequently, these employees continued to submit urine samples until results showed concentrations below the plant action level. 10 CFR 20.1201(e) requires, in part, that licensees' limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity. All urine samples taken indicated a soluble uranium uptake well below 1 milligram (mg). Dose calculations performed indicated that two employees' received exposures of approximately 200 and 100 millirem (mrem).

The licensee performed dose calculations which represented the uranium solubility as class Y. Class Y solubility indicates that the chemical form of an isotope, has a biological clearance rate (T_b) of greater than 100 days. The inspectors concurred that the use of this method was conservative in determining the dose to the workers.

c. Conclusions

No workers received occupational doses in excess of 10 CFR 20.1201 limits. The licensees' methods for determining the doses to workers was conservative.

1.4 Power Outage-Standby Power Action Plan Procedure

a. Inspection Scope

The inspectors conducted a walkdown with various plant staff of the emergency diesel generator "Standby Power Action Plan Procedure" that was used during the December 3, 1996 power outage.

b. Observations and Findings

The inspectors toured the power house to inspect the emergency diesel generator and to walk down the "Standby Power Action Plan Procedure" with the power house control room operator. The inspectors noted that the emergency diesel generator start switch was positioned correctly for an automatic start. Plant staff indicated that the plant emergency diesel generator automatically started when the local power grid was lost. The inspectors noted that the "Standby Power Action Plan Procedure" used by the power house control room operator was dated 1987 and was not approved for current use.

The inspectors also walked down the "Standby Power Action Plan Procedure" with the duty electrician in the main switch house. The inspectors noted that the procedure used was also not current. Although the actions performed by the power house control room operator and the electrician generally corresponded with the actions specified in the current procedure, the inspectors were concerned that they were not aware of the most current version of the procedure applicable to the task.

In addition, the inspectors interviewed the FMB control room foreman on actions required by the FMB control room operators as specified in the "Standby Power Action Plan Procedure". Although, the foreman was very knowledgeable on all the actions required for a loss of power pertaining to the FMB, he indicated that the control room did not have any copy of the procedure, but that he knew what actions were required based on his experience. The inspectors were concerned that the foreman was unaware that the approved procedure was located in the Emergency Response Procedure Manual, which was located in the FMB control room office. The foreman's inability to locate the current procedure indicated that he relied primarily upon on-the-job training or experience for the performance of work.

c. Conclusions

Plant staff are very knowledgeable on all the actions required for a loss of power event but appeared to rely primarily upon on-the-job training or experience for the performance of work as the procedures available for use were generally out of date.

1.5 Cylinder Rotation at the Paducah Gaseous Diffusion Plant

a. Inspection Scope

The inspectors reviewed the licensee's investigation report regarding the rotation of an Allied Signal cylinder in an autoclave at the Paducah Gaseous Diffusion Plant (PGDP) on December 20. 1996. In addition, the inspectors interviewed the operators on shift for that cylinder fill operation.

b. Observations and Findings

Allied Signal received a call on December 20, 1996, from PGDP concerning Allied Signal cylinder AC-944. PGDP staff reported that while in an autoclave, cylinder AC-944 rotated 60 degrees counterclockwise along the horizontal axis, so that the cylinder valve was located in the 10 o'clock position. During normal operations the cylinder valve is located in the 12 o'clock position.

The licensee's investigation found that all cylinders located in the storage yard area generally had rotated clockwise between 0 and 3 degrees. All cylinders located in the cooling area generally had rotated clockwise between 0 and 5 degrees. Also, operators in the FMB and in the yard area had previously seen cylinder rotations, but only to a small extent with a maximum cylinder rotation of 10 degrees.

The licensee concluded that no cause could be found regarding cylinder rotation at PGDP.

The inspectors walked down the storage yard and cylinder fill stations to look at cylinder orientations, and interviewed operators that were on duty when cylinder AC-944 was filled. They indicated that it was a routine fill operation and no problems could be recalled. The inspector's observations of cylinder orientations and observations of several cylinder lift operations with the crane indicated that the licensee was following appropriate procedures.

c. Conclusions

The inspectors concluded that no determination could be made regarding the cylinder rotation event at PGDP.

