ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	40-8902
License No.:	SUA-1470
Report No.:	40-8902/96-01
Licensee:	Atlantic Richfield Company (ARCO)
Facility:	Former Bluewater Mill Facility
Location:	Grants, Cibola County, New Mexico
Date:	October 3, 1996
Inspector:	Robert J. Evans, P.E., Health Physicist Nuclear Materials Inspection and Fuel Cycle/Decommissioning Branch Division of Nuclear Materials Safety
Accompanied By:	Elaine S. Brummett, Health Physicist Uranium Recovery Branch Division of Waste Management Office of Nuclear Material Safety and Safeguards
Approved By:	Charles L. Cain, Acting Deputy Director Division of Nuclear Materials Safety

Attachments:

Attachment 1:	Partial List of Persons Contacted List of Items Opened, Closed, and Discussed List of Acronyms
Attachment 2:	Photographs Taken at the Bluewater Mill Facility

EXECUTIVE SUMMARY

Former Bluewater Mill Facility
NRC Inspection Report 40-8902/96-01

This inspection included a review of site status, closeout inspection and survey, and followup of commitments made previously to the NRC.

Closeout Inspection and Survey

- A limited confirmatory survey was performed by the NRC inspector and staff members of the Oak Ridge Institute for Science and Education (ORISE). The survey was performed to validate that the soil around the site had been cleaned up to the limits specified in 10 CFR 40, Appendix A, Criterion 6. The survey did not identify any area of the site that failed to meet the acceptance criteria for radium-226 concentrations in the soil (Section 2).

- The NRC obtained six archived soil samples from the licensee that were originally obtained from the former evaporation pond area. The samples were analyzed by ORISE for their thorium-230 content and compared to the licensee's sample results. The sample results were not statistically comparable in two out of six cases. In addition, several sample results exceeded the guideline value for thorium-230 in surface soil. The NRC's Office of Nuclear Material Safety and Safeguards plans to resolve this issue prior to the termination of the license (Section 2).

- Several commitments were made to the NRC during this and the previous inspections. The licensee fulfilled these commitments prior to the end of this inspection period (Sections 2 and 3).

Report Details

1 Site Status

At the time of the inspection, there were no licensee employees in place at the site. All work was being performed by contract workers. Recent activities completed by the licensee included burial of contaminated material containing small amounts of polychlorinated biphenyls (PCBs). In a letter dated October 2, 1996, the NRC formally approved the burial of this mixed waste. At least 3 feet of compacted clay cover material was placed over the mixed waste. At the time of the inspection, no additional construction work was required to be performed by the licensee at the site.

One structure remained on site during the facility inspection: the PCB storage building. The licensee verbally informed the NRC that they had subsequently disassembled and removed this building from the site immediately after the onsite inspection. Other activities planned in the near future included the installation of site location markers (referred to as "tombstones") and property line postings designating portions of the site as Department of Energy land. A road and a gate have been installed by the licensee for site access by Department of Energy personnel once the ARCO license has been terminated by the NRC.

2 Closeout Inspection and Survey (83890)

2.1 Inspection Scope

The objective of the inspection was to verify that the facility had been decontaminated to acceptable levels and to assure that the facility will not present a radiation hazard to future occupants.

2.2 Observations and Findings

a. Confirmatory Survey

The licensee was required to decommission the Bluewater facility to the limits provided in 10 CFR 40, Appendix A, Criterion 6, prior to termination of License SUA-1470 by the NRC. The licensee must ensure that the tailings impoundment meets the radon-222 flux limit and that the rest of the site meets the limit for radium-226 in soil. By letters dated August 22, 1995, and October 31, 1995, the licensee submitted the results of their site radon flux tests to the NRC. The NRC, by letter dated December 13, 1995, accepted the licensee's radon flux measurements for the main tailings impoundment (which included the former acid tailings pile). In addition, the flux data for the carbonate pile was accepted by the NRC by letter dated March 10, 1995. At the time of the current inspection, the NRC had not approved the licensee's radon flux test results, submitted to the NRC by letter dated June 17, 1996, for the remaining specific areas including the plant

site, former ore stockpile area, Disposal Area No. 1, the Asbestos Disposal Area, the North Landfill, and the South Landfill.

