

1. Petrotonics Company  
P. O. Drawer 2450  
Casper, Wyoming 82601
2. February 13 and 14, 1967
3. Reinspection
4. 10 CFR 20.22
5. License No. SUA-551 (Docket No. 40-6659)
6. The inspection showed that the licensee had taken appropriate corrective action with regard to the items of noncompliance noted during the last inspection. The licensee's facilities and process for separating the uranium from the ore remain unchanged from that noted during the previous inspection.

The licensee was considering discontinuing milling operations with the termination of their contract with the AEC. The licensee is, however, currently arranging for private sale of uranium concentrate (none has been sold to date) and the milling operation is being continued. The licensee's program for determining the concentration of uranium in the restricted area and the unrestricted area remains basically the same as that noted during the previous inspection. There has been no overexposures to concentrations of uranium.

The discrepancies noted during the inspection included:

Condition No. 13(A)3  
Amendment issued 12/22/64

in that, during the period September through November, 1965, assays for uranium in the seepage liquid effluent were not performed at monthly frequency as required.

(See par. 27)

Condition 13(A)4  
Amendment issued 12/22/64

in that, the licensee failed to submit a report to the Commission showing the results of the seepage liquid assays no later than December 31, 1965. (See par. 28)

Condition 13(B)  
Amendment issued 12/22/64

in that, during the period January 1 through December 31, 1965, the licensee failed to assay for uranium in the potable liquid at six month frequency as required.

(See par. 27)

Condition 13(C)  
Amendment issued 12/22/64

in that, during the period January 1 through December 31, 1965, the licensee failed to assay for uranium in the RTH 1, 2, and 3 test wells at 12-month frequency as required. (See par. 27)

10 CFR 20.201, "Surveys".

- (b) ~~in that, during March and April, 1966, the licensee failed to assay the seepage liquid effluent for uranium and, during May through December, 1966, for Ra-226 and Th-230 in order to show compliance with 10 CFR 20.106 of the regulations. (See par. 31)~~

7. August 18 and 19, 1965

8. No

<u>PA</u>	<u>N. Paul Alley</u>	<u>3/2/67</u>
Initials	Inspector	Date
	Special Agent by Roger T. Wooten	MAR 2 1967
<u></u>	<u></u>	<u></u>
Initials	Reviewer	Date

## GENERAL INFORMATION

### Inspection History

9. The last inspection of the subject licensee was conducted on August 18 and 19, 1965.

The items of noncompliance noted during the inspection included:

1. In lieu of posting the entrance to the mill in accordance with Condition No. 10 of the license containers within the plant were not labeled as required;
2. two employees were exposed to concentrations of radioactive material in excess of the limits (the overexposures were reported as required);
3. surveys were inadequate in that time-weighted exposures were not computed for the crusher and precipitation operators during periods when the concentration of airborne uranium exceeded the MPC; and,
4. current time studies were not conducted for the precipitation operator to correctly reflect the time spent cleaning the yellow cake rotocloner.

It was determined during the current inspection that the licensee had corrected the foregoing discrepancies.

### Current Inspection

10. An unannounced reinspection of the subject licensee was conducted on February 13 and 14, 1967. The principal interviewee was Mr. C. E. Wolff, Mill Foreman. Other employees of the licensee contacted during the course of the inspection were Mr. W. Butcher, Administrative Assistant to Mr. G. K. Coates, Project Manager. Mr. Coates was in Washington, D. C. at the time of the inspection. The inspection findings were reviewed, by telephone, with Mr. Coates on February 27, 1967.

## ADMINISTRATION

### Organization

11. There has been no change in the partnership of the firms holding interest in the Petrotomics Company. Since the previous inspection, which was conducted on August 18 and 19, 1965, Mr. C. E. Wolff, Mill Foreman, has been assigned the duties of Mr. Claude Duffield as Plant Radiologist. Mr. Duffield terminated in May, 1966. In addition to the foregoing change in the organizational structure of the licensee, Mr. Emerson Kemp, Mill Superintendent, also terminated with the company. Mr. C. E. Wolff is also filling Mr. Kemp's position as Mill Superintendent. The mill continues to employ approximately 109 individuals. Although the licensee had not contracted to supply uranium under the AEC "Stretch-Out" procedure apparently disposition of the ore has been arranged by private sale. It should be noted in this connection that the licensee is setting up the machinery for the sale of the uranium but

no actual sale has taken place since the termination of the contract with the AEC. On February 10, 1967, the licensee had stockpiled 223,606 pounds of U<sub>3</sub>O<sub>8</sub> in preparation for eventual sale.

