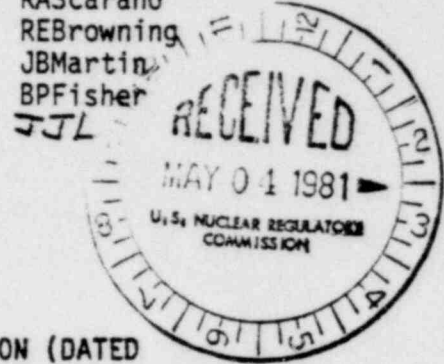


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BPFisher



WMUR:GGE
Docket No. 40-8698

MEMORANDUM FOR: LeRoy S. Person
Operating Facilities Section I
Uranium Recovery Licensing Branch

THRU: H. J. Pettengill, Section Leader
Operating Facilities Section II
Uranium Recovery Licensing Branch

FROM: Gregory G. Eadie
Operating Facilities Section II
Uranium Recovery Licensing Branch

SUBJECT: REVIEW OF EMP REPORT FOR SHOOTERING CANYON (DATED
NOVEMBER 1980)

I have reviewed "Preoperational Radiological Environmental Monitoring Program for the Shootering Canyon Uranium Project - Interim Report 1979-1980," dated November 1980. Results are reported for samples collected between the periods March 1979 through August 1980 (i.e., about a 1 1/2 year preoperational monitoring program).

Chapter 1.0 Introduction

Page 1-4: The distances (in kilometers) from the facility to the nearest receptor in the Ticaboo Townsite and in the Bullfrog Basin Marina should also be given in Table 1-1.

Chapter 2.0 Air Samples

Page 2-1: Meteorological data, including a wind rose, for the project site should be provided to verify that the off-site environmental monitors are properly located in the predominant downwind direction and also to provide data for predictive modeling purposes.

Pages 2-3 to 2-10: (Table 2-1, Air Samples) In order to avoid confusion about sampling locations and the reliance on a map of the site vicinity to show such locations, the preferable method of sampling location identification is to provide a written description of the location in the tables rather than using symbols or numbers. For example, station AP-1 should be identified as the "air particulate sampler at the dam at the South end of the tailings

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pond". Although the basic data obtained for each quarter should be reported as in Table 2-1, it would also be extremely useful to provide a summary table of all the data by sampling location. Since one of the goals of this preoperational monitoring program was to obtain the "baseline" airborne particulate concentrations, the annual average airborne radioactivity should also be provided in the summary table. See the attached table for the recommended reporting format for airborne particulate radioactivity monitoring.

Page 2-11: Contrary to the procedures used for this preoperational monitoring, when some samples were collected for only a 24-hour period each seven days, in the future, all airborne particulate sampling should be conducted on a continuous basis with weekly filter changes or more frequently as required by dust loading. The sampler head (i.e., the filter paper holder) should not be above a 2 meter height above ground surface, in order to obtain air samples in the representative breathing zone rather than changing the sampler height or collecting some filters as high as 3 meters above the ground surface.

Page 2-19: At this time, the track etch device as provided by the Terradex Corporation of Walnut Creek, CA has not been approved by the NRC for conducting radon gas monitoring because of the lack of an appropriate calibration procedure. The EMI composite radon sampling method, as described on page 2-19, and several other continuous radon monitoring instruments (e.g., the Eberline RGM-1 Radon Gas Monitor or the Aerovironment PRM - Passive Radon Monitor) are acceptable continuous radon monitoring methods.

However, with respect to the data presented in Table 2-2 concerning the radon concentrations as measured using the track etch device, a summary table would be useful. A comparison of the monthly exposure track etch results versus the quarterly exposure track etch result as shown in Attachment 2 indicates that the quarterly exposure devices (i.e. Column 6) produced results averaging 6.5 times less (ranging from 3.0 to 15.8 time less) than the average of the three monthly results (i.e., Column 5). This data indicates the uncertainty of accurately determining the radon gas concentration for monthly versus quarterly exposure periods for the track etch device. Therefore, until appropriate calibration procedures are completed for the track etch device, and the results of such tests are submitted to the NRC for review and approval, the Terradex Corporation's track etch device results should be considered inadequate for radon gas monitoring purposes.

