

DRAFT
GRANT:cj
11/29/66

Reviewed by: CW

Date: 11/24/67

Clear
BACK-UP FOR AEC-591

PART 40 INSPECTION

W. R. SPACE AND CO.
Davison Chemical Division
P. O. Box 188
Pompton Plains, New Jersey 07444

Inspector: William B. Grant

License No.: STA-422

Date of Inspection: November 17, 1966 - Announced Reinspection

Persons Accompanying Inspector:

None - New Jersey Department of Public Health Notified

Persons Contacted:

Mr. Hugh Sweitzer, Plant Manager
Mr. Peter Garino, Plant Chemist and RSO

DETAILS

Background Information

1. The most recent inspection of the licensee's facility was conducted on July 1, 1964. Items of noncompliance noted were as follows:
 - a. Failure to make surveys to determine concentrations of removable surface contamination existing in unrestricted and restricted areas. The current status of compliance was reviewed with Garino and compliance was noted. (See paragraph 16 of report details.)
 - b. Quantities of natural thorium in excess of 1,000 times Appendix C, 10 CFR 20 were buried in one location. The current status of compliance was discussed with Garino and compliance was noted. (See paragraph 24 of report details.)

Organization and Administration

2. The Pompton Plains plant is one of the Davison Chemical Division of the W. R. Grace and Co. The plant manufactures polishing compounds for use in the optical trade and other glass manufacturing. These polishing compounds are reportedly obtained from the refining monazite ore.

3. Mr. Peter Garino, Plant Chemist and RSO, reports directly to Mr. Hugh Sweitzer, Plant Manager. Mr. Garino is a graduate chemist and has taken a two week course in methods of radiation protection at the Grace plant in Erwin, Tennessee. Garino stated that out of 32 employees, 18 are considered production workers and actually work with thorium containing ore.

Facilities and Uses of Byproduct Material

4. The Pompton Plains plant is a two story brick building containing the production area, an office, and lab space. The plant facilities are located on Black Oak Ridge Road (Route 202M). The production area consists of monazite ore storage, ball mill, filter press, rare oxide, chloride, and thorium refining areas. Facilities for change, lockers, and building services are located on the first floor of the plant. The employee lunchroom is located in a 20 foot trailer located approximately 40 feet from the main building on the opposite side of the truck loading platform and driveway. A waste treatment facility, sludge storage, and waste burial area are located in the rear of the licensee's property and approximately 200 - 300 feet from the residential areas in the rear of the plant. The inspector noted that the entire facility was surrounded by an 8 foot high chain link fence which restricts the area to entrance at the office and of the facility.

5. The scope of the license was reviewed with Garino. The licensee is permitted to have thorium in unlimited quantities for thorium ore processing. Garino stated that the facility is currently processing approximately 50 tons of monazite ore per month and this ore contains approximately 3% thorium oxide.

He stated that thorium is a waste product of the company's processing methods which are intended to remove the rare ^{earth} oxide from the original ore with an approximate 93% purity. Garino stated that the final rare ^{earth} oxide powder contains trace amounts of natural thorium ~~ore~~ (from 0.1 - 0.2%.)

6. Garino was noted to maintain a monthly inventory. The inventory as of October 1, 1966 showed the possession of the following: 3,494 pounds of thorium (natural) in monazite sand - 3% enrichment; 9,392 pounds of thorium oxide in waste sludge.
7. Garino stated the final rare earth oxide powder contains trace amounts (0.1 to 0.2%) natural thorium.
8. Garino described the manufacturing process and it is as outlined in paragraph 5a - h of the previous inspection report, dated 7/14/64. According to Garino, the process is still classified as company confidential.
9. The facilities used in the manufacture of the rare earth oxide from monazite ore consist of: a separate room for the ball mill operations which Garino stated is a very dusty operation; a sulfonation kettle area; calcining furnace; centrifuge area; filter press area; thorium crystallization unit; and a monazite storage area.
10. Garino stated that the plant produces approximately 30,000 pounds of rare earth oxides from 50 tons of ore per month and that the process also produces about 1500 pounds of ThO_2 .
11. According to Garino, all personnel working in the vicinity of operations in which a potential dust hazard exists are required to wear respirators. All personnel working in the plant processing areas are required to undergo a clothing change prior to reporting to the work areas. *On arrival* at the plant, operated ~~under~~ the clean area (west side of locker room), undress and *change*

place their street clothes in their assigned lockers. They then pass into the process area (east side of locker room) and put on their process clothing and safety shoes. At the end of their shift, operators return their process clothing to their lockers in the east locker room and pass to the west locker room. Garino stated that supervisory personnel and individuals who occasionally visit the processing areas, including visitors, are issued smocks and overshoes. The inspector noted that these are maintained on hangers immediately adjacent to the chemical control laboratory in the office area at the plant. The inspector donned a smock and shoe covers prior to entering the processing area.

