U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 40-3392/87002 License No. SUB-526

Docket No. 40-3392

Licensee: Allied Corporation
P. O. Box 430
Metropolis, IL 62960

Facility Name: Metropolis Works

Inspection At: Metropolis, Illinois

Inspection Conducted: August 17-21, 1987

George M France, III

Inspector: George M. France, III

9-04-87
Date

C. F. Dillon

Approved By: L. Robert Greger, Chief
Facilities Radiation Protection
Section

9/4/87
Date

Inspection Summary

Inspection on August 17-21, 1987 (Report No. 40-3392/87002(DRSS))
Areas Inspected: Routine unannounced health and safety inspection, including radiation protection program; training; radioactive waste management, including transportation activities; and discussions with licensee representatives concerned with quality assurance checks on UF_6 product cylinders.
Results: No violations or deviations were identified in the areas inspected.

DETAILS

1. Persons Contacted

R. Allshouse, Technical Supervisor (Quality Assurance)
*J. C. Bishop, Plant Manager
L. Bruce, Technical Supervisor (Environmental Programs)
P. Gasperini, Production Supervisor
R. W. Hahn, Manager, Maintenance and Plant Engineering
*J. E. Honey, Manager, Environmental Regulatory Affairs
M. Kosmider, Technical Supervisor
R. Lewis, Operator (UF_6 Distillation)
H. Roberts, Assistant Health Physicist
M. Shepherd, Manager, Process Technology and Quality Assurance Program
J. Swacker, Process Engineer (Environmental Programs)
L. Weaver, Training Specialist
G. Yates, Supervisor, Accounting and Contract Administration
*R. Yates, Health Physicist

The inspector also interviewed several other production and safety personnel.

*Denotes those present at the exit meeting on August 21, 1987.

2. General

The inspection, which began at 3:30 p.m. on August 17, 1987, was conducted to examine operations required in the production, storage, and shipment of uranium hexafluoride (UF_6). The inspector reviewed the radiation protection program, transportation activities, and the status of the licensee's quality assurance program. On August 27, 1987, the inspector confirmed by telecommunication that the licensee had received and understood the Order Modifying License which restricted the use of UF_6 cylinders equipped with valves manufactured by Superior Valve Company in lots numbered 16 through 22.

3. Licensee Action on Previously Identified Items

a. (Open) Open Item (40-3392/86003-37): Lack of retraining on chemical and distillation processes and lack of training on system modifications and procedure changes. This matter is still under review. During the exit meeting the licensee made the following comment in updating the status of operator retraining: A committee shall be established for the purpose of evaluating the need and frequency of retraining. The committee shall be appointed by the plant manager and should be made up of one or more members from each department. The committee will

report to the plant manager and function under his direction. The members should utilize their expertise to evaluate the content of current training and to make recommendations for improving the quality of the training provided. It will also recommend the frequency at which retraining is required. The plant manager in conjunction with the committee shall then decide proper retraining requirements and provide this information to department managers and involved supervisory personnel.

b. (Closed) Violation (40-3392/86003-09): Survey instruments could not measure 200 dpm/100 cm^2 as required by the licensee. Effective August 18, 1987, License Condition No. 17 has been amended to increase the contamination limit to 1000 dpm/100 cm^2.

c. (Closed) Open Item (40-3392/86002-04): The control room in the Feed Materials Building is designed for a positive air pressure of +2.5 inches of water when the emergency blowers are on to ensure habitability. However, the pressure has never been measured. A manometer has been installed and the pressure will be measured under a variety of conditions. According to NFPA 496 (1982) positive pressure is desirable, with a maximum reading of 0.1 inches of water. During the course of this inspection, the licensee noted that the operable level of the manometer under present conditions measures about 0.05 inches of water. Positive pressures of 0.25 to 0.5 inches of water are considered excessive and would require the manipulation of air locks in order to maintain personnel access. Positive pressure is desirable in the chemical and oil industry to keep vapor out of control rooms.

A log sheet is maintained in the control room to record measurements during a test drill involving operation of the control room emergency blower. Operators will be assigned to record the pressure differential between the control room and the Feed Materials Building.