2.0 Housekeeping/Fire Protection (88055)

a. Inspection Scope

The inspectors surveyed the plant to inspect areas where the potential for fires or explosions could result from the lighting and smoking of cigarettes in areas where flammable chemicals are utilized onsite.

b. Observations and Findings

During facility tours, the inspectors observed housekeeping practices and noted that attention to housekeeping throughout areas of the facility varied. In particular, inspectors identified that some 55-gallon drums of ore concentrates in the ore concentrates storage yard were stacked four high and could pose a potential fall hazard. In general, drums throughout the yard were only stacked three high. The SSS indicated that he would review the practice of stacking drums four high.

In addition, during tours of the FMB and fluorine production plant, inspectors noted that cigarette butts littered the floors, and operators casually smoked cigarettes during normal work operations. When asked about this practice, the licensee stated that the NRC license does not prohibit smoking in restricted areas, and that smoking was prohibited only in a limited number of onsite areas. These areas included the liquid propane gas tanks, and the paint spraying operations. The inspectors further inquired about the prohibition of smoking around two specific operations; the ammonia dissociators and electrolytic cells.

The licensee uses ammonia dissociators to 'crack' ammonia creating gas mixtures of approximately 75% hydrogen and 25% nitrogen, which is piped to various operations throughout the FMB. The electrolytic cells in the Fluorine plant take in HF and create fluorine, the product gas and hydrogen, a waste gas. Cigarette butts were observed in both of these process areas.

Inspectors also observed cigarette butts in areas where the smell of ammonia was typically present; near ammonia piping systems, and the ammonia tank car station. The Allied Signal Metropolis Works Employee Safety handbook, page 137, stated, that "No smoking is permitted in the presence of ammonia vapors."

The licensee indicated that no known incidents have occurred in the history of the plant as a result of smoking onsite. The licensee was informed that "Under a Memorandum of Understanding (MOU) with the Department of Labor, Occupational Safety and Health Administration (OSHA)," the NRC will forward the identified safety concern to the appropriate OSHA regional office. This issue will be tracked as an Unresolved Item (URI 040-03392/97001-02).

c. Conclusions

The NRC will forward the issue of smoking in certain areas of the plant to the appropriate OSHA regional office, and the issue will be tracked as an URI.

3.0 Maintenance and Surveillance Testing (88025)

3.1 Maintenance Procedures

a. Inspection Scope

The inspectors reviewed portions of the scheduled maintenance and surveillance activities for the crane used in the FMB. Inspectors also interviewed various maintenance personnel.

b. Observations and Findings

Inspection Report No. 040-03392/96005 Section 2 a, Maintenance Procedures, stated that the maintenance procedure used for the periodic inspection of the UF_6 handling crane in the distillation plant was last revised February 3, 1972.

Discussions with the maintenance personnel indicated that they considered the procedure as adequate. Maintenance personnel stated that although the crane had recently been upgraded, all the systems on the crane remained the same, with the exception of the remote control unit that is being used. In addition, maintenance staff indicated that all the old controls referenced in the 1972 procedure were still in operation and are still checked weekly. Personnel also indicated that if there was a problem with procedures, a change would be initiated accordingly. The licensee's "Procedure Control Policy", does not specify any periodic review frequency for maintenance/surveillance procedures unless a problem occurred or a specific change to equipment was identified.

c. Conclusions

Surveillance procedures for the crane appeared to be adequate.

4.0 Radiation Protection Program (83822)

4.1 Personnel Exposure Results

a. Inspection Scope

The inspectors reviewed the licensee's external exposure results for the period from October through November 1996 to determine if exposures were in compliance with 10 CFR 20 limits.

b. Observations and Findings

The inspectors reviewed documentation and discussed with the licensee the personnel exposures for October and November 1996. Selected thermoluminescent dosimeter (TLD) results that were above licensee action levels were investigated and dispositioned appropriately. HP staff conducted a complete investigation of approximately 5 individuals, which included reviews of all the expected individuals' normal exposure results. The inspectors found the licensee's investigation and dose calculations to be adequate.

c. Conclusions

Based on the records review and interviews, the licensee's exposure control program was adequate for evaluating and monitoring personnel exposures. All exposures were within regulatory limits.

