

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION IV

Report No. 40-6659/80-02

License No. SUA-551

Licensee: Petrotomics Company
Shirley Basin, Wyoming 82615

Inspection conducted: May 15-16 and June 3, 1980

Inspector: C. L. Cain 6/17/80
C. L. Cain, Radiation Specialist Date

Approved: Glen D. Brown 6/18/80
Glen D. Brown, Chief Date
Fuel Facility and Materials
Safety Branch

Inspection Summary

Inspection on May 15-16 and June 3, 1980 (Report No. 40-6659/80-02)

Areas Inspected: Routine, unannounced inspection of uranium mill operations and radiation protection program including organization and administration; facilities and equipment; waste management; internal exposure control; external exposure control; environmental monitoring; audits and training; fire protection; posting, labeling, and reports; and independent measurements.

The inspection involved twenty-one (21) hours on-site by one inspector.

Results: Of the ten (10) areas inspected, no items of noncompliance or deviations were identified in eight (8) areas; five (5) apparent items of noncompliance were identified in two (2) areas (infraction - failure to obtain NRC approval prior to transferring tailings, see paragraph 5; infraction - failure to perform air sampling as stipulated in application, see paragraph 6.a; infraction - failure to sample for radon in mill, see paragraph 6.b; infraction - failure to evaluate bioassay results exceeding action levels, see paragraph 6.d; infraction - failure to properly select and test respiratory protection equipment, see paragraph 6.e).

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DETAILS1. Persons Contacted

- *J. H. Whitman, Resident Manager
- *S. J. Pfaff, Radiation Coordinator
- *K. McDowell, Assistant Radiation Coordinator
- F. Wicks, Metallurgist
- J. E. Bates, Mill Trainer

*Individuals present at exit briefing

In addition, the inspector interviewed two members of the mill work force.

2. Licensee Action on Previous Inspection Findings

- a. (Closed) Noncompliance (40-6659/79-01): This item involved failure to evaluate airborne radioactivity, personnel exposures determinable by bioassay sampling, and engineering controls. The inspector observed that such evaluations had been performed since the last inspection.
- b. (Closed) Noncompliance (40-6659/79-01): This item involved failure to post airborne radioactivity areas. The inspector observed that the entire mill building was so posted.
- c. (Closed) Noncompliance (40-6659/79-01): This item involved failure to conduct annual radiation safety retraining. The inspector verified that such training had been performed since the last inspection.
- d. (Closed) Noncompliance (40-6659/79-01): This item involved failure to instruct female employees concerning prenatal radiation exposure. The inspector verified that such orientation had been presented since the last inspection.

3. Organization and Administration

The inspector discussed the organization and administration of the licensed activities with licensee representatives and determined that the organization remained unchanged except in two cases. R.N. Cook has joined the staff as Safety and Environmental Coordinator and Karen McDowell has been added as Assistant Radiation Coordinator. The licensee stated that mill workers are represented by The Oil, Chemical and Atomic Workers Local 2-230 and that the mill work force is comprised as follows:

25	salariied employees and laboratory technicians
36	mill operations technicians
<u>34</u>	<u>maintenance technicians</u>
95	Total

4. Facilities and Equipment

The inspector toured the mill and the tailings disposal areas to observe operations in progress and to verify that equipment and facilities were in accordance with applicable license requirements. The licensee stated that the mill thru-put was averaging 1625 dry tons of ore per day with the mill operating twenty-four (24) hours per day, seven (7) days per week. The mill was in operation at the time of the inspection and housekeeping was noted to be good. No major changes to the mill process circuit were identified except that a filter had been added between the thickener and solvent extraction circuits.

The inspector toured the change room and observed that a portable survey instrument was available at the main exit to the mill. The licensee stated that yellowcake workers are required to shower after each shift. The inspector reviewed a log book containing worker signatures testifying that such had been performed. Other workers are not required to shower or monitor. The change room had been thoroughly washed and was essentially dust free.

The inspector also investigated an allegation telephoned to the NRC Region IV office on May 8, 1980, relative to uranium contamination of the mill domestic water supply. The licensee described the occurrence by telephone on May 8, and submitted a report also dated May 8, 1980. The licensee stated that yellowcake had entered fresh water lines serving an eyewash fountain and an emergency shower but not drinking water fountains. The licensee stated that he was immediately aware of the occurrence and had initiated sampling and flushing procedures. The inspector observed numerous check valves installed on fresh water lines to prevent recurrence of the incident.

The inspector also reviewed documented hourly checks of scrubber operation in the concentrate drying area. Data appeared to be appropriately documented.