4. Management Organization and Controls

The inspector reviewed the licensee's management organization and controls for radiation protection and operations, including changes in the organizational structure.

The Manager, Process Technology and a selected Technical Supervisor have been assigned the task of expanding the Quality Assurance program to ensure that more of the plant operations come under quality assurance checks. There were no changes in personnel assignments that affected the radiation protection program.

No violations or deviations were identified.

5. Radiation Protection

The inspector reviewed the licensee's internal and external exposure control programs including the required records, reports, and notifications.

a. Internal Exposure Control

Bioassay records for the first half of 1987 disclosed that the 40 MPC-hour intake limit for uranium was not exceeded. Whole body count results (conducted in March 1987) for feed materials workers were below the maximum permissible body burden for uranium. The next whole body counts are scheduled for September 1987.

b. External Exposure

Over the January through June 1987 operating period the highest cumulative dose reported was 244 mrem. Overall exposure to workers for the first half of 1987 is less than the exposure recorded for the first half of 1986. This trend is due to the licensee's aggressive worker awareness program in radiation protection and the impact that Sequoyah Fuels UF_6 cylinder rupture event made on the fuel facility industry in 1986.

c. Surveys and Contamination Control

Records of periodic surveys disclosed that removable contamination levels continue to be below established levels for unrestricted areas (administrative building, guard station, lunch room, and personnel change rooms). This conclusion was based on 2100 weekly smears with no smears exceeding the action level of 200 dpm/100 cm^2 in non-uranium areas. The spread of removable contamination is prevented by performing frequent maintenance on the floors.

It was also observed that the day shift guard provided anti "c" clothing for radiation protection to all visitors entering restricted areas. The guard was also diligent in requesting visitors leaving the restricted area to perform personal surveys.

No violations or deviations were identified.

6. Transportation Activities

The inspector reviewed the licensee's program for receipt and/or shipment of radioactive materials. Licensee shipping records disclosed that the licensee performed adequate program requirements that covered.

- Monitoring for radiation and contamination of radwaste packages and transport vehicles.

- Shipping paper documentation in accordance with licensee and burial site procedures.

- Shipping papers for UF_6 shipments to DOE facilities.

The licensee shipped about 10,000 cubic feet of radioactive contaminated scrap metal and combustible materials to the Nevada burial site without any unusual occurrences. One unusual incident during the receipt of materials occurred on August 13, 1987, when an Eck Miller Transportation Corporation truck arrived at Allied with a shipment of Australian uranium ore. Also on the truck was a used automobile, which was apparently picked up by the driver for personal reasons while in route from the port of entry (New Orleans, Louisiana) to Allied Corporations Metropolis Works. The licensee requested that the driver off load the automobile before returning to the plant to deliver the uranium ore. The licensee promptly reported the incident to Region III and to the carrier.

Periodically, the licensee ships large quantities of low level radioactive material formed during neutralization of the acid waste stream (synthetic fluorspar). In Inspection Report No. 40-3392/86004, the inspector documented results of an investigation of the licensee's production, preparation and analysis, and shipment of synthetic fluorspar (CaF_2). Synthetic fluorspar which is formed from HF scrubber liquors during lime treatment (neutralization) meets the requirements of 10 CFR 40.13, which addresses unimportant quantities of source material. Under this article, the licensee may transfer the synthetic fluorspar to another party as long as the contained source material (uranium in this case) does not exceed 0.05 percent or 500 parts per million. On the basis of this regulatory limit, the inspector reviewed analytical data for two large shipments of synthetic fluorspar. The respective shipments had uranium values of 215 and 395 ppm uranium, which were clearly under the limit of 500 ppm.

No violations or deviations were identified.

7. Licensee's Incident Report File

In addition to making notification to Region III under 10 CFR 20 and 21, the licensee periodically informs the Region about incidents and/or unusual occurrences that may have potential safety significance, but are not necessarily reportable. The discussion that follows is based on telecommunications between the licensee and the inspector followed by an onsite inspection.

- UF_6 "buggy" cylinder carrier was nearly hit by railway tank car.