4.2 Contamination Monitoring

a. Inspection Scope

The inspectors observed visitors and contractors performing self-monitoring for contamination prior to leaving the Restricted Area. In addition, the inspectors conducted a contamination survey of the visitor's lobby.

b. Observations and Findings

Radiological survey instrumentation for exiting the plant restricted area is located by the employee exits and also by the security guard post, where visitors exit. Selected survey instrumentation used for exit monitoring satisfied the required calibration frequency. Observations of employee practices for performing self-monitoring indicated that radiological training appeared adequate in the use of radiation detection equipment. Interviews with several employees at the exit stations indicated that they were familiar with the appropriate actions and procedure to contact Health Physics (HP) in a contamination event.

The inspectors conducted a contamination survey of the visitor's lobby utilizing the licensee's calibrated instrument, a Ludlum model 3 meter with an Eberline HP260 pancake probe. Survey results showed that radiation levels were below the License Condition limit of 5000 disintegrations per minute per 100 square centimeters ($dpm/100cm^2$). HP records indicated no contamination above license limits in this area for the past calendar year.

Security personnel were observed to conduct a thorough radiological survey of vehicles leaving the restricted area. The inspectors interviewed selected security staff and found that they were knowledgeable in the use of radiation detection equipment and the

appropriate procedure to follow in the event of either a personnel or vehicle contamination. In addition, the security personnel were knowledgeable in ensuring that proper exit monitoring was conducted by visitors. (see Section 5.0)

c. Conclusions

Employee and security personnel demonstrated adequate knowledge of contamination monitoring, radiation detection equipment and the appropriate procedure to follow in the event of either a personnel or vehicle contamination.

4.3 As Low As Reasonably Achievable (ALARA) Program

a. Inspection Scope

The inspectors reviewed the "Facility Effluent Reports" for 1994, 1995, and 1996. In addition, the ALARA program was discussed with the SSS, HP supervisor and HP staff.

b. Observations and Findings

The inspectors compared the ALARA liquid and gaseous uranium effluent data and the amount of lost uranium bearing process material from the conversion process from 1994 to June 1996. The inspectors determined that the ALARA results indicated a general increase for the first six months of 1996 when compared to 1994 or 1995 data. The licensee explained that in the last quarter of 1995, a second fluorination line was started to increase UF_6 production. As a result, the inspectors determined that for the first six months of 1996, liquid effluents increased by 45%, gaseous effluents increased by 40% and the quantity of lost uranium bearing material increased by 75% when compared to an average of 1995 results. Effluent release, however, remained below 10 CFR Part 20 limits.

In response to these elevated trends an "ALARA Leak List" was developed by the licensee which identified equipment that was leaking uranium bearing material from the conversion process and the repair status for each of these leaks. The December 6, 1996, "ALARA Leak List" identified more than 30 leak/problem areas of which 80% had been identified as fixed. The inspectors observed three leak sources which were identified as repaired and one leak source which still required repair. The three identified repaired leak sources showed no indications of material leakage and the leak source identified as needing repair was being fixed at the time of the inspection.

Preliminary ALARA data for the second half of 1996 indicated that the ALARA equipment improvement program for reducing uranium leakage appeared to reduce liquid and gaseous effluents and the quantity of lost uranium bearing material from the UF_6 process.

Discussions with plant staff indicated that the licensee appeared to have a proactive approach to developing methodologies for improving seals, gaskets, and rubber bellows in order to provide greater reliability and longer service to prevent material leakage. In addition to finding better materials, the maintenance staff has been trending equipment failure data to determine appropriate maintenance schedules. Perspectives from two control room operators interviewed indicated that "there are fewer equipment leaks since the institution of the ALARA Leak List."

c. Conclusions

Implementation of the "ALARA Leak List" appeared to have successfully reduced the quantity of liquid and gaseous uranium effluents and the quantity of lost uranium bearing material.

