

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.: 40-8902
License No.: SUA-1470
Report No.: 40-8902/97-01
Licensee: Atlantic Richfield Company (ARCO)
Facility: Former Bluewater Mill Facility
Location: Grants, Cibola County, New Mexico
Date: January 6-7, 1997
Inspector: Robert J. Evans, P.E., Health Physicist
Nuclear Materials Inspection and
Fuel Cycle/Decommissioning Branch
Division of Nuclear Materials Safety
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 40-8902/97-01

This inspection included a review of site status; management organization and controls; site operations; and the licensee's radiation protection, waste management and environmental protection programs.

Management Organization and Controls

- Licensee staffing was adequate for the work in progress. Procedures had been established at the site and were found to be adequate for the staff currently assigned (Section 2).

Operations Review

- Recent site activities were noted to have been conducted in accordance with the applicable license and regulatory requirements (Section 3).

Radiation Protection

- The licensee had developed a radiation protection program that met the intent of the license and NRC regulations. Areas of the radiation protection program reviewed and found to be satisfactory included equipment release surveys, ALARA audits, maintenance of records, and equipment calibrations. Occupational exposures at the site were small fractions of the limits established in 10 CFR 20 (Section 4).

Radioactive Waste Management/Environmental Protection

- A review of the licensee's environmental and groundwater monitoring programs, and the annual land use survey, indicated that the licensee was in compliance with license requirements. All reports related to the groundwater and environmental monitoring programs had been submitted to the NRC as required. A review of the reports and the original laboratory documentation revealed that the radiological releases from the site to the environment during 1995 were within the limits established by 10 CFR 20 (Section 5).

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 or its contractors included:

- Disassembly and removal of the last building, the PCB Storage Building, from within the restricted area.
- Installation of the site location marker (referred to as the "tombstone") and 52 property line postings designating portions of the site as Department of Energy land.
- Reworking an area on the north end of the main tailings pile during December 1996 to eliminate a low point on top of the pile. This activity was performed to reduce the potential for standing water to accumulate on the pile.

In anticipation of the termination of the license in early 1997, the licensee has discontinued their groundwater monitoring, environmental monitoring, and most of their radiation protection programs. Following license termination, the licensee plans to abandon 21 of 30 groundwater monitoring wells. The remaining 9 wells will be left in service for long-term monitoring of the site property.

2 Management Organization and Controls (88005)

2.1 Inspection Scope

The organizational structure was reviewed to ensure that the licensee had established an organization with defined responsibilities and functions. The site standard operating procedures were reviewed, and the licensee's implementation of these procedures were assessed to evaluate the effectiveness of the licensee's control of site activities.

2.2 Observations and Findings

a. Management Organization

Site staffing requirements are established in License Condition 32. In their letter dated February 20, 1995, the licensee submitted an organization chart to the NRC for implementation at the site. The staff at the site, with the exception of the project manager, was replaced with contract workers at the beginning of 1996. At the time of the onsite inspection, there were no ARCO employees at the site on a daily basis, and all work was being performed by contract workers on an as-needed basis.

b. Management Controls

License Condition 20 states that written procedures shall be established for nonoperational activities to include in-plant and environmental monitoring, bioassay analyses, and instrument calibrations. In addition the license states that the radiation safety officer shall perform a documented review of all existing site procedures at least annually.

The licensee's master procedure manual was reviewed. All procedures required by the license were found in the manual. In addition, procedures were still available for use if needed for programs that had been discontinued, including the respiratory protection program. Furthermore, the site procedures had been reviewed on an annual basis, with the last annual review being performed by the radiation safety officer during February 1996.

2.3 Conclusions

Licensee staffing was adequate for the work in progress. Procedures had been established at the site. The procedures were found to be adequate, and up-to-date, for the work in progress.

3 Operations Review (88020)

3.1 Inspection Scope

A facility tour was performed to verify that site activities were being conducted in accordance with applicable regulations and the conditions of the license, and to ensure that operational controls were adequate to protect the health and safety of the workers and members of the general public.