  A UF_6 cylinder carrier was towing a full cylinder of UF_6 across the onsite rail crossing (spur line for freight) while an HF tank (rail) car was being moved on the track. Although the driver of the UF_6 cylinder carrier did not recognize that the train was moving, the

locomotive engineer observed the UF_6 cylinder carrier and applied his brakes in time to avoid a collision. The UF_6 cylinder carrier rig consisted of a motorized vehicle with a buggy attached to the rear equipped with cylinder cradles to handle 14-ton UF_6 cylinders.

The inspector and the plant Assistant Health Physicist reviewed the scene of the incident. Apparently, the tank car stopped within three feet of the UF_6 cylinder buggy. Because the rail car was moving slowly (and because of the engine noise from the UF_6 prime mover), the UF_6 cylinder buggy driver did not hear the train nor did he anticipate the track being used. In order to prevent a recurring incident, the licensee has proposed that a red light (signal device) be installed near the rail crossing. The light will be activated anytime the rail gate is open and/or a train is on the track. Preventive measures in this area will be reviewed during a future inspection. (Open Item No. 40-3392/87002-01(DRSS))

- Cylinder Plug Shows Excess Number of Threads

The licensee reported that quality assurance checks of a Series No. 9 plug on a cold, filled UF_6 cylinder showed five threads, one more than the ANSI standard allows. Cylinder plugs identified as Series No. 9, when properly engaged, should reveal four threads visible above the cylinder surface. In correcting the discrepancy the licensee extracted the UF_6 from the cylinder by controlled heating and evacuation. Thermocouples were attached to the cylinder surface (skin) and the temperature was restricted to 150°F. This arrangement allowed evacuation without increasing cylinder pressure above atmospheric pressure. The evacuation process took about 48 hours. After several discussions between the licensee and DOE, it was agreed that Allied would make the proper placement of the cylinder plug, and pressure test the cylinder prior to refilling.

This will be followed by telecommunications and reviewed further during a future inspection. (Open Item No. 40-3392/87002-02(DRSS))

8. 10 CFR 21 Report

On July 28, 1987, while performing pre-shipment quality assurance checks on UF_6 cylinder No. AC 65, the licensee discovered that the cylinder valve packing nut was cracked around 80% of its circumference. The valve was identified as being a Descote (French Manufacturer) Serial No. 1690.

During the course of this onsite inspection, the inspector confirmed by observation that the cylinder valve packing nut was cracked. The licensee also noted that the remaining inventory of Descote valves have been placed "on hold" pending resolution of this matter. A Descote representative has been notified. The inspector concluded that the licensee's 10 CFR 21 report was a timely submittal that mitigated the potentially unsafe condition. Final resolution of this matter is still pending. (Open Item No. 40-3392/87002-03(DRSS))

9. Order Modifying License

a. Faulty UF_6 Valves

Effective August 19, 1987, the NRC Office of Nuclear Material Safety and Safeguards (NMSS) issued an Order to Allied Corporation's Metropolis Works which:

(1) Prohibits filling, heating, emptying, or delivering to a carrier for transport 48-inch and 30-inch diameter uranium hexafluoride cylinders fitted with Superior Valve Company 1-inch alloy valves manufactured in Superior Valve Company lots numbered 16 through 22 inclusive.

(2) Requires that all 1-inch Superior valves for use in UF_6 cylinders in warehouse stock be carefully inspected. All valves shall be reinspected before fitting into cylinders. All defective valves found in stock regardless of lot number or manufacturer shall be reported to the Administrator of the appropriate NRC office.

On July 24, 1987, the U.S. Department of Energy, Oak Ridge Operations Office Safety Division (DOE), notified the Nuclear Regulatory Commission (NRC) of parallel cracks that were observed in and around the threads of 1-inch valves used in 30- and 48-inch diameter uranium hexafluoride (UF_6) cylinders. The cracks were observed in the valve threads of valves in lots 17 and 20 manufactured by Superior Valve Company. NRC licensees were notified by phone to look for defects in valves in these lots. On July 29, 1987, after further investigation, DOE again notified and reported to NRC that Superior valves in lots 16 through 22 inclusive should be suspect for thread cracking. The affected lots were later confirmed to be lots 16 through 22 inclusive. DOE is in the process of determining the reasons for the cracking and recommends that cylinders fitted with 1-inch valves in lots 16 through 22 not be filled, emptied heated, or shipped until a determination of their safety is made.