4.4 Respiratory Protection Program

a. Inspection Scope

The inspectors reviewed the respiratory fit testing program and toured the licensee's laundry facility where respirators are sanitized and repaired.

b. Observations and Findings

An NRC inspector was adequately fit tested for a respirator after respiratory protection training was conducted by the licensee. The licensee appropriately required the medical determination that approved the use of respiratory protection. The training effectively addressed all the relevant NRC regulatory requirements and OSHA issues concerning respirator use. The inspectors also noted that the licensee had adopted a respiratory fit factor which was ten times more conservative than that required by the NRC. The licensee kept track of employees' respiratory certification via a computer database, which offers easy and timely access to these records. The instructor was very knowledgeable on proper respirator use and hygiene, and addressed any questions regarding respiratory protection and the plant policies.

Facility tours showed that operator training appeared effective. Selected employees observed wearing respirators were utilizing them appropriately. Interviews with operators regarding respiratory protection indicated that they were cognizant of issues related to the proper use of respiratory protection. Inspectors were also given a tour of the respirator wash and inspection facility. There appeared to be a large inventory of spare parts for the repair and maintenance of respiratory protection equipment for plant staff.

c. Conclusions

The licensee is adequately implementing a respiratory protection program. Licensee employees appeared to be well trained and cognizant of respiratory protection requirements.

5.0 Operator Training (IP 88010)

a. Inspection Scope

The inspectors interviewed new personnel, process operators, radiation protection staff, and security personnel to determine the effectiveness of the licensee's training program. In addition, the inspectors reviewed selected instructor lesson plans, class handouts, and slides for training conducted in March, April, and July of 1996.

b. Observations and Findings

Once a month, all employees attend the Safety Committee "B" meeting, a mandatory training course. Training topics were selected from employee recommendations or selected from subjects discussed during the monthly Safety Committee "A" management meeting. In addition to employee training and qualification on operating procedures, formal monthly safety/training meetings covered various aspects of radiological safety, non-radioactive hazardous materials safety, radioactive waste and transportation requirements, emergency response, and industrial safety. Training efforts and methods appeared to be generally effective in teaching employees relevant safety and regulatory requirements. Additional safety meetings are also conducted monthly for HP personnel and weekly for maintenance personnel. These job-specific sessions teach specific employees appropriate regulatory requirements and safety related job functions.

Observations and interviews with security guards indicated that the HP program for training security personnel on contamination surveys was effective. This was demonstrated on several occasions. Inspectors observed security personnel stop an offsite food delivery person from exiting the plant restricted area. The individual was observed performing an inadequate radiological exit survey, and was instructed to re-survey three times by security guards before being allowed entry into the unrestricted area. The security guards provided verbal guidance from the HP decontamination procedure to the food delivery person to ensure proper self monitoring was performed.

c. Conclusions

Plant staff appeared knowledgeable and adequately qualified to perform their assigned tasks. Overall, the training program appeared effective.

6.0 Transportation of Radioactive Materials (86740)

a. Inspection Scope

The inspector observed the shipment of radioactive material packages, toured selected radioactive waste maintenance areas, and reviewed records of several selected domestic and overseas shipments for the past several months. Waste shipping activities were also reviewed and discussed with persons who perform internal audits.

b. Observations and Findings

The inspectors reviewed the licensee's transportation survey program which was the responsibility of the HP department. The inspectors noted that the licensee had written procedures for receiving and shipping packages containing radioactive materials and performing surveys for exposure rates and removable contamination. A review of survey records for the last quarter of 1996 for packages shipped and received documented that removable contamination on cylinders and overpacks was below the limits of 49 CFR 173.443. Dose rates for cylinders, overpacks, and vehicles were below the limits of Department of Transportation regulations as well.

In addition to routine shipments of UF_6 cylinders, the licensee made several shipments of crushed drums containing bed materials and filter fines to the Quivira Mining Company in Grants, New Mexico during 1996. The crushed drums were packaged with a plywood top and bottom, and then shrink-wrapped. The inspectors reviewed the shipping papers for these shipments. Inspectors also observed a shipment of crushed drums. The licensee shipped the crushed drums as surface contaminated objects (SCO) with an appropriate stencil and placard. The packages were appropriately braced on the truck, and the truck was properly placarded. The licensee performed the contamination and dose rate surveys required to satisfy Department of Transportation (DOT) regulations.

c. Conclusions

The licensee was effectively implementing its radioactive materials transportation program. The licensee's records for shipping activities were well organized and orderly. The licensee performed receipt surveys pursuant to 10 CFR 20.1906, and regulatory requirements of 10 CFR Part 71 and 49 CFR Parts 171 through 189 were being met.