Radiation Safety Precautions and Procedures

Instructions

12. The licensee has written instructions entitled, "Health Physics Manual, Davison Chemical Co., Pompton Plains, New Jersey". The manual contains information as to the reason and importance of the control of radioactive materials, the areas of responsibility for the health physics department, and a definition of terms. The manual also lists maximum permissible levels and concentrations, methods of contamination control, radiation surveys, decontamination procedures, description of waste disposal, explanation of medical examinations, procedures for measurement of radioactivity (alpha and beta), sample administrative forms, and emergency contacts. Garino stated that all new employees receive a two hour indoctrination lecture from the plant manager and that Garino periodically lectures on safety, cleanliness and use of the clothes change area.
13. Garino had on hand a copy of the license and copies of 10 CFR 20, 30 and 40. He stated that the file was available to all workers upon request.

Surveys

14. Garino stated that he makes direct physical surveys using an Anton Model 5 survey meter quarterly. He stated that ~~when~~ these surveys are made in 13

locations in the plant and burial sites, and less frequently at the fence line location. It was noted that records of the surveys were maintained. The last survey record, dated September 28, 1966, reported radiation levels at waist level at 3.5 mr/hr in the monazite storage area, 2.5 mr/hr at the surface of the thorium press, .5 - 1 mr/hr in the sludge burial area, 1.5 mr/hr in the shipping room and 0.05 - 0.75 mr/hr at the fence lines.

15. Independent surveys were made by the inspector using Serial No. 5682 Precision Instrument end window GM survey meter calibrated 11/1/66. Radiation levels were noted as follows:

*all
estimated
areas*

At the surface of pile of bags containing monazite sand - 7 mr/hr.

At rope barrier approximately 2 feet from stack - 1 mr/hr.

At the surface of the ball mill - 2 mr/hr.

At the surface of the filter press - 7 mr/hr.

At the surface of the centrifuge - 10 mr/hr.

18 inches from pile of thorium waste in rear of licensee's facility - 1.5 - 2 mr/hr.

16. Garino stated that they have made surveys in the form of smear samples to determine the amount and location of removable contamination existing in the licensee's facility. According to Garino, the samples have been taken on three month intervals since the last inspection. Records were noted to be maintained of the results of these samples and the results for the last survey performed September 28, 1966 revealed the following results:

<u>Location</u>	<u>Results in mc/square foot</u>
Sales Office - desk	background
floor	1.8×10^{-6}
Polishing Lab - desk	2.2×10^{-10}
floor	6.8×10^{-5}
Engineering Office - desk	4.2×10^{-6}
floor	3.7×10^{-5}
Shipping Room - table	3.5×10^{-6}
floor	8.4×10^{-6}

<u>Location</u>	<u>Results in $\mu\text{c}/\text{square foot}$</u>
Ball Mill Room - floor	3.6×10^{-3}
door	2.8×10^{-4}
Old Calcining Furnace - floor	6.7×10^{-6}
wall	2.4×10^{-6}
Monazite Storage - floor	6.8×10^{-4}
door	8.8×10^{-6}
Shipping Platform	background
Entrance - stairs	1.4×10^{-6}
Locker Room - floor	3.8×10^{-6}

Air Surveys

17. Garino stated that he performs air surveys by collecting air at the rate of 20 cubic feet per minute for five minutes using a Staplex high volume air sampler with Whatman 41 filter paper. Garino stated that samples are taken in restricted and unrestricted areas on a quarterly basis. According to Garino, the samples are counted in a Nuclear Corporation gas flow proportional counter, used in conjunction with a RIDL scaler. Records were noted to be maintained of these samples. The most recent sample data collected September 14, 1966 was as follows:

<u>Location</u>	<u>Results in $\mu\text{c}/\text{ml}$</u>
Shipping Room	1.8×10^{-12}
Pulverizer Room	2.5×10^{-12}
Calcining Furnace	1.8×10^{-12}
Process Storage Area	1.2×10^{-12}
Ball Mill Room	4.1×10^{-12} (Mill running, but no occupancy)
Monazite Storage Area	3.0×10^{-12}
Lunchroom	1.1×10^{-12}
Control Lab	1.5×10^{-12}

<u>Location</u>	<u>Results in $\mu\text{c}/\text{ml}$</u>
Sulfonation Kettle	2.4×10^{-12}
Northwest Fence Line	background
Southwest Corner Fence Line	background
Midway Point Fence Line	background

Waste Disposal

Liquid Effluent

18. The waste treatment plant treats all liquid wastes from the plant. The waste includes wash water, floor washings, and surface runoff from the adjacent plant property.