According to Appendix A of 10 CFR 40, the licensee must clean up the land around the tailings impoundment until the concentration of radium in land, averaged over 100 square meters, does not exceed the background level by more than 5 picocuries per gram (pCi/g) of radium-226 averaged over the first 15 centimeters below the surface and 15 pCi/g of radium-226 averaged over 15 centimeter thick layers more than 15 centimeters below the surface. In previous correspondence with the NRC, the licensee demonstrated to the NRC that the background concentration for radium-226 in the soil was 1.9 pCi/g at the site; therefore, the acceptance criteria for the radium-226 concentration in the first 15 centimeters (approximately 6 inches) of soil was set at 6.9 pCi/g.

In an attempt to verify that the site property contained radium-226 concentrations below the limit following cleanup of the property, the licensee obtained gamma radiation measurements and collected soil samples. During site surveys, if the gamma radiation measurements exceeded a certain value, then the licensee assumed that the soil contained an excessive amount of radium-226, and additional cleanup was deemed necessary. The licensee continued the gamma scan and cleanup cycles until the site soil was determined to be free of excessive radium-226 concentrations. However, at the time of this inspection, the NRC had not determined if the licensee's data related to the radium-226 concentrations in the soil was acceptable and had adequately demonstrated compliance with 10 CFR 40.

During the inspection, a limited confirmatory survey was performed on portions of the site property. The survey was performed by the NRC inspector and by staff from the ORISE. This confirmatory survey was a followup to a survey that had been performed by the NRC and ORISE representatives on June 12, 1996, at the site. The confirmatory survey was performed to substantiate the adequacy and accuracy of the licensee's final status survey results.

The survey consisted of soil sampling, surface scan surveys, and gamma exposure rate measurements in seven selected areas. The licensee's global positioning system was used to accurately identify the point where the radiological samples were obtained. The surface scan surveys were obtained using a sodium-iodide detector to locate potential radioactive "hot spots." The soil samples obtained were analyzed for their radium-226 concentrations to ensure that the soil acceptance criteria limit of 6.9 pCi/g had not been exceeded, and to help confirm the adequacy of the licensee's correlation data between surface ambient gamma measurements and the soil radium concentrations. Finally, gamma exposure rate measurements were obtained for comparison to background values. Unfortunately, inclement weather during the site visit prevented the NRC from collecting background soil samples.

The soil samples that were collected at the site were composite samples obtained over a 100 meter^2 area. The samples were analyzed using gamma spectrometry by ORISE in Oak Ridge, Tennessee. The results of the NRC/ORISE radiological samples are as follows:

SOIL SAMPLE IDENTIFICATION	SAMPLE LOCATION	RADIUM-226 CONCENTRATION (pCi/g)
S001	N35091/E29193	4.59 ± 0.11
S002	N32000/E29000	1.36 ± 0.07
S003	N36850/E25850	1.23 ± 0.06
S004	N26583/E24383	1.92 ± 0.08
S005	M29250/E21350	1.90 ± 0.06
S006	N25783/E27616	6.01 ± 0.10
S007	N25750/E28250	3.60 ± 0.09

In summary, none of the soil samples exceeded the radium-226 acceptance criteria limit of 6.9 pCi/g. The data results suggest that the licensee had remediated the site property to the limits specified in Criterion 6 of 10 CFR 40, Appendix A.

In addition, six soil samples were obtained from the licensee's archives for verification analysis of their thorium-230 content. These samples were previously obtained by the licensee from the former evaporation ponds area. Elevated thorium-230 concentrations had been identified by the licensee in certain areas of the site. (The standards provided in 10 CFR 40, Appendix A, do not specifically address thorium-230 concentrations in soil, although thorium-230 decays to radium-226.) The six soil samples were analyzed by ORISE using gamma and alpha spectrometry.

The thorium-230 sample results were not statistically comparable in two out of six cases. (That is, ORISE measurements were generally higher than those of the licensee.) In addition, several samples exceeded the guideline value of 14.3 pCi/g of thorium-230 in surface soil. (The value 14.3 pCi/g is the amount of thorium-230 that would decay to 5 pCi/g of radium-226 in about 1000 years.) Followup and resolution of this issue will be completed by the NRC's Office of Nuclear Material Safety and Safeguards prior to the termination of the license.

b. Other Decommissioning Issues

The inspectors discussed with the licensee the information provided in the licensee's letter dated September 23, 1996. This letter provided responses to NRC questions and comments (submitted to the licensee by NRC letter dated September 20, 1996) about the licensee's reclamation completion report. In response to the discussions, the license committed to submit supplemental information to the NRC's program office. After the onsite inspection was completed, in a letter dated October 18, 1996, the licensee provided the NRC with the information that fulfilled the commitments made during the inspection.