3.2 Observations and Findings

There were no standing structures in the restricted area or the area that will be turned over to the Department of Energy following termination of the license. One structure, a farmhouse that had been temporarily used as an office, was located on site property but outside of the restricted area. Current security measures consisted of maintaining the access gates locked and use of fences. The site's fences were noted to be in excellent condition. Restricted area postings were noted to meet the intent of License Condition 17. A pile of crushed rock was noted to be left on site property for future use, such as for road maintenance or repair.

In recent months, the site was visited, as a minimum, weekly by the licensee's contractors to change out the filters in the environmental monitoring air particulate samplers. The licensee discontinued the weekly filter change-outs on December 30, 1996. After that date, site entries were to be made on an as-needed basis depending on the work in progress.

3.3 Conclusions

Recent site activities appeared to have been conducted in accordance with applicable license and regulatory requirements. Site fences were in good condition, and perimeter postings were appropriate. No significant health or safety hazards were identified.

4 **Radiation Protection (83822)**

4.1 Inspection Scope

The purpose of this portion of the inspection effort was to determine if the licensee's radiation protection program was in compliance with the requirements established in the license and 10 CFR Part 20 regulations.

4.2 Observations and Findings

a. Employee Exposures

The radiation dose assessment requirements have been established in License Condition 32. The licensee's external personnel monitoring program consisted of issuance of thermoluminescent dosimeters (TLDs) to site employees and to selected contractors. The TLD's were being exchanged on a quarterly basis up until the end of the third quarter of 1996. The licensee suspended the use of personnel TLDs for workers in the restricted area because of the completion of reclamation and decommissioning activities at the site. During the fourth quarter of 1996, the licensee estimated the external exposures based on time spent in a known radiation field.

During 1995, 374 people were monitored for exposure using TLDs, down from 512 workers in 1994. The highest deep dose equivalent (as measured by the TLDs) during 1995 was 101 millirems for two individuals. During 1996, 53 individuals were monitored for exposure using TLDs. The highest deep dose equivalent for the first three quarters of 1996 was 20 millirems for one individual. The decreases in the amount of dose received and the number of TLDs issued in 1996 was reflective of the reduced workload at the site during 1996 as compared to the 1995 workload.

Internal radiation doses were calculated in 1995 and 1996 based on air sampling data or similar data. A total of 391 air samples were obtained during 1995, and 11 samples were obtained during 1996. The information gained during the performance of these air samples was incorporated into the committed effective dose equivalent calculations.

During 1995, the highest total effective dose equivalent (summation of external and internal doses) for an individual was conservatively estimated to be 357 millirems.

During 1996, the highest total effective dose equivalent was 82 millirems. A review of dosimetry records indicated that exposures were well below the annual 10 CFR 20.1201 limit of 5000 millirems. Based on these results, site workers received less than 10 percent of the occupational dose limit established in 10 CFR 20.1201. Therefore, in accordance with 10 CFR 20.1502, the use of personnel monitoring was not necessary.

The routine personnel exposure monitoring program (including use of TLDs) was discontinued by the licensee by the end of 1996. The licensee planned to use personnel monitoring, and other portions of the radiation protection program, on an as-needed basis to support any work activity being performed under the radiation work permit program during 1997.

b. Employee Training

Site training requirements are provided in License Condition 32. The licensee is required to provide new employee training and annual refresher training to site workers. A written examination is required to be taken and passed by all site workers prior to working in the restricted area. The licensee was noted to have discontinued the annual refresher training and written examinations. This was deemed appropriate by the inspector in light of site status. The last examination was given to site workers during August 1995. Since the discontinuance of the annual refresher training and site examinations, the licensee has provided specialized training to workers on an individual basis prior to the workers being authorized entry to the site.

Safety meetings were conducted on a monthly basis up until December 1995. Work briefings were performed during 1996 on an as-needed basis.

c. Equipment Calibrations

License Condition 18 states in part that the results of calibration of equipment shall be documented. In addition, survey instruments were required by License Condition 32 to be calibration checked on a semi-annual basis. The licensee's calibration records for selected instruments were reviewed during the inspection. In addition, the air sampler calibration records were inspected. Calibration records existed for the site's survey and sampler instrumentation. The licensee allowed the calibrations of the instrumentation to expire at the end of 1996 since the instruments were no longer needed.

d. Release of Equipment for Unrestricted Use and Employee Monitoring

Personnel and equipment decontamination requirements are provided in License Condition 32. Weekly contamination surveys of lunch rooms, monthly contamination surveys of offices, and random/routine personnel spot checks were discontinued during late-1995 by the licensee. (One random spot check of site personnel was performed during June 1996.) Personnel contamination surveys were performed after 1995 only as stipulated under guidance provided in applicable radiation work permits versus the routine program requirements.