19. Garino stated that the process involves the use of an average of 35,000 gallons of water per day. All waste water is discharged to a common 1,000 gallon sump equipped with two automatically controlled pumps which force the waste in to a 50,000 gallon retention tank. Each pump has capacity to handle the peak load and is installed so that the second pump starts in the case of extreme demand or failure of the first. The retention tank provides a minimum of 48 hours average retention of waste and, in addition, acts as a mixing and clarification tank. The incoming wastes flow through a distributing channel in the tank and the effluent, after initial settling, is removed from the mid part of the tank, and flows by gravity to a mixing tank. A draw off is provided at the bottom of the retention tank to pump accumulated solids to the sludge filter press. Garino stated that the 8,000 gallon mixing tank is equipped with a gate agitator which travels at approximately five revolutions per minute. A pH electrode assembly is in the center of the mixing tank and electrically connected to a mechanically operated diaphragm valve. Two storage tanks are provided to feed either sulphuric acid or caustic soda solution through the automatic diaphragm valve to

the mixing tank as called for by the pH controller. Effluent from the mixing tank is piped to a 2,000 gallon hardinge thickener at a pH of 5.8 - 6.2.

20. The hardinge thickener provides a clear overflow to the final clarification tank and is adjusted to give a 20% solids overflow which is pumped to the sludge filter press in the control house.
21. The final clarification tank of 50,000 gallons capacity provides an average of 48 hours retention time for the effluent before discharge from the system. The main function of this tank provides sufficient time for post precipitation of solids after pH adjustment. A drawoff is provided at the bottom of the tank to pump accumulated solids to the sludge filter press.
22. The system is designed to operate automatically, part of the normal maintenance, cleaning and control operation. The entire operation is under the supervision of Carino in his capacity of Plant Chemist. Carino stated that he samples the effluent daily at the overflow of the hardinge thickener and at the weir in the control house. Carino stated that sampling at the hardinge thickener provides an average of 48 hours retention time before discharge and will indicate quality of effluent entering the clarification tank. Sampling at the weir provides a check on the amount of contamination which has settled out of the effluent in the final clarification tank, or if there is any additional contamination being added to the effluent to the accumulation of sludges in the clarification tank.
23. Records of samples taken at both stages of the effluent stream were noted to be kept on the "Plant Effluent Form". Review of these records showed the average daily discharge to the Pompton River to be 2.0×10^{-7}

µc/ml, which is approximately 20% the MPC of 1×10^{-6} µc/ml for natural thorium.

Solids

24. Garino stated that all other waste is either disposed of by burial on the licensee's property or is held in storage until it can be transferred to a disposal site. According to Garino and as indicated in disposal records, the licensee buries 992 pounds of thorium phosphate per month. Garino stated that a pit is dug and the waste is dumped into the pit. He stated that earth is mixed with the waste as the pit is being filled and that a minimum of six feet of earth fill covers the pit. Garino stated that, according to 10 CFR 20.5(c)(1) and 10 CFR 20.304(a), they are permitted to bury in one location only 1,000 pounds or 50,000 µc natural thorium. He stated that their processes produce approximately 1500 pounds of thorium (natural) per month. He stated that they currently have 9,392 pounds of this thorium sludge in a storage pit in the back of the property. Garino stated that he is in the process of investigating possible disposal sites for this waste and in all probability it will be shipped to either Grace's Chattanooga, Tennessee plant or Nuclear Fuel Services, West Valley, New York, a Grace subsidiary. Records were noted to be maintained showing the location, date of burial, and quantity buried monthly since the period of the last inspection.

Instrumentation and Calibration

25. The licensee had on hand an Anton Model No. 5 GM survey meter with a range of 0 - 100 mr/hr. He also had a Nucor gas flow proportional counter and an RIBL scaler. Garino stated that the GM survey meter is used for all direct survey measurements and that all smears and/or water samples are counted in the gas flow proportional counter. He stated that the survey meter is sent to Lionell Corporation for calibration at six month intervals. He said that the proportional counter is checked for calibration using U_3-308 National Bureau of Standards
0₃

uranium oxide standard of 1.8 dps and an Am-241 source of 1.07×10^4 dpm (2/65).

Storage of Material

26. It was noted that the entire building is surrounded by chain link fence eight feet high. The pedestrian entrance through the fence was noted to be carefully marked directing visitors to the office area. Garino stated that during working hours, unaccompanied visitors are not allowed in the production area and the workmen are instructed to direct all such people to the office. Garino stated that the plant gates are locked during non-working hours. It was noted that the monazite sand is stored in large piles under a roofed shed in the rear of the manufacturing area. The sand is in 100 pound paper sacks and, therefore, it does not appear that there is any likelihood for unauthorized removal of the material.