#### Responsibilities

12. The loss of certain key personnel during 1966 was due, in large part, to the licensee's completion of contract with the AEC and the impending shutdown of the mill. Mill management, as late as March 9, 1966, was under the impression that completion of Petrotonics' contract would be accomplished before December 31, 1966. However, the Petrotonics Company elected to continue mill operation indefinitely and sell the mill product to private buyers. The radiation safety program (previously administered by Mr. Claude Duffield who terminated in May, 1966) was taken over by Mr. C. E. Wolff, Mill Foreman. The radiation safety program assigned to Mr. Wolff is in addition to his normal mill foreman duties.

#### Facilities and Milling Process

13. Mr. Wolff stated that there has been no change in the facilities or mill process from that noted during the previous inspections. In fact, Mr. Wolff stated that because of the impending shutdown of the mill, there had been little maintenance of milling equipment during the entire year of 1966.

#### Housekeeping

14. During the inspection, a tour of the plant facilities and tailings area was made and it was observed that the general housekeeping in the plant appeared good. The general tailings area could be observed only from the main mill road (because of inclement weather conditions). What could be observed appeared to be adequately fenced and posted.

### RADIOLOGICAL PROCEDURE

#### Airborne Radioactive Materials - Restricted Area

15. The licensee requested in letter dated March 4, 1966, permission to sample on a quarterly frequency areas in the plant that had routinely showed concentrations of uranium below 25% of the established MPC. The licensee also stated in the letter that areas where the concentration of uranium exceeded 25% of the established MPC would be sampled at a monthly frequency. The foregoing letter was incorporated in the license issued April 20, 1966. A review of the licensee's records dating from the previous inspection in August, 1965, showed that up until April, 1966, and the incorporation of the new sampling procedure the licensee continued to collect monthly general air samples at 27 locations throughout the mill and an additional nine breathing zone samples during specific jobs. The locations, as noted during the previous inspection, corresponded to the sampling points listed in the

licensee's letter to the Commission dated February 14, 1962, which had been incorporated in License Condition No. 8. Subsequent to April, when the new sampling procedure was submitted to DHEC, monthly and quarterly samples were collected as described in the license. ~~After~~ <sup>Since</sup> March 1, 1966. In addition to the routine air sampling performed by the licensee, breathing zone samples had been taken during the few special maintenance jobs that had been undertaken since the previous inspection. A review of the records showed that the jobs where the concentrations of uranium exceeded the MPC included crusher during cleanup, yellow cake during charging and sampling of the drum, and during the cleaning of the ropelane.

#### Shift Schedule and MPC

16. There has been no change in the work schedule for plant personnel. The licensee is authorized by Condition 12 of the license to average airborne concentrations of uranium over an 80-hour period in any 14 consecutive days. The operators in the yellow cake portion of the plant work 3-1/2 days per week, for a total of 42 hours, and the operators in the crushing part of the plant work 5 days per week, 9 hours per day, for a total of 45 hours. The MPC used for the yellow cake operators is  $4.6 \times 10^{-11}$  uc/ml since these operators are required to spend one-third of their time in the sample preparation room where the exposure is to uranium with its daughters. The MPC for the crusher operator is  $2.2 \times 10^{-11}$  uc/ml.

#### Equipment

17. The sampling equipment and analytical procedures employed by the licensee remain the same as those noted during previous inspections. To recapitulate, samples are taken with a Gast air sampler using Whatman #41, 2.85 centimeter filter discs. Each sample is taken 10 minutes at 17.5 liters per minute for a total of 175 liters. The breathing zone samples are taken 12 inches from the operator's mouth while a worker is in a potential dust area and the general air samples are taken in every area in which the operator normally occupies.

#### Time Studies

18. Complete time studies have been made for the sample preparation operator, crusher operator and the yellow cake precipitation operator which encompasses the activities of the various operators within the plant. The latest time studies were completed in October 1966, and are used to compute weighted exposures for personnel. In addition to the foregoing time studies for the normal tasks performed, the licensee has also made time studies for special maintenance jobs that are done at infrequent intervals. Weighted exposures for maintenance personnel have been computed using the measured time for the performance of the job.

#### Time-Weighted Exposures

19. A review of the records dating from the previous inspection in August 1965 through November 1966 showed that the employee exposures varied from  $0.103 \times \text{MPC}$  to  $0.939 \times \text{MPC}$ . There were no instances noted wherein licensee personnel (included the packaging, precipitation, and crusher operators) received exposures in excess of the permissible limit. In addition, the licensee's computation of the weighted exposures for special maintenance work on the rotoclone and during the cleaning of dryer rakes showed that these personnel received a maximum time-weighted exposure of  $0.183 \times \text{MPC}$ . The foregoing time-weighted exposures (which are computed on a monthly basis) were all calculated using breathing zone air concentration data.