With respect to the release of equipment for unrestricted use, the NRC determined during a previous inspection that the licensee had unintentionally developed inaccurate guidance related to the efficiency of the survey equipment used to perform the radiological surveys. The licensee used a "2 pi" instrument efficiency factor when they should have used a "4 pi" efficiency factor. This erroneous interpretation was subsequently referenced in the license (Condition 31). During this inspection, the licensee's equipment release records were reviewed to ascertain whether the licensee had inadvertently released equipment with contamination above the guideline values provided in Regulatory Guide 1.86, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproducts, Source, or Special Nuclear Material."

The licensee maintained extensive records for components and equipment released for unrestricted use. A spot check of the licensee's records did not reveal any item that had been inappropriately released. The licensee's implementing procedure suggests that an As Low As Reasonably Achievable (ALARA) limit of 25 percent of the guideline values was used during the equipment surveys. Furthermore, the licensee's radiation safety officer stated that no equipment had been released with contamination levels at or near the guideline values. Therefore, there was no indication that the licensee had released equipment with contamination above the guideline values as a consequence of having used an instrument efficiency factor of 2-pi rather than the required 4-pi efficiency factor.

e. Annual ALARA Audit

Annual As Low As Reasonably Achievable (ALARA) audits are required by License Condition 32. The most recent ALARA audit was performed in May 1996. The audit report was submitted to the NRC on June 24, 1996. The audit was noted to be a comprehensive document that effectively identified trends in the radiation protection program.

Although not required by the license, a monthly report had been issued by the radiation safety officer. Monthly reports were issued for all twelve months of 1995; however, the radiation safety officer only issued two reports (June and July) during 1996. The licensee suspended the issuance of the reports following the July 1996 report. The reports that were issued during 1995 and 1996 were reviewed during

the inspection. The reports were noted to provide an adequate overview of the implementation of the radiation protection program at that time.

f. Radiation Work Permits

The requirements for radiation work permits (RWP) are provided in License Condition 21. During 1995, the licensee issued two RWPs, while five RWPs were issued during 1996. One representative RWP was reviewed and compared to the conditions of the license. The RWP was noted to comply with the conditions of the license. The licensee planned to issue RWPs during 1997 on an as-needed basis.

4.3 Conclusions

The licensee had developed a radiation protection program that met the intent of the license and NRC regulations. Areas inspected and found to be satisfactory included equipment release surveys, ALARA audits, maintenance of records, and equipment calibrations. Site employees' exposure to radiation, based on summations of internal and external exposures, was down significantly in 1996 from previous years. No individual appeared to have exceeded 10 percent of the occupational limits established in 10 CFR 20.

**5 Radioactive Waste Management (88035)
And Environmental Protection (88045)**

5.1 Environmental Protection

a. Inspection Scope

The environmental monitoring program at the site was reviewed to assess the effectiveness of the licensee's program and to evaluate the effects, if any, of site activities on the local environment.

b. Observations and Findings

Environmental monitoring program requirements are identified in License Conditions 12, 32, and 37. License Condition 12 states that the results of all effluent and environmental monitoring required by the license shall be reported in accordance with 10 CFR 40, Section 40.65. License Condition 32 states that the licensee shall implement the radiation safety and environmental monitoring programs specified in its letters dated February 20, 1995, and February 22, 1995. Finally, License Condition 37 states that the licensee shall perform air particulate, radon, soil, and vegetation sampling at two locations: the Berryhill House (the background location) and the nearest residence location (Station No. 102A or alternative).

The two semi-annual reports for 1995, the semi-annual report for the first half of 1996, and the raw data for the second half of 1996 (for which a report had not

been issued) were reviewed during the inspection, as well as the original data used to develop the semi-annual reports. Overall, the licensee had obtained and reported the environmental monitoring samples as required by License Condition 12.