7.0 Radioactive Waste Management (88035)

a. Inspection Scope

Through tours and interviews with plant staff, inspectors observed the licensee's radioactive waste management program for solid wastes. This included a review of waste storage, segregation and characterization, and waste processing operations.

b. Observations and Findings

Previous inspection reports; 040-3392/96001 and 040-03392/95-201, identified an inspection follow-up item, which stated, in part, that numerous corroded and leaking drums of contaminated Bed Materials, Filter Fines and KOH muds are being repackaged and reprocessed for shipment to either a mill for uranium recovery or to the Quivira Mining Company mill tailing retention pond for disposal. Subsequent inspection reports have tracked this issue and noted progress not only in the reduction of waste, but also in the licensee's program for managing these wastes.

At the time of the inspection, the licensee had made continued progress in the reprocessing and disposal of bed materials and filter fines, which are being sent to the Quivira Mining Company for disposal. Waste of this sort, continues to be segregated near the point of generation in the plant, a program initiated by the licensee in the first half of 1996. The plant currently operates one day shift in this area

The mill, which is accepting the KOH muds for uranium recovery, has received an amendment to its license from the NRC to receive this waste. Transportation requirements concerning this material have been determined, and the licensee planned to begin shipping the KOH muds in the first half of 1997. This issue will continue to be tracked in future inspections under IFI 40-3392/96001-01.

c. Conclusions

General improvements and consistency in the licensee's overall program for managing radioactive solid wastes continues to be noted. Inspection Followup Item 40-3392/96001-01 will remain open.

8.0 Inspection Follow-Up System (IFS) Issues (92702)

8.1 Closed) IFI 40-3392/91003-02 and IFI 40-3392/92002-05: Review emergency rescue procedures and determine how best to effect the stretcher-bearers descent down the flights of stairs in the FMB.

The SSS indicated that in 1992, along with the new stretcher design, a number of areas were modified in the stairwells. This included modification of stair handrails and in some cases a widening of the stair landing. The SSS indicated that in 1996 a new industrial grade nylon basket stretcher was purchased. This new stretcher allows fire brigade members even more maneuverability and flexibility down the flights of stairs. The November 1996 fire brigade members' annual 24-hour emergency response training exercise tested the new stretcher. The SSS indicated that the brigade members were pleased with the new stretchers performance, and that a program was underway to purchase more of these stretchers.

The inspectors determined that effective corrective actions were implemented. It was also noted that problems and concerns have not been identified by brigade personnel concerning this issue in neither the 1995 nor 1996 Emergency Preparedness Drills.

8.2 (Closed) IFI 40-3392/91003-05 and IFI 40-339292002-06: Documentation of safety analysis of higher chemical hazard systems including the potential for mishap by considering likely failures of safety systems or important operator actions.

The licensee's response dated November 13, 1991, indicated that it's current hazard assessment was not done in a manner consistent with recognized industry standards.

Process engineers at the facility indicated that the Process Hazard Analyses (PHA), required by 29 CFR 1910.119, documented safety analyses covering the issues addressed in this IFI. Under 29 CFR 1910.119 'Process Safety Management of Highly Hazardous Chemicals', OSHA requires that facilities which utilize certain chemicals in certain quantities, perform a PHA on the chemical processes. It should be noted that although there are only a few areas in the plant covered by this regulation, the licensee has taken a safety conscious approach and performed PHA's for all areas in the plant which contained Highly Hazardous Chemicals, whether or not these areas are required by the OSHA rule.

The inspectors reviewed selected parts of the PHA's and found that the concerns addressed in the IFI are adequately covered in the PHA's.

8.3 (Closed) IFI 40-3392/94003-07: Contamination was reaching outside the restricted area, specifically on a rug near the guards station and also near the employees' exit.

The inspectors verified that these rugs are surveyed at the frequency specified in the HP manual, and that the licensee has been surveying these rugs at the appropriate frequencies. Also, a health physicist noted that these rugs are washed on a regular frequency.