Also briefly discussed were the licensee's plans for the long term disposition of site records. After submittal of selected records to the NRC, the licensee stated that the remainder may be shipped for storage at the licensee's main office in California. For example, the licensee planned to keep the site employee exposure records for an indefinite period of time. The licensee planned to send an index of all records to the NRC in the near future for determination of which records need to be submitted in accordance with 10 CFR 40.36.

In addition, the NRC randomly selected and reviewed the licensee's color-coded radiological survey maps. The hand-written gamma readings on the licensee's "Verification Survey Data Sheets" were compared to the data entered into the licensee's computer system which was used to generate the maps. Four 1000 meter by 1000 meter blocks of gamma survey data were reviewed. No problems were identified that would cast doubt on the validity of the information provided on the survey maps.

2.3 Conclusions

A limited confirmatory survey was performed at the Bluewater facility. No radioactivity was identified that was above the limits established in 10 CFR 40, Appendix A. Higher than expected thorium-230 concentrations were found in soil samples that were analyzed by ORISE and the licensee. The NRC's Office of Nuclear Material Safety and Safeguards will review this issue prior to license termination. Commitments made by the licensee during the onsite inspection were resolved by the licensee prior to the end of the inspection period. Finally, a spot check was performed on the licensee's radiological survey maps; nothing was identified that would suggest that the final data was inaccurate.

3 Followup (92701)

During an NRC inspection conducted on June 12, 1996, and documented in NRC Inspection Report 40-8902/96-201, the licensee committed to provide the NRC with additional information related to rock gradation and thorium-230 sampling. In the first case, the licensee committed to submit information related to potential deficiencies with the site's erosion protection design. Draft correspondence was

submitted to the NRC during September 1996. In the second case, the licensee committed to conduct additional soil sampling for thorium-230 in the vicinity of the former evaporation ponds. The licensee submitted this additional information to the NRC by letters dated June 24, 1996, and September 23, 1996. Therefore, the licensee was deemed to have fulfilled their commitments that they had previously made to the NRC.

Exit Meeting Summary

The inspector presented the preliminary inspection results to the representatives of the licensee at the conclusion of the inspection on October 3, 1996. Licensee representatives acknowledged the findings as presented.

An exit interview was held with the licensee on November 14, 1996. The final results of the inspection, including the soil sample results, were presented to the licensee during this meeting.

Attachment 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee

N. Patel, Consultant, AVM Environmental Services, Inc.
R. Ziegler, Site Manager

Oak Ridge Institute for Science and Education

R. Morton, Technician, Environmental Survey and Site Assessment Program
T. Vitkus, Survey Projects Manager, Environmental Survey and Site Assessment Program

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Closed

None

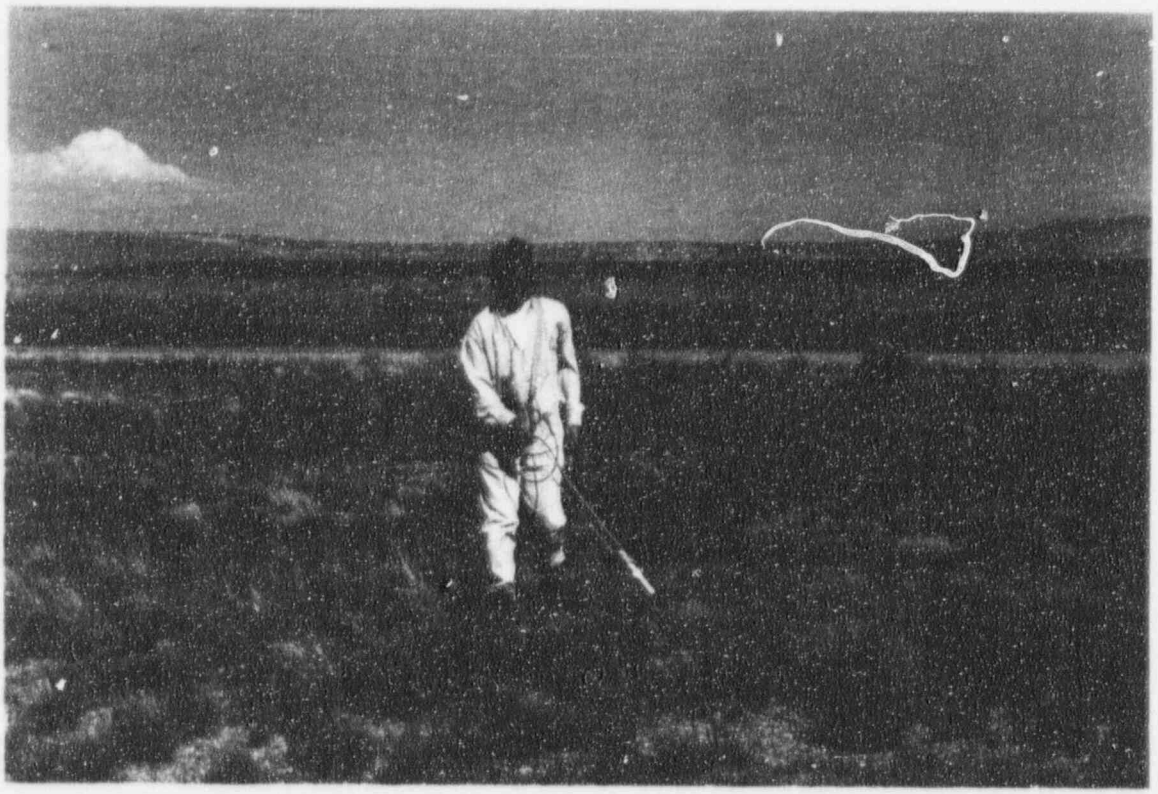
Discussed

None

LIST OF ACRONYMS USED

ARCO	Atlantic Richfield Company
ORISE	Oak Ridge Institute for Science and Education
PCB	polychlorinated biphenyls
pCi/g	picocuries per gram