Air particulate sampling was continuously performed at four locations during the first half of 1995, three locations during the second half of 1995, and two locations during 1996. (The licensee reduced the number of environmental monitoring stations to two, the minimum number of stations required by the license.) The composite filter samples were analyzed on a quarterly basis for their natural uranium, thorium-230, radium-226 and lead-210 particulate content. The results for 1995 and 1996 indicated that all radionuclides were less than five percent (most were under one percent) of the effluent limits established in 10 CFR 20, Appendix B, Table 2.

Radon-222 monitoring was performed at the environmental monitoring stations during 1995 and 1996. The radon was measured continuously with track etch devices. The sample results indicated that the maximum radon concentration, 1.9 picocuries per minute (1.9 E-9 microcuries per milliliter), was measured at the nearest residence location during the fourth quarter of 1995. This value was 19 percent of the effluent concentration limit (1.0 E-8 microcuries per milliliter) established in 10 CFR 20, Appendix B. Most sample results were less than 10 percent of the limits.

Ambient gamma exposure rates were measured at the sample stations. The gamma exposure rates were continuously measured with thermoluminescent dosimeters that were changed out on a quarterly basis. The background station (Berryhill House) measured 105.6 millirems of gamma exposure during 1995 and 77 millirems during the first three quarters of 1996. The southeast perimeter station measured 113 millirems (7.4 millirems above background) during 1995 and 87 millirems (10 millirems above background) during the first three quarters of 1996. Also, the nearest residence sample station measured 115 millirems of exposure during 1995, or 9.4 millirems above background. Exposure rate measurements were not obtained at the nearest resident location during 1996 because this station was no longer required by the license. (The southeast perimeter station is located between the main tailings pile and the former nearest residence station and provides a conservative location for estimation of offsite exposures.) In summary, the ambient gamma exposure rates measured at the downwind stations during 1995 and 1996 suggested that the doses that could have been received by individual members of the public did not exceed the limit (100 millirems) established in 10 CFR 20.1301.

Vegetation and soil samples were obtained annually at each of the sample stations. The samples were obtained in September 1995 and October 1996. The samples were analyzed for their natural uranium, thorium-230, radium-226, and lead-210 concentrations. The highest radionuclide concentration in the vegetation samples was observed in the Berryhill House (background station) sample obtained in September 1995. In this sample, the lead-210 concentration was 430 E-6 microcuries/kilogram of vegetation. The NRC has not established limits for vegetation samples; however, the sample results for 1996 were comparable to previous years' sample results.

The highest radionuclide concentrations measured in the soil samples were observed in the southeast perimeter samples. The radium-226 concentration was 4.9 picocuries per gram in the September 1995 sample and 4.2 picocuries per gram in the October 1996 sample. All radium-226 sample results were below the NRC guideline value (5 picocuries per gram above background) established by 10 CFR 40, Appendix A.

The licensee utilized two contractor laboratories for sample analysis, one for environmental monitoring sample analysis and the second for groundwater sample analysis. Both laboratories were verified by the inspector to be properly licensed to possess radioactive materials. In addition, both laboratories possessed Environmental Protection Agency certifications.

On December 23, 1996, the licensee formally requested NRC permission to terminate the environmental monitoring program beginning January 1997 at the Bluewater Mill site. The request was made because site reclamation was complete, license termination was imminent in early 1997, and recent environmental monitoring data indicated that the airborne and groundwater concentrations were below the limits and stable. As of January 1, 1997, the licensee had discontinued the environmental monitoring program pending license termination.

License Condition 29 states that written procedures shall be established for instrument calibrations. The licensee performed a calibration of the low-volume environmental air samplers on a quarterly basis during 1995 and 1996. The licensee allowed the air sampler calibrations to expire at the beginning of January 1997 because the licensee did not plan further use of this equipment.

5.2 Groundwater Compliance Monitoring Program

a. Inspection Scope

The groundwater compliance monitoring program was reviewed to verify that the program was consistent with the requirements specified in the license.

b. Observations and Findings

A groundwater compliance monitoring program is required to be implemented by License Conditions 32 and 34. The program consisted of sampling six point-of-compliance wells on a semi-annual frequency for molybdenum, natural uranium, and selenium content in the groundwater. In practice, the license sampled the wells on a quarterly basis during 1995 and 1996. The sample results were submitted to the NRC in the semiannual effluent reports for 1995 and 1996. The data for the last half of 1996 had not been submitted to the NRC at the time of the inspection. A review of the semi-annual effluent reports and the preliminary data for the third quarter of 1996 indicated that none of the samples had exceeded the groundwater protection standards listed in the license.