The inspector noted that the licensee had new laboratory facilities and equipment for health physics analyses. Included in the complement of equipment were laser fluorometry analyzers for determination of uranium levels in air and bioassay samples.

5. Waste Management

The inspector visited the area of the tailings pond and the embankment, construction of which was completed during September 1979. Tailings were being deposited on the upstream face of the dam and were adequately moist to prevent wind erosion as were ore stock piles.

The inspector reviewed documentation of daily inspections of tailings lines and embankment, semi-annual readings of displacement monuments, and monthly readings of piezometers.

The inspector questioned the licensee regarding transfer of tailings from the site. The licensee stated that approximately 90 gallons of tailings had been transferred to the Getty Oil Exploration and Product Research Center, Houston, Texas, on May 14, 1980. The licensee presented documented evidence that the recipient was licensed to receive and possess the material. However, the licensee stated that prior approval of the transfer was not obtained from the NRC. The inspector discussed the matter with Licensing on June 10, 1980, and informed the licensee on the same day that failure to obtain the prior approval was in apparent noncompliance with license condition 16.

6. Internal Exposure Control

a. Sampling Program for Airborne Uranium

The license application lists 48 mill locations (or activities) where (or during which) air samples will be obtained monthly. The inspector reviewed air sample data and noted that 7 to 14 samples were not obtained each month during the period May through November 1979. The inspector informed the licensee that failure to perform air sampling as indicated in the application was an apparent item of noncompliance with license condition 10. The licensee stated that the samples obtained during April 1979 were never received by the contractor laboratory; therefore, there was no data for that month. The licensee had not yet processed samples obtained since December 1979. The licensee stated that the cause for the delay was related to the transition from vendor analysis service to site laboratory analysis.

As many as 5 of the 48 air samples indicated concentrations in excess of 25% of the MPC each month. The inspector noted that the main mill building, the primary crusher building, and the secondary crusher building were posted as airborne radioactivity areas. The licensee had implemented various engineering controls including the following:

- (1) A larger scrubber had been installed to service the dryer and its enclosure.
- (2) The room enclosing the dryer had been modified to provide a double-door personnel access port.
- (3) The barreling control operation had been automated.

b. Sampling Program for Airborne Radon Daughters

The licensee stated that there was no program for evaluating radon concentrations inside the mill buildings; however, documented data for samples obtained during inspections by the Wyoming State Inspector of Mines and MESA were available. The inspector responded that failure of the licensee to evaluate radon concentrations was an apparent item of noncompliance with 10 CFR 20.103 (a)(3).

c. Personnel Exposure Data

The licensee used air sample data in conjunction with work function time studies and worker-supplied time vouchers to calculate time weighted exposures for each worker. Licensee records indicated that workers had exceeded neither the 40-hour control measure for ore dust, nor the 40-hour exposure limit for soluble uranium as specified in 10 CFR 20.103. The licensee utilized a program of worker assignment rotation in order to maintain individual exposures below weekly limits.

d. Bioassay Program

The licensee has established a bioassay program pursuant to the "Staff Technical Position" of June 1978. Urine samples have been obtained from all mill workers on a weekly basis since November 1979. Prior sampling frequency was bi-weekly. All analyses have been performed at the mill site by the licensee since January 1980 using a Scintrex model UA3 nitrogen laser fluorometer. The licensee presented data indicating that the 130 microgram per liter action level had been exceeded on the following occasions:

	<u>Date</u>	<u>ugld</u>
Individual A	7/18/79	147
Individual B	1/20/80	168
Individual B	1/27/80	142
Individual B	2/10/80	150
Individual C	2/18/80	172
Individual D	3/02/80	202

The inspector requested to see documented evaluations of these incidents, but the licensee stated that none had been prepared. The inspector responded that failure to perform a formal documented evaluation for each measurement exceeding 130 micrograms per liter was an apparent item of noncompliance with the license amendment dated June 22, 1978. The inspector verified that the licensee's program met all of the remaining requirements of the "Staff Technical

Position." The inspector also reviewed in vivo thorax data reported by vendor for counting performed March 5-8, 1979, and July 30-31, 1979. Each datum was below 16 nanocuries.

e. Respiratory Protection Program

The licensee stated that a respiratory protection program had been maintained in accordance with 10 CFR 20.103(c) but that protection factors were only applied to exposure records for personnel who work in concentrate drying and packaging areas. The inspector verified that the two types of respirators used by the licensee, COMFO II half-masks and Racal Airstream full-face supplied air units, were approved under appropriate Approval Schedules in 30 CFR 11.

The inspector noted that a protection factor of ten was credited to a yellowcake worker during June 1979 for work performed in an airborne uranium concentration of 2.4×10^{-9} microcuries per milliliter, a concentration exceeding the MPC by a factor of approximately eighteen. The inspector informed the licensee that failure to select respiratory protective equipment to provide a protection factor greater than the multiple by which peak concentrations exceed the concentrations specified in Table I, Column 1 of Appendix B to 10 CFR 20 was an apparent item of noncompliance with Section C.2 of Regulatory Guide 8.15 referenced by 10 CFR 20.103(c).

The inspector also observed that half-mask respirators were not being tested for fit with irritant smoke, prior to use, each time such equipment was donned as required by Table 1, Footnote f, of Regulatory Guide 8.15. The inspector stated that failure to perform such tests was an item of noncompliance with 10 CFR 20.103(c).

f. Contamination Surveys

Although there is no license requirement for contamination surveys, the inspector reviewed results of surveys performed during a corporate audit. This report indicated that contamination control was adequate.

7. External Exposure Control

Licensee records indicated that TLD dosimeters are provided to all mill workers on a monthly exchange frequency. Prior to November 1979 only selected mill workers were monitored and the exchange frequency was bi-weekly. The inspector reviewed data reported to the licensee by the vendor since the last inspection and noted no exposure in excess of 10 CFR 20.101 limits. A report filed by the licensee pursuant to 10 CFR 20.407 indicated that 129 individuals were monitored during 1979 and the highest exposure was less than 250 millirems. The inspector also noted

that area dose rates were determined by quarterly placement of fixed TLD dosimeters at 10 locations and by monthly instrument surveys at 37 locations.

8. Environmental Monitoring

The licensee's environmental monitoring program is described in the license application, and the inspector determined that the program had been conducted as required. The concentrations of uranium, thorium - 230, radium - 226, radon - 222, in ambient air, ground water, surface water, soil, and vegetation were noted to be less than the applicable MPC's for unrestricted areas and did not display increasing trends.

The licensee also measures radioactive effluents from release stacks in accordance with the license application. These data are used to report effluent release information to the NRC. Effluent reports were reviewed and found to be satisfactory, although one report was submitted later than that required by 10 CFR 40.65.

9. Audits and Training

The inspector reviewed semi-monthly reports prepared by the Radiation Coordinator for the Mill Superintendent and monthly reports of inspections conducted by the ALARA committee described in the application.

The licensee stated that all new workers are provided initial training and all other workers are provided annual refresher training which covers the radiological hazards involved in mill work and respiratory protection training. Class rosters were available for review as were acknowledgement forms signed by employees stating that safety rules and regulations had been read and understood. The inspector interviewed two workers and determined that their understanding of radiological hazards at the mill was sufficient to comply with 10 CFR 19.12. The licensee stated that female employees are instructed in the contents of Regulatory Guide 8.13 and that signatory verification of this instruction is required. The inspector reviewed one personnel folder and found a signed copy of such verification on file.

10. Fire Protection

The licensee described the following equipment as part of the mill fire protection program:

- a. seventy (70) chemical extinguishers
- b. foam sprinkler system in the SX building

- c. fire truck equipped with foam and chemical extinguishes
- d. one (1) ambulance (a second is stationed at the mine site)
- e. five (5) hydrant houses fed by a storage tank with 100,000 gallons reserve.
- f. electric and gasoline powered pumps to replenish the water storage tank
- g. evacuation sirens in the mill building

All fire protection equipment was evidenced as having been inspected at least monthly.

The licensee stated that a fire exercise was conducted during April 1980 and that the insurance underwriter had inspected the fire protection program twice since the last NRC inspection.

11. Posting, Labeling and Reports

The inspector noted that drums of yellowcake were labeled as LSA and radioactive. The inspector reviewed representative material transfer and inventory reports and verified compliance with 10 CFR 40.64. The inspector noted that documents were posted as required by 10 CFR 19.11 and 21.6.

The inspector noted continuous fencing of the restricted area and access control at the main gate. The plant entrance was posted with the information that all areas within the mill may contain radioactive material.

12. Independent Measurements

An air sample was taken in the dryer enclosure and will be analyzed for total uranium. A water sample was obtained from Sand Draw downstream of the tailings embankment and will be analyzed for uranium, Th-230, and Ra-226. Analytical results will be compared to the licensee's samples taken at the same locations at the same times. The inspector performed measurements of external radiation levels in unrestricted areas and within the mill. Measurements confirmed compliance with 10 CFR 20.

13. Exit Interview

The inspector met with licensee management (see Paragraph 1) at the conclusion of the inspection on June 3, 1980. Following a discussion of the purpose and scope of the inspection, the inspection findings were reviewed.