#### Previous Violations

20. The licensee was cited at the time of the previous inspection for failing to time-weight for concentration data for the crusher and precipitation operators during periods when the concentration of airborne uranium exceeded the MPC. Further, the licensee was cited for failing to use a time study which correctly reflected the actual time required to clean the yellow cake rotoclone by the precipitation operator. It was determined during the current inspection that the licensee routinely computes employee exposures for all job classifications (sample preparation, precipitation, and crusher operators) and a new time study had been conducted showing the actual times taken to clean the rotoclone.

#### Independent Samples

21. During the inspection two independent air samples were collected in the primary and secondary crusher plant. The yellow cake packaging area was shut down at the time of the inspection and no samples were taken in this area. In addition, due to inclement weather there were no samples taken outside the plant (it was snowing at the time of the inspection). The samples that were taken were sent to the Health & Safety Division, ID, for analyses. The licensee collected similar samples for comparison. The results of the samples and the corresponding results of the licensee will be added to this report as a supplement when the data become available.

#### Airborne Radioactive Material - Unrestricted Areas

22. Dating from the previous inspection which was conducted in August 1965, the licensee took samples in the unrestricted area on March 8, 1966. The licensee had noted on the survey records the wind velocity, direction, and meteorological conditions at the time of sampling. It was noted that all samples were taken downwind from the mill, with a maximum concentration in the unrestricted area of  $5.34 \times 10^{-13} \text{ uc/ml}$ . This location was noted as being 100 yards north of the crusher feed bin with the wind 20 to 30 miles per hour from the west southwest. The licensee's sampling was in accordance with the licensee's letter submitted



to the Commission dated February 14, 1962, and incorporated in the license. The licensee stated, in part, "... sample locations will be located relatively close to the mill and not exceeding 500 feet from the origin point of the dust. Experience has shown that such contamination is confined to areas within 1000 feet of the origin. Such a survey will be conducted on an annual or semiannual basis". The foregoing survey indicated that the licensee is complying with the provisions of the February 14, 1962 letter.

#### Radiation Surveys

23. There has been no direct radiation survey of the plant since June 1964. The June 1964 survey confirmed previous survey results recorded by the licensee on several occasions. As a consequence, the licensee discontinued making direct radiation surveys because of the repetitive nature of the results.

#### Personnel Monitoring

24. The licensee supplies film badges to two yellow cake operators and four precipitation operators. Film badge service continues to be supplied by Tracerlab on a two-week frequency. A review of the film badge records dating to the previous inspection through the end of 1966, showed that, with one exception, all quarterly exposures were less than 25% of the limits specified by paragraph 20.101(a). The one exception was one quarterly exposure of 360 mr. This exposure was recorded as whole body exposure by Tracerlab.

#### Posting and Labeling

25. The licensee is exempt from the requirements of Section 20.203(e)(2) and 20.203(f)(2), 10 CFR 20, for areas and containers within the mill provided all entrances to the mill are conspicuously posted in accordance with Section 20.203(e)(2) and with the words, "Any Area Or Container Within This Mill May Contain Radioactive Material". It was noted during the last inspection that one mill entrance had not been posted in accordance with Condition 10 of the license. At the time of the current inspection, it was observed that the licensee had posted the entrance in accordance with Condition 10 of the license.

#### Instruction of Employees

26. It was observed that Form AEC-3 was posted on the bulletin board located near the mill entrance and on the bulletin board which is located at the entrance to the mill employees' change room. A booklet describing the safety program at the mill continues to be provided new employees. Mr. Wolff stated that each new employee is provided oral instructions with regard to radiological safety and clean working habits. The licensee possessed copies of the license, Part 20, and procedures applicable to the licensee's program.

## Liquid Effluents

27. The licensee has five sources of water that are sampled for Ra-226, Th-230, and uranium. The water analyzed includes the mill potable water, three test wells located below the tailings ~~seepage~~ stream which originates in the unrestricted area outside the fence ~~enclosing the lower tailings dam~~. The licensee was granted an amendment to the license dated December 22, 1964, authorizing the discharging into the unrestricted area Th-230 concentrations in the seepage in excess of the limits specified in Appendix B, Table II, Column 2, Part 20. In addition, the amendment specified that the mill potable be sampled at six month intervals, three test wells be sampled at twelve month intervals, and the seepage be composited weekly and assayed at monthly intervals. The provisions of the foregoing amendment expired on December 31, 1965. An additional provision of this amendment required that the licensee submit to the Commission the survey results for their seepage sampling program no later than December 31, 1965. A review of the licensee's records dating from the last inspection in August, 1965, through December, 1965, ~~showed~~ that the licensee failed to assay (on a monthly basis) the seepage for uranium for ~~September~~, October, and November, 1965; failed to assay (on a six month basis) for uranium in the potable water during the period January 1 through December 31, 1965; and, failed to assay (on a one-year basis) for uranium in the RTH 1, 2, and 3 wells during the period January 1 through December 31, 1965. The licensee was reminded of Condition 13(A)3, 13(B), and 13(C) that require that the water from the seepage, potable, and RTH 1, 2, and 3 test wells, respectively, be assayed for uranium.
28. The licensee also failed to submit a report to the Commission no later than December 31, 1965, the results of the assays performed on the liquid seepage. The licensee was reminded of Condition ~~13(A)4~~ that required a report be filed with the Commission no later than December 31, 1965, of the results of the liquid survey program.
29. A review of the liquid assay data for 1965 and 1966 for the Ra-226, Th-230, and uranium that had been performed showed that concentration of these isotopes in the potable and RTH 1, 2, and 3 wells were within the limits specified by Appendix B of the regulations. With respect to the liquid seepage, the following information was taken from the licensee's records:

Month	Avg. Flow GPM	Ra-226 (uc/ml)	Th-230 (uc/ml)	U Nat (uc/ml)
June 1965	18	$1.6 \times 10^{-9}$	$1.0 \times 10^{-5}$	$.05 \times 10^{-5}$
July 1965	22	$2.1 \times 10^{-8}$	$9.6 \times 10^{-6}$	$.07 \times 10^{-5}$
August 1965	12	$3.7 \times 10^{-8}$	$5.3 \times 10^{-6}$	$.05 \times 10^{-5}$
September 1965	57.2	$4.6 \times 10^{-9}$	$1.2 \times 10^{-7}$	
October 1965	58.9	$2.4 \times 10^{-10}$	$6.5 \times 10^{-8}$	
November 1965	43.9	$5.6 \times 10^{-9}$	$2.0 \times 10^{-8}$	
December 1965	54.4	$0.51 \times 10^{-8}$	$.11 \times 10^{-6}$	$.05 \times 10^{-5}$

No samples in January and February 1966



Month	Avg. Flow GPM	Ra-226 (uc/ml)	Th-230 (uc/ml)	U Nat (uc/ml)
March 1966	164	$0.07 \times 10^{-8}$	$0.008 \times 10^{-6}$	
April 1966	63	$0.17 \times 10^{-8}$	$0.021 \times 10^{-6}$	
May 1966	13			$0.03 \times 10^{-5}$
June 1966	13			$.03 \times 10^{-5}$
July 1966	10			$.03 \times 10^{-5}$
August 1966	7			$.04 \times 10^{-5}$
September 1966	7			$.05 \times 10^{-5}$
October 1966	7			$.06 \times 10^{-5}$
November 1966	6			$.06 \times 10^{-5}$
December 1966	3			$.08 \times 10^{-5}$

A review of the above data shows that (during those months when assays were performed) the concentration of Ra-226, Th-230 and U nat did not exceed Appendix B levels for these isotopes when averaged over a period of one year.

30. As noted in paragraph 27, the authorization to release thorium in concentrations in excess of the limits expired on December 31, 1965. However, the licensee continued to sample possible and RTH test wells at semiannual and annual frequencies, respectively. A review of the data showed that the concentrations of Ra-226 and Th-230 were within the limits specified by Appendix B of the regulations.
31. With respect to the seepage stream sampling subsequent to December 1965, a review of the records (see par. 29 above) showed that the licensee did not sample the seepage stream during January and February 1966 due to inclement weather. Sampling was resumed in March and April 1966 and assays performed for Ra-226 and Th-230 on the samples taken. The licensee did not assay for uranium during these two months. According to Mr. Wolff, samples were collected from May 1966 through December 1966 and uranium assays were performed. However, neither Ra-226 or Th-230 was run on the seepage stream for the months of May through December 1966. The licensee was reminded that failure to perform an adequate survey program to show compliance with 10 CFR 20.106, "Concentrations in effluents to unrestricted areas", constituted noncompliance with 10 CFR 20.201(b), "Surveys". It was noted to the licensee that prior to December 1965, Condition 13 of the license specifically outlined the liquid sampling procedures and authorized concentrations of Th-230 in excess of the limits to be discharged. It was further noted that this particular condition of the license was no longer applicable and the provisions of Part 20 require such surveys to be performed to show compliance with respect to the concentrations of liquids released to the unrestricted area.

#### Management Review

32. At the conclusion of the inspection, the results of the inspection were reviewed with Mr. Wolff. The inspection findings were also reviewed with Mr. G. K. Coates on February 27, 1967. Mr. Coates provided assurance that the liquid effluent survey program would be brought into compliance with the regulations as soon as possible. Mr. Coates added that the seepage would be sampled and assayed in the same manner as in the past when Amendment dated 12/22/64 was in effect.