On December 23, 1996, the licensee formally requested NRC permission to terminate the groundwater compliance monitoring program beginning January 1997. As of January 1, 1997, the licensee had discontinued the groundwater monitoring program pending license termination. Once the License SUA-1470 is terminated by the NRC and the State of New Mexico has terminated the Discharge Plan (the State has been petitioned to allow the licensee to permanently terminate the Discharge Plan), the licensee plans to abandon 21 of 30 onsite monitoring wells. Nine wells will be kept in service for use by the Department of Energy (or other perpetual custodian of the site), including the six point-of-compliance wells. The physical abandonment of the wells will take about a week once the work has begun. The licensee plans to submit a well completion report to the NRC when the 21 wells have been abandoned.

In accordance with License Condition 34, the licensee is required to submit an annual corrective action program review to the NRC by December 31 of each year. On January 18, 1996, the licensee requested that they no longer be required to submit corrective action program reviews to the NRC as required by the license. The letter also noted that the NRC project manager for this site had verbally agreed in principle with the licensee's request to discontinue the annual submittals. Therefore, the licensee did not submit annual corrective action program reviews to the NRC for 1995 or for 1996. At the time of this inspection, the NRC had not formally approved the licensee's request to discontinue the annual corrective action program review submittals.

5.3 Annual Land Use Survey

License Condition 33 stipulates that an annual survey of land use be performed annually. In addition, this report shall be submitted to the NRC by July 1 of each year. The licensee's 1995 and 1996 land use surveys were reviewed during the inspection. A report was submitted for 1995. In addition, the licensee submitted a letter to the NRC during 1996 which stated that no changes in land use had been made since the previous report. In summary, the licensee had submitted documentation related to the land use survey that met the intent of the license.

5.4 Conclusions

The licensee had obtained environmental and groundwater monitoring samples as required during 1995 and 1996. A review of the data failed to reveal any upward trends at any of the environmental monitoring stations. In addition, the groundwater sample results were below the protection standards listed in the license. The annual land use surveys were submitted to the NRC as required by the license. In summary, the site did not appear to contribute significant amounts of radioactivity into the environs of the site during the previous two years.

6 **EXIT MEETING SUMMARY**

The inspector presented the inspection results to the representatives of the licensee at the conclusion of the inspection on January 7, 1997. Licensee representatives acknowledged the findings as presented.

Attachment 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee

N. Patel, Consultant/Radiation Safety Officer, AVM Environmental Services
J. Sanchez, Environmental Technician, AVM Environmental Services

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None were opened in this report. In addition, a review of the NRC's information systems revealed that there are no outstanding open items, unresolved items, violations, or deviations for this licensee.

