UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

February 6, 2002

Mr. J. William Vinzant
Regional Environmental Manager
Corporate Environmental Affairs
Kaiser Aluminum and Chemical Corporation
9141 Interline Avenue, Suite 1A
Baton Rouge, Louisiana 70809-1957

SUBJECT: NRC INSPECTION REPORT 040-02377/01-02

Dear Mr. Vinzant:

This refers to the inspection conducted on December 6-7, 2001, at the former Kaiser Aluminum Specialty Products facility in Tulsa, Oklahoma. The purpose of the inspection was to determine whether decommissioning and remediation activities were being conducted in accordance with the commitments made in your Remediation Plans and other documents. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. The final inspection findings were presented to Mr. Paul Handa, Site Administrator, on February 1, 2002. The enclosed report presents the results of that inspection. No response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Mr. Robert J. Evans at (817) 860-8234 or Dr. D. Blair Spitzberg at (817) 860-8191.

Sincerely,

/CLCain for/

Dwight D. Chamberlain, Director
Division of Nuclear Materials Safety

Docket No.: 040-02377
License No.: STB-472 (terminated)

Enclosure:
NRC Inspection Report
040-02377/01-02

cc w/enclosure:
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ENCLOSURE

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	040-02377
License No.:	STB-472 (Terminated in March 1971)
Report No.:	040-02377/01-02
Property Owner:	Kaiser Aluminum & Chemical Corp. (Kaiser)
Facility:	Former Kaiser Aluminum Specialty Products Facility
Location:	7311 East 41st Street Tulsa, Oklahoma
Inspection Dates:	December 6-7, 2001
Inspector:	Robert J. Evans, PE, CHP, Health Physicist Fuel Cycle & Decommissioning Branch
Accompanied by:	Linda M. Psyk, Health Physicist Materials Safety and Inspection Branch Division of Industrial and Medical Nuclear Safety Office of Nuclear Material Safety and Safeguards
Approved By:	D. Blair Spitzberg, Ph.D., Chief Fuel Cycle & Decommissioning Branch
Attachments:	Supplemental Inspection Information Photographs Taken at the Former Kaiser Facility

EXECUTIVE SUMMARY

Former Kaiser Aluminum Specialty Products Plant
NRC Inspection Report 040-02377/01-02

This was an announced inspection of the Kaiser Aluminum Specialty Products facility, formerly occupied by the Standard Magnesium Company and Kaiser Magnesium. This inspection included a review of the groundwater and surface water sampling programs.

Closeout Inspections and Surveys

- Kaiser has conducted quarterly sampling of surface and groundwater since 1999. The inspector observed sampling in progress and concluded that Kaiser collected the samples in accordance with the requirements specified in the applicable work plan, implementing procedures, and an industry standard. The samples were analyzed for the radionuclides specifically mentioned in the work plan and implementing procedures (Section 1).

- Five samples were collected by the NRC simultaneously with the collection of Kaiser's samples at the same locations. The samples were analyzed by both the NRC's and Kaiser's contract laboratories. The sample results were considered to be in reasonable agreement. In cases where there was not agreement within the statistical errors, the results were very low and well below any applicable effluent concentration limit. The licensee will continue to sample the surface water and groundwater to identify any radionuclides or trends present in the surface waters and groundwater monitoring wells (Section 1).

Report Details

Summary of Site Status

From 1958 until 1971, Standard Magnesium Corporation, and later Kaiser Magnesium, possessed thorium for use in the manufacture of magnesium anodes. License STB-472 was terminated by the U.S. Atomic Energy Commission during March 1971. During November 1993, an NRC inspector toured the Kaiser Aluminum facility and determined that the site was still contaminated with radioactive material. The site was subsequently added to the NRC's Site Decommissioning Management Plan during August 1994.

Remediation of the site will occur in phases. Phase I involved remediation of offsite contamination, while Phase II involved remediation of onsite contamination. The Phase I Adjacent Land Remediation Plan was approved by the NRC on April 4, 2000. Offsite remediation occurred between October 2000 and May 2001. About 285,000 cubic feet of soil was moved from offsite locations into the restricted area. The Phase I final radiological status survey was recently submitted to the NRC but has not been approved.

The Phase II Remediation Plan was also submitted to the NRC and is under review by the NRC. Kaiser recently conducted a radiological characterization survey in the former operational area, and this information will be submitted to the NRC in a future survey report. Kaiser will submit an addendum to the Phase II Remediation Plan to account for residual contamination identified in the former operational area.

1 Closeout Inspection and Surveys (83890)

1.1 Scope

Kaiser's water sampling program was reviewed and compared to the requirements specified in the applicