



EC NO. 659: J. R. ...
A. W. Berger

J. P. Agos
N. A. Director

HEAVY MINERALS CO.

TN. 04-4

4000 NORTH HAWTHORNE STREET, CHATTANOOGA 8, TENNESSEE

RARE EARTH CHEMICALS • THORIUM • HEAVY MINERALS

OXFORD 8-3481

September 6, 1957

Director
Division of Civilian Application
United States Atomic Energy Commission
Washington, D. C.

Dear Sir:

In accord with the requirements of "Amendment to Title 10, Code of Federal Regulations, Part 20", Paragraph 20.403(c) we wish to notify you of a series of incidents of the release of activities in excess of the limits set forth in Appendix B, Table 2, Column 2 of C.F.R. 20.

Preliminary indication of the possibility of excess activity in our discharge of process wastes were noted by Alpha, Beta, Gamma counts made on a grab sample taken from the overflow of a settling pit located adjacent to a process building on July 29, 1957. In view of this sample having given results different than those indicated by our existing control, on August 3, 1957 a grab sample was taken at the point of uncontrolled discharge which indicated:

$$B \sim 1 \times 10^{-5} \text{ cc/mc}$$

In view of the fact that we could not identify the activity we considered the tolerance to be $1 \times 10^{-7} \text{ cc/ml}$, or the discharge to be 100 times that permissible. In as much as tests made on the sample taken July 29, 1957 indicated that "B" activity was concentrated in solids being carried by the waste stream. Contractors were called in to:

1. Increase efficiency of present settling pits.
2. Provide an additional large settling pit.

These facilities were completed by August 14, 1957.

Unfortunately during this period our radiation counting equipment developed electronic difficulties. On about August 6, 1957 we contacted and received the consulting service of Mr. Edward Sadowski of the Vallecitos Atomic Laboratory to aid us in determining appropriate action in regard to our discharge, equipment and methods for determining radioactivity and aid in establishing a more complete health physics program. Mr. Sadowski visited our facility on August 17 and 18 and made many valuable recommendations. Mr. Sadowski has had ten (10) years of experience as a Health Physicist, chiefly at the Knolls Atomic Power Laboratory.

DIRECTOR,

SIGN OF CIVILIAN APPLICATION

PAUL R. KRUESSI

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2. Pursue a program of prevention of excess discharge of activities by preventing them from entering the waste stream, if possible and removing them from the waste stream before final discharge.

Very truly yours,

HEAVY MINERALS CO.

Paul R. Kruessi, Manager
Manufacturing Division

PRK/awb

AIR MAIL SPECIAL DELIVERY

CC Mr. H. J. McAllduff
Deputy Director
Inspection Division
Oak Ridge Operations Office
United States Atomic Energy Commission
Oak Ridge, Tennessee

1001 825 0 04 15 01

OAK RIDGE OPERATIONS
U. S. A. E. C.

monitor was installed shortly after start-up to measure Gamma activity of all discharged waste. Alpha and Beta and Gamma counting equipment and personnel monitoring equipment were secured. We have subsequently come to believe that the Gamma radiation is at too low a level to adequately reflect the Beta and Alpha activities. We have, therefore, since July 20, 1957 abandoned this system and relied on direct Alpha and Beta counting. A continuous sampling of the waste stream is currently being installed.

Recognizing that our waste discharge exceeded permissible levels we have taken the following actions:

1. Put into being a secondary settling basin to prevent discharge of solids to waste, a temporary basin was completed August 14.
2. Retained Mr. Edward Sadowski to advise us on methods to bring our discharge to within permissible levels.
3. Contacted and has tests performed by a supplier of settling and filtration equipment toward the installation of a permanent facility to prevent solid discharge.
4. Set up procedures to enhance the precipitation and settling of active solids from the waste stream.
5. Ordered and received additional Alpha, Beta and Gamma counting equipment to augment our present knowledge.
6. Initiated a program to determine causes of discharged activities (Thorium, uranium and thorium daughter products) and to eliminate these discharges.
 - a. A source of release of thorium daughter products was located and a method of precipitation and filtration put into effect.
 - b. Analyses of possible sources of activity are being conducted.

In addition to the actions cited above it is our intention to:

1. To secure still more counting equipment and personnel to develop facts relative to the activities we are discharging.

On August 14, 1957 a sample of waste being retained in the new settling basin showed:

$$\alpha 3 \times 10^{-6} \text{ uc/ml}$$
$$\gamma -$$
$$\beta 2.6 \times 10^{-5} \text{ uc/ml}$$

Grab samples of discharge on August 17 and August 20 showed:

$$\text{August 17 } \alpha 4.5 \times 10^{-7} \text{ uc/ml}$$
$$\text{August 20 } \alpha 6 \times 10^{-8} \text{ uc/ml}$$

Composite samples of discharge on following dates gave the following results:

$$\text{August 23 } \alpha 2.56 \times 10^{-5} \text{ uc/ml}$$
$$\text{August 26 } \alpha 2.84 \times 10^{-6} \text{ uc/ml}$$
$$\text{August 27 } \alpha 1.87 \times 10^{-5} \text{ uc/ml}$$
$$\text{August 28 } \alpha 2.15 \times 10^{-5} \text{ uc/ml}$$
$$\text{August 29 } \alpha 1.53 \times 10^{-5} \text{ uc/ml}$$

Composite

$$\text{August 26-29 } \alpha 2.2 \times 10^{-6} \text{ uc/ml}$$

We feel the following facts should be brought to your attention:

We are engaged in the processing of the mineral monazite to produce a thorium-uranium hydroxide and a series of rare earth products. Activities are therefore, natural thorium, natural uranium, purified thorium and the daughter products of thorium. Samples taken above (except where otherwise noted) were taken at discharge of the settling basin. Discharge ranges between 50,000 and 77.3116×10^3 100,000 gallons per day. The wastes pass by a drainage ditch, ~~within our control~~, approximately one-half (½) mile to discharge into Chickamauga Creek. Chickamauga Creek has an average flow of about 800 - 1,000 cubic feet per second and a minimum flow of 100 cubic feet per second, (Period 1946 - 1952), it is not used for either commercial or domestic purposes. About one (1) mile from our point of discharge Chickamauga Creek enters the Tennessee River. Minimum flow 5,800 cubic feet per second. About three and one-half (3½) miles downstream from the juncture of Chickamauga Creek and the Tennessee River the city of Chattanooga draws its drinking water supply.

Our facility has been in operation since January of 1957. Full operating levels were obtained in August, 1957. Prior to start-up, Nuclear Instrument and Chemical Corporation was retained to advise us on radiation hazards and recommend counting equipment and procedures. A twenty-four (24) hour recording