Closed

None

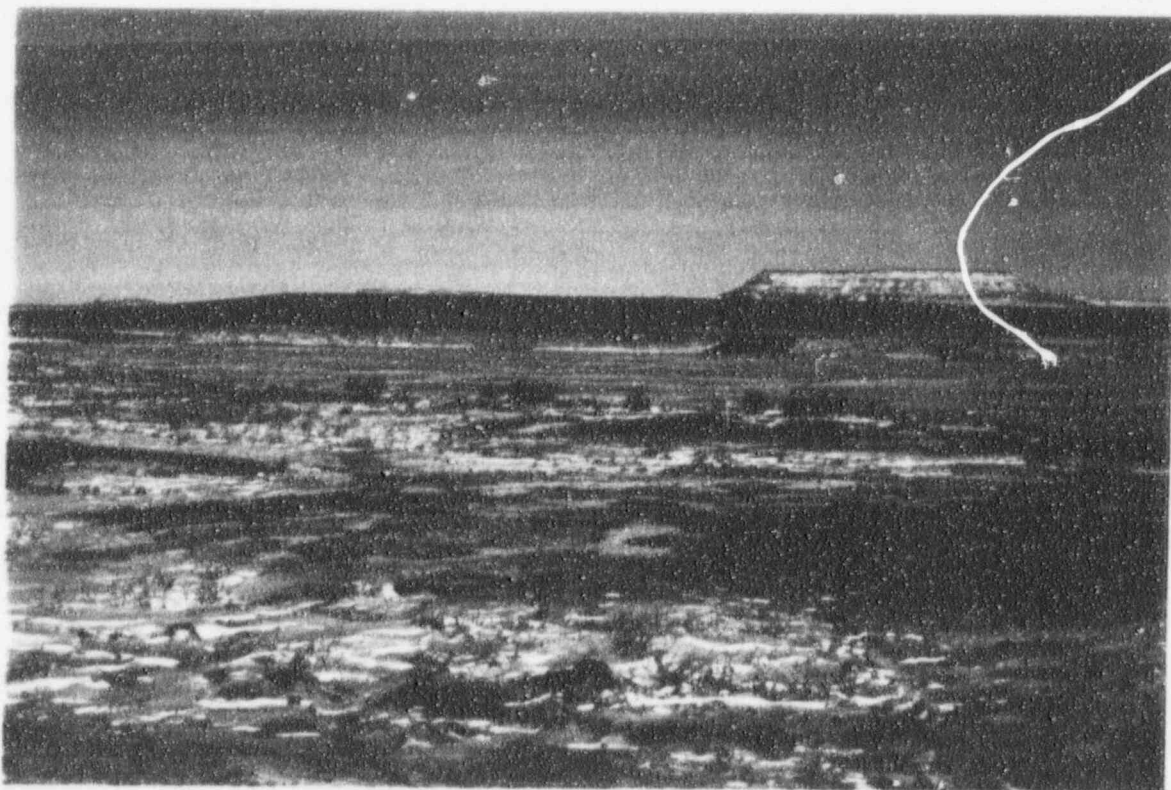
Discussed

None

LIST OF ACRONYMS USED

ALARA	As Low As Reasonably Achievable
ARCO	Atlantic Richfield Company
RWP	radiation work permits
TLD	thermoluminescent dosimeters

ATTACHMENT 2 - PHOTOGRAPHS TAKEN AT THE BLUEWATER MILL FACILITY



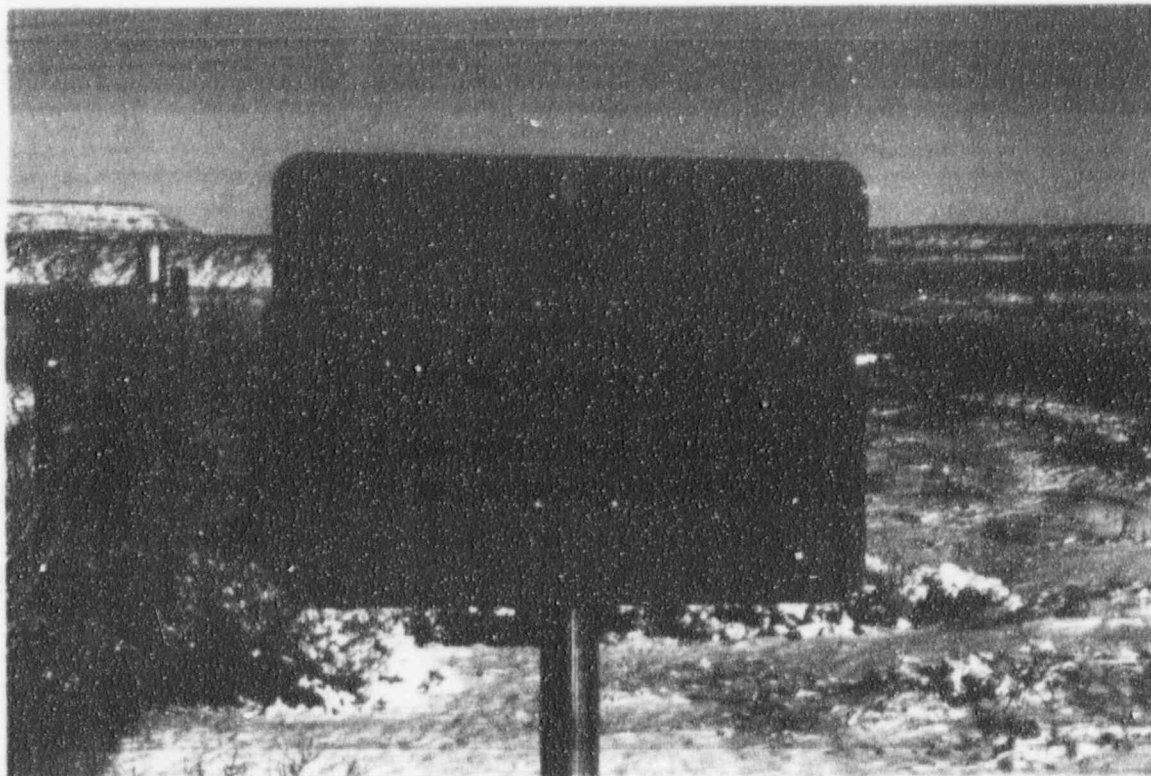
Photograph 1 - The Main Tailings Pile at the ARCO site.