The licensee noted that Superior Valve Company tentatively plans to make an investigation concerning the valve problem, shift into a production mode, and possibly replace the valves in lots 16 through 22. Progress in this area will be monitored via telecommunications with the licensee followed by onsite inspections as needed. (Open Item No. 40-3392/87002-04(DRSS))

b. Stiffening Ring Damage Detected on UF_6 Cylinders

In May of 1987, the NRC Office of Nuclear Material Safety and Safeguards (NMSS) issued an ORDER TO SHOW CAUSE to Allied Corporation's Metropolis Works which:

Prohibits Allied Corporations Metropolis Works to fill with UF_6 any 48-inch diameter cylinder manufactured by the W. H. Stewart Company of Oklahoma City, Oklahoma, with the following manufacturer's serial numbers:

2309 through 2333
2442 through 2617
2782 through 2828

This Order remains in effect until such time as Allied Corporation has determined through appropriate chemical and physical tests or from manufacturing records that the stiffening rings on the specific cylinder(s) to be filled with UF_6 are not made of ASTM A306, Grade 75 steel.

The ASTM A306, Grade 75 steel is not specified in ANSI Standard N14.1-1982. Stiffening ring damage due to wedge shaped cracking was detected by Eldorado Nuclear of Canada. All cylinders in question were manufactured by the W. H. Stewart Company of Oklahoma City, Oklahoma. During this inspection the licensee noted that they have initiated the following course of action:

- As a result of a meeting between representatives of Allied, Sequoyah Fuels, Eldorado Nuclear, and DOE, a contract will soon be awarded to a consultant to conduct an investigation that will include an evaluation and recommendation as to whether or not the cylinders (containing vintage ASTM A306, Grade 75 Steel) can be safely used for in-plant operations.

Progress in this area will be monitored by telecommunications between Allied and Region III followed by onsite inspections as needed. (Open Item No. 40-3392/87002-05(DRSS))

10. Emergency Preparedness

During the production of UF_6 several hazardous and/or highly reactive chemicals/chemical compounds are either produced or used in the product stream. In order to mitigate potential offsite releases of hazardous materials, the licensee has carefully designed process equipment to handle hazardous material and integrated safety requirements into operating procedures.

In order to make quantitative estimates of materials that may escape process and/or procedure safeguards and cause offsite exposures, the licensee has incorporated the use of a computer code with graphical display. The system is called "SAFER" and consists of parameters such as meteorological changes, chemical concentration, duration of leak, distance, and other parameters necessary for dispersion modeling.

The inspector observed a half-hour demonstration of possible offsite effects from HF and UF_6 releases. The SAFER system provides the licensee with a valuable tool for assessing the impact of offsite releases of reactive chemicals on the general public.

No violations or deviations were identified.

11. Quality Assurance Program (QA)

The inspector interviewed the Manager, Process Technology and Quality Assurance and the Technical Supervisor, Quality Assurance concerning the status of the licensee's QA program. These individuals were recently assigned the task of expanding the Quality Assurance program as noted in Section 4 above.

Effective June 1, 1987, Corporate Headquarters approved the above mentioned assignments. The Technical Supervisor has no responsibilities other than QA. During the interview the licensee noted the following:

- The Technical Supervisor, QA was involved in investigating problems involving the French Descote Valve and the Superior UF_6 cylinder valve.

- The licensee has been active in the formation of an ASTM committee on QA for uranium converters. International UF_6 converters were also included.

- A letter describing plans to initiate an independent QA program conforming to ASTM standards was forwarded to NMSS as part of a progress report.

The inspector will monitor the licensee's time table for developing target dates and milestones for defining the QA program. (Open Item No. 40-3392/87002-06(DRSS))

12. Exit Meeting

The inspector met with licensee representatives (denoted in Section 1) at the conclusion of the onsite inspection on March 20, 1987. The inspector summarized the scope and findings of the inspection. The inspector also discussed the likely information content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents/processes as proprietary. In response to certain items discussed by the inspector, the plant manager noted that a committee appointed by the plant manager shall evaluate the need and frequency of retraining.