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Page 2-18 (Table 2-3, EMI Composite Radon Sampler): The use of the EMI composite radon sampler and the associated analysis system is appropriate and acceptable. However, the sampling frequency as shown in Table 2-3 is inadequate to meaningfully monitor radon gas concentrations around the site. Although the data presented in Table 2-3 is representative of typical background concentrations of radon, the data is inadequate since it only represents a single 48 hour sample at each location. Radon gas monitoring should be conducted continuously or at least for one week each month with samples being collected about every 48 hours during that one week period in order to be consistent with the recommendations of Regulatory Guide 4.14.

Chapter 3.0 Water Samples

The complete evaluation of the ground and surface water monitoring programs will be discussed in a separate memorandum.

Pages 3-1 to 3-16 (Groundwater Samples): The results of the groundwater monitoring wells as presented in Table 3-1 appear to be at typical background concentrations for the radionuclides of concern. However, for 5 of the 6 monitor wells, only 3 grab samples have been reported, and for RM-3, only 2 grab samples are reported. Therefore, sampling should be continued for each monitor well so that at least four valid samples are obtained in order to establish the "baseline" condition for each well. Also, the baseline data for the nonradiological parameters as listed in Table 2-9 of the EIS have not been reported here.

Pages 3-17 to 3-49 (Surface Water): The extensive surface water sampling as reported in Table 3-2 of the four seeps and the runoff locations in the site vicinity indicate background concentrations except for the 160 pCi/g of radium-226 (suspended) in the runoff sample at Location 23 on 3-15-79. (This particular result should be checked and confirmed.) In the future, surface water monitoring should be conducted at Lake Powell near its junction with Hansen Creek since that is the nearest permanent water impoundment. Sampling should be conducted on a quarterly basis, with quarterly analysis for both the dissolved and suspended components of uranium, radium-226, thorium-230, but only semiannual analysis for both the dissolved and suspended components of lead-210 and polonium-210. Surface water sampling of the seep or runoff locations should be conducted only if there has been some type of direct surface drainage from potentially contaminated areas, or if there has been some type of tailings discharge or accidental release to such areas, or if the Lake Powell water samples indicate an elevated level above the baseline concentrations of the uranium decay chain series radionuclides. Therefore, since only two water samples have been reported for Lake Powell, on 3-11-80 and 6-29-80, at least two additional samples should be collected and analyzed to establish the baseline concentrations of both the suspended and dissolved radionuclides (U, Th-230, Ra-226, Po-210 and Pb-210).

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Chapter 4.0 Vegetation and Fish Samples

The vegetation sampling results as shown in Table 4-1 indicate background concentrations of the radionuclides of interest. In the future, however, vegetation sampling should be conducted in the Spring and Summer seasons as well, especially during the grazing season.

The single sample of fish from Lake Powell (page 4-19) indicates no detectable levels of radioactivity; therefore, due to the distance from the site, future fish sampling may be suspended so long as the water sample results from Lake Powell are at baseline levels.

Chapter 5.0 Soil and Sediment Samples

Pages 5-1 to 5-34: All of the surface and subsurface soil sample results indicate background levels of the uranium decay chain series radionuclides.

Pages 5-35 to 5-56 (Table 5-9): The sediment sample results as provided in Table 5-9 indicate background concentrations of the uranium decay chain series radionuclides. However, the results given for samples from Location 3 on 7-7-80 (page 5-43) and for Location 4 on 7-7-80 (page 5-46) appear to have the wrong exponent; i.e., the value of E-9 is given whereas the exponent most probably is E-6.

Chapter 6.0 Direct Radiation

The gamma survey measurements given in Table 6-1 are representative of background gamma exposure rates, except for location NNW7.5 which had a rate of 93.6 mR/gr (page 6-5). This particular high exposure rate should be checked and confirmed and if it is real, the source of this higher exposure rate should be determined and explained.