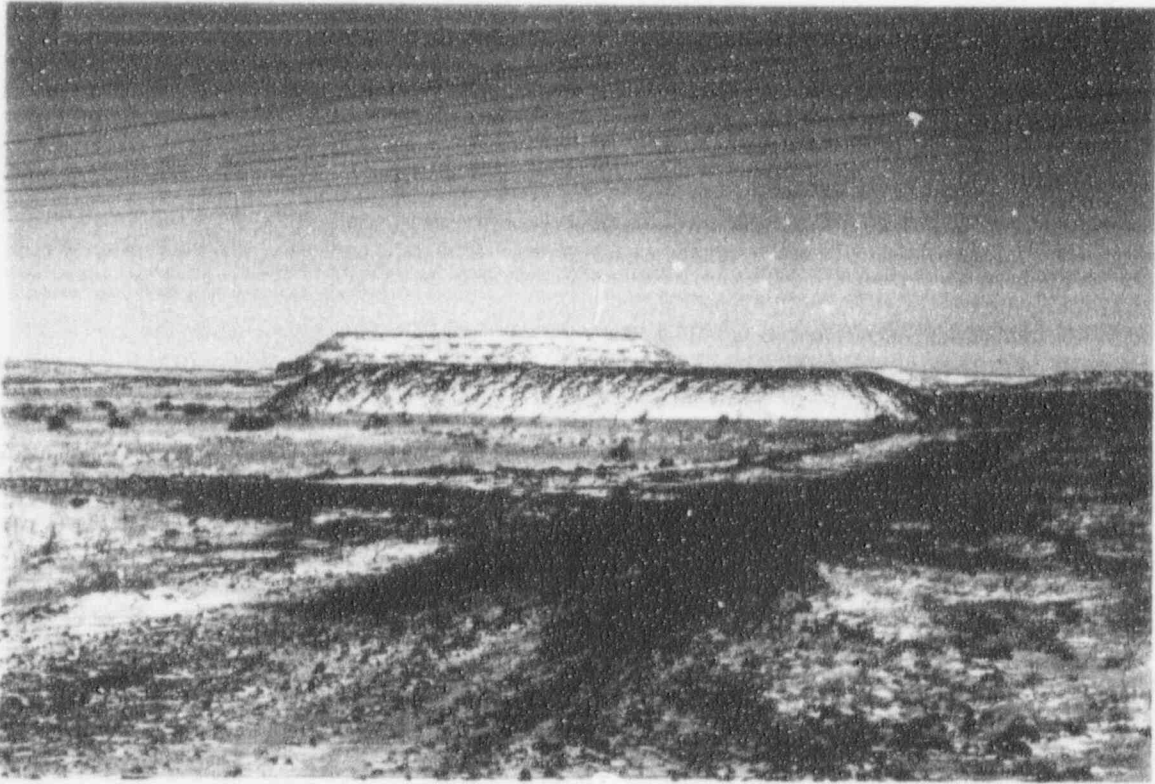
Photograph 2 - NRC Inspector adjacent to the Location Marker with Main Tailings Pile in background.



Photograph 3 - Closeup of the Location Marker.



Photograph 4 - One of 52 signs recently installed on site property.



Photograph 5 - Rock (pile left of gate) available for future road maintenance activities.