8.4 (Open) IFI 40-3392/96003-01: The licensee's Distillation and Cylinder wash manual procedures had not been revised to incorporate standard practices which had been in place for three to four years. The rigor of the licensee's program for accomplishing reviews will be tracked.

The licensee revised sections 2.4.1 of the Distillation manual and 3.0.D of the Cylinder Wash manual. Both corrections were verified in the manuals by the inspectors. At the exit meeting, the inspectors were informed that a committee was tasked with reviewing all plant manuals and procedures for accuracy and adequacy. This committee is scheduled to have the review and updates completed by the end of February 1997. Consequently, future progress on the generic issue of procedures review and writing will continue to be tracked under this open IFI.

8.5 (Closed) VIO 40-3392/96004-01: Failure to provide NRC notification of an alert within one hour. The root cause was determined to be that the release occurred at a time of day when the Radiological Contingency Plan (RCP) key Officers were driving home from work, and thus could not be contacted on the initial phone call required by the Radiological Contingency Plan.

The licensee purchased two pagers, which two key RCP Officers will carry with them when not at work or at home. Instructions for contacting these people through the pagers have been included in the "Contingency Call List" in Appendix B of the RCP. Refresher training was conducted for all RCP Officers, with offsite notification requirements being emphasized in the training. Inspectors verified that Appendix B of the RCP was amended and that the two pagers were purchased for use. A review of the training records indicated that the three key RCP officers attended the training and the training slides verified emphasis on offsite notification requirements.

8.6 (OPEN) VIO 40-3392/96004-02: Failure to provide adequate structure and detail to the instructions for flushing the vaporizer resulted in an UF_6 release to the basement of the FMB. The root cause of the event was identified as a failure to ensure that the pressure in the nitrogen header was greater than the UF_6 pressure in the vaporizer.

The following corrective actions were developed to preclude a similar event: relocating the note in the flush procedure to align it with the action step; adding a minimum nitrogen pressure to the procedure which must be met before the purge is performed; installation of an alarm indicating low pressure in the distillation nitrogen header; and a review of a similar procedure for the high boiler pot.

The corrective actions were verified by the inspectors with the exception of the installation of an alarm indicating low pressure in the distillation nitrogen pressure. The licensee has purchased the equipment to perform this corrective action and action is pending for its installation. This will remain open until inspectors verify the completion and operation of the low pressure nitrogen alarm.

8.7 (Closed) IFI 040-03342/96006-01: Bioassay results from exposed plant employees that occurred as a result of a "dustout" in the FMB.

The licensee's submitted bioassay results that indicated that two employees received exposures of 200 mrem and 100 mrem. The results were below occupational doses of 10 CFR 20.1201.

8.8 (Closed) IFI 040-03342/96006-02: The licensee's investigation to determine whether the emergency diesel generator automatically started during the loss of power event that occurred on December 3, 1996.

The licensee indicated that the emergency diesel generator started automatically as required on the loss of power event on December 3, 1996. This is a correction to Inspection Report 96006 which stated that the emergency diesel generator failed to automatically start. The preliminary diesel generator information originally given to the NRC was supplied in error.

9.0 Management Meeting

The inspectors presented the inspection results to members of licensee management and others at the conclusion of the inspection on October 25, 1996. The inspector summarized the scope and findings of the inspection. The licensee acknowledged the findings presented.

The licensee did not identify any of the information discussed at the meeting as proprietary.

List of Acronyms

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
CLMM	Customer-Linked Manufacturing Manager
dpm/100cm^2	disintegrations per minute per 100 square centimeters
FMB	Feed Materials Building
HF	hydrogen fluoride
HP	health physics
hr	hour
IFI	Inspection Followup Item
IP	Inspection Procedure
KOH	potassium hydroxide
lbs/hr	pounds per hour
lbs	pounds
mg	milligram
mrem	millirem
NRC	Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
PGDP	Paducah Gaseous Diffusion Plant
PHA	Process Hazards Analysis
RCP	Radiological Contingency Plan
rem	roentgen equivalent man
SCO	Surface Contaminated Object
SSS	Site Safety Supervisor
T_e	biological clearance rate
TLD	thermoluminescent dosimeter
UF_4	uranium tetrafluoride
UF_6	uranium hexafluoride
UO_2F_2	uranyl fluoride
URI	Unresolved Item