The thermoluminescent dosimeter (TLD) results provided in Table 6-4 are representative of background exposure rates. However, it is not clear what exposure periods were used to obtain these results and this matter should be clarified. The text indicates that the TLD's were replaced at three month intervals (page 6-12); however, the first TLD data give the dates from 7-3-79 to 10-3-79 (page 6-14), but the second table gives the dates 7-3-79 to 1-3-80 (page 6-15), and the third table gives the dates from 1-3/4/79 to 4-1-80 (page 6-16). The exact exposure period for each of these three TLD data sets should be explained. Also, contrary to the statement made on page 6-12, no comparison has been made or discussed between the direct gamma dose rate measurements and these TLD results. The comparison between results using the TLD versus the gamma survey meter should be presented and discussed.

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Chapter 7.0 Radon Flux

The radon flux estimates as given in Table 7-1 appear to be realistic and representative of background flux rates. However, only 9 locations were sampled instead of the recommended 10 locations, and the sampling frequency at 7 of those locations was less than the recommended quarterly sampling frequency. The additional radon flux measurements should be completed in order to establish the baseline value.

Appendix A

The sample analysis information and the lower limits of detection (LLD's) as provided in Appendix A for the Eberline Instrument Corporation appear to be adequate to support a meaningful environmental monitoring program. The description of Eberline's QA Program as provided in Section A-6, "Description of Quality Control" appear to be adequate; however, the licensee should obtain and evaluate the monthly QA reports prepared by the Eberline laboratory and these findings should also be included in the reports to the NRC. Since no similar sample analysis information has been provided for the Hazen Research of Golden, CO, the sample results from this laboratory have been considered as supplemental information only and as such have not been reviewed or approved.

Summary

The preoperational environmental monitoring program results as reported in this Interim Report for 1979-80 are essentially adequate to establish the "baseline" levels of the uranium decay chain series radionuclides of concern for the various sample types. With a few exceptions as outlined above, the sufficient number of sampling locations and the sample collection frequency are consistent with the recommendations of Regulatory Guide 4.14. However, where necessary, additional samples should be collected and analyzed so that the "baseline" value may be established based on the sampling frequency as recommended in Regulatory Guide 4.14.

The greatest deficiency in this preoperational program is the radon gas monitoring method using the track etch device rather than the approved continuous or EMI type of sampler with a 48 hour collection period for at least one week each month. Until adequate calibration procedures for the track etch device are reviewed and approved by the NRC, some other type of radon gas monitoring should be conducted consistent with the recommendations of Regulatory Guide 4.14 (e.g., the EMI sampler with 48 hour collection period for at least one week each month for a total of 12 monthly results per year). Also, airborne particulate monitoring shall be conducted on a continuous basis rather than the 24-hour period each seven days as was the case for several samplers as reported.

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The presentation of basic data should be better organized by providing a summary table for each specific location listing sequential sampling results; rather than the mere reporting of data as in this interim report. Also, the final report should have summary and comparison tables which show the basic data used to obtain the baseline value or which support the conclusions reached from the various sampling schemes.

Future environmental monitoring program reports submitted to the NRC in compliance with 10 CFR Part 40.65 should contain the analytical results for samples collected during the previous six month period. Such compliance reports should be submitted with 60 days after January 1 and July 1 of each year, with a copy sent directly to the Uranium Recovery Licensing Branch, U. S. Nuclear Regulatory Commission, Washington, DC 20555.