Receipt of Materials

27. According to Garino, monazite sand is received from all over the world. Records were noted to be maintained showing kind, quantity, and date of receipt.

Personnel Monitoring

28. St. John's X-ray Corporation, Califon, New Jersey supplies film badges which are processed on a monthly basis for personnel in the plant. Records are maintained on the film badge processor's reports as well as Form AEC-5. The records were examined from the date of the last inspection to October 1966. The records showed a typical exposure to be less than 20 mrem per month. Richard Silsbury, operator of the thorium press, showed a maximum exposure of 400 mrem for the second calendar quarter of 1966. Mr. Silsbury's exposures are averaging 100 - 150 mrem per month and are maximum for all plant workers.

Posting and Labeling

29. The inspector noted that there were signs posted at the entrance gates and at all outside doors of the plant reading "Any area within this plant may contain radioactive material". The storage pile was posted with a sign reading "Caution - Radioactive Materials". All processing rooms were posted with signs reading "Caution - Airborne Radioactivity Area". All signs had the conventional symbol and color.

License Conditions

30. The specific documents referred to in License Condition 8A were reviewed with Garino and compliance was noted.
31. In accordance with License Condition 10, the licensee is authorized to incinerate source materials in accordance with procedures described in his letter dated July 3, 1961. Garino stated that no incineration has taken place during the period since the last inspection.
32. License Condition 11, as amended November 4, 1966, was discussed with Garino and compliance was noted, as stated in paragraph 29.

Management Discussion

33. A conference was held with Mr. Hugh Sweitzer, Plant Manager, and Garino immediately following the inspection. The inspector stated that in his opinion the problem of disposition of the thorium sludge was one that the company would have to solve in the near future. The inspector added that the company must assure themselves that the transferee has a license from the USAEC or an agreement state to possess the material transferred to them. Sweitzer indicated his willingness to comply with the regulations and stated that he would insure a proper transfer.
34. The inspector believes that management of this company is ^{limited} ~~surrounded~~ with

the hazards connected with processing natural thorium and efforts to comply with regulations were noted.



April 27, 1982

FREEDOM OF INFORMATION
ACT REQUEST

Mr. Karl Abraham
U.S. Nuclear Regulatory Commission
King of Prussia, PA

FOIA-82-219

rec'd 05/07/82

Dear Mr. Abraham,

This is a Freedom of Information Act request.

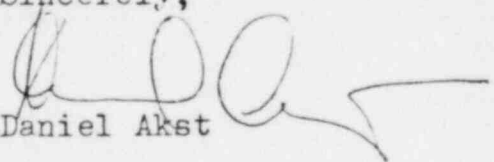
Under the provisions of FOI, I am seeking any and all documents relating to NRC activities concerning Sheffield Brook in Wayne, NJ; Wayne, NJ; Rare Earths, Inc., in Wayne, NJ; W.R. Grace & Co. and its Davison Chemical Division; Electro-Nucleonics, Inc.; 868 Black Oak Ridge Rd. in Wayne, NJ; buried and non-buried thorium in Wayne, NJ; and any other material relating to, describing, or stemming from any radiation in Wayne, NJ.

This request includes but is not limited to reports on any radiation hazard in Wayne, NJ; NRC memoranda mentioning or relating to Sheffield Brook in Wayne NJ or any radiation in Wayne NJ; records of tests on same; letters written or otherwise relating to same; contracts in any way relating to or stemming from or mentioning same in any way; and any other material that in any way relates to radiation in the township of Wayne, NJ.

This request also includes but is not limited to material assessing any radiation hazard that might exist in Wayne NJ and any health hazard from radiation that might exist in Wayne, NJ.

Hope to hear from you soon.

Sincerely,


Daniel Akst



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

May 3, 1982

The Record
ATTN: Mr. Daniel Akst
Building 36
Preakness Shopping Center
Wayne, New Jersey 07470

Dear Mr. Akst:

This is to acknowledge the Freedom of Information Act request from you to Mr. Karl Abraham, dated April 27, 1982, and received in the Region I Office on April 30, 1982.

In accordance with the Code of Federal Regulations, Title 10, Part 9.8, Freedom of Information Act requests should be addressed to the Director, Office of Administration, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. I am forwarding your request to Mr. J. M. Felton, Director, Division of Rules and Records, Office of Administration.

Sincerely,

Gary L. Snyder, Chief
Emergency Preparedness and Program
Support Branch

cc:
J. M. Felton, Director, Division
of Rules and Records, ADM

Dupe of 8208250058