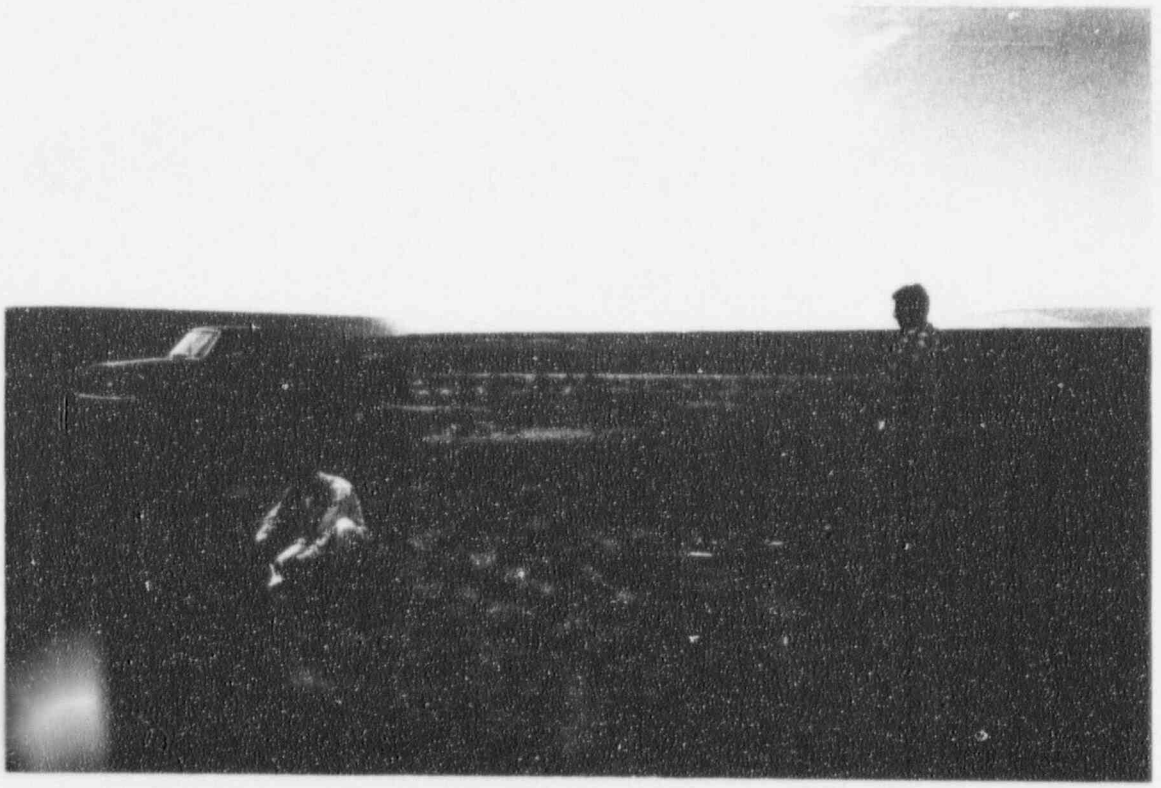
PHOTOGRAPHS TAKEN AT THE BLUEWATER MILL FACILITY



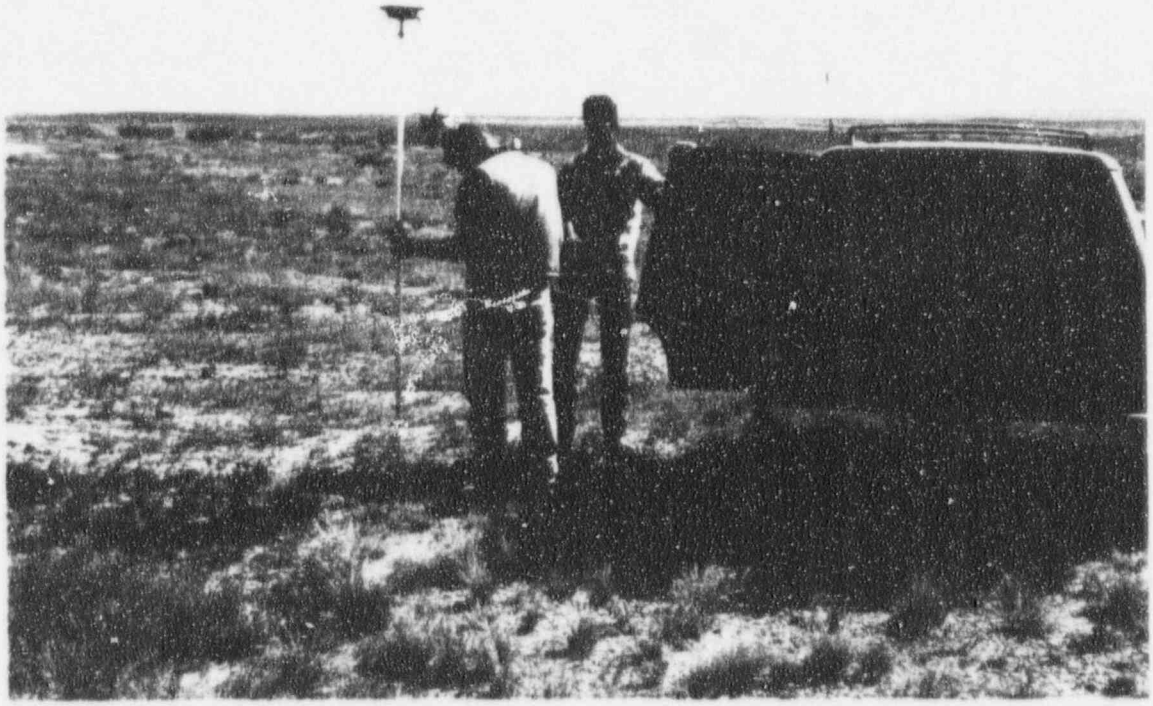
Photograph 1 - ORISE representative performing surface gamma scans using sodium-iodide detector.

Photograph 2 - ORISE representative performing surface gamma scans; the former tailings impoundment can be seen in background.

Photograph 3 - ORISE representative using pick axe to break up ground prior to collection of soil sample.



Photograph 4 - ORISE representative (left) obtaining a soil sample while licensee representative (right) obtains a gamma survey measurement.



Photograph 5 - Licensee's global positioning system was used to accurately identify the point where the radiological samples had been obtained.