Original signed by

Gregory G. Eadie
Operating Facilities Section II
Uranium Recovery Licensing Branch
Division of Waste Management

Attachments:

- 1. Summary Table - Airborne Particulate Monitoring ($\mu\text{Ci}/\text{m}^3$)
- 2. Comparison of Track Etch Radon Monitoring Methods ($\mu\text{Ci}/\text{m}^3$)

Approved by: Original signed by

H. J. Pettengill, Section Leader
Uranium Recovery Licensing Branch

Case Closed: 04008698M01E

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Summary Table
Airborne Particulate Monitoring ($\mu\text{Ci}/\text{mk}$)

Location	AP-1 On-Site at South End of Tailings Dam	AP-2 On-Site, East End of Plant Site	AP-3 On-Site, Northeast	AP-4 On-Site North End of Tailings Pond	C-1 Nearest Actual Residence Bullfrog Basin Marina	C-2 Nearest Planned Residence Ticaboo Townsite
<u>3Q 79</u>						
U-nat	2.0E-16	No data	3.3E-16	No data	0.53E-16	2.7E-16
Th-230	1.4E-16	"	1.3E-16	"	0.49E-16	2.6E-16
Ra-226	0.86E-16	"	0.49E-16	"	0.21E-16	0.93E-16
Pb-210	220E-16	"	190E-16	"	140E-16	90E-16
<u>4Q 79</u>						
U-nat	1.40E-16	3.2E-16	3.2E-16	2.6E-16	0.88E-16	1.40E-16
Th-230	0	0	3.8E-16	0	0	0.90E-16
Ra-226	0.74E-16	1.52E-16	1.52E-16	2.2E-16	0.52E-16	0.68E-16
Pb-210	280E-16	420E-16	360E-16	280E-16	420E-16	320E-16
<u>1Q 80</u>						
U-nat	3.5E-16	2.8E-16	1.4E-16	2.6E-16	0.48E-16	0.81E-16
Th-230	1.5E-16	0	0	1.5E-16	0.76E-16	0.62E-16
Ra-226	1.3E-16	1.4E-16	1.3E-16	1.2E-16	0.25E-16	0.35E-16
Pb-210	140E-16	1330E-16	230E-16	250E-16	210E-16	200E-16
<u>2Q 80</u>						
U-nat	1.6E-16	1.5E-16	1.4E-16	1.5E-16	0.30E-16	0.67E-16
Th-230	0.95E-16	0.97E-16	1.2E-16	1.5E-16	0.22E-16	0.65E-16
Ra-226	0.70E-16	0.92E-16	0.86E-16	0.38E-16	0.24E-16	0.25E-16
Pb-210	170E-16	180E-16	160E-16	300E-16	170E-16	110E-16

Annual Average Baseline Airborne Particulate Radioactivity
(for the period July 1979 through June 1980)

U-nat	2.5E-16	2.33E-16	2.3E-16	0.548E-16	1.42E-16
Th-230	0.97E-16	2.1E-16	1.5E-16	0.49E-16	1.21E-16
Ra-226	1.20E-16	1.04E-16	1.26E-16	0.305E-16	0.553E-16
Pb-210	643E-16	240E-16	277E-16	235E-16	182E-16

Comparison of Track Etch Radon Monitoring Methods ($\mu\text{Ci}/\text{ms}$)

Location	April 1980*	May 1980*	June 1980*	Quarterly Average of Three Monthly Results	2nd Quarter Results** (Separate Track Etch device)
C-1 Bullfrog Basin Marina	0.18E-9	0.87E-9	0.19E-9	0.41E-9	0.06E-9
C-2 Ticaboo Townsite	0.70E-9	0.64E-9	1.5E-9	0.95E-9	0.06E-9
AP-1 On-Site at South End of Tailings Dam	0.18E-9	0.17E-9	0.19E-9	0.18E-9	0.06E-9
AP-2 On-Site, East End of Tailings Pond	0.18E-9	0.17E-9	0.19E-9	0.18E-9	0.06E-9
AP-3 On-Site Northeast	0.18E-9	0.17E-9	1.3E-9	0.55E-9	0.23E-9

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Comparison of Track Etch Radon Monitoring Methods ($\mu\text{Ci}/\text{me}$)

Location	April 1980*	May 1980*	June 1980*	Quarterly Average of Monthly Results	2nd Quarter Results** (Separate Track Etch device)
AP-4 On-Site, North End of Tailings Pond	0.44E-9	1.8E-9	0.99E-9	1.1E-9	0.14E-9

*Data from pages 2-14 and 2-15

**Data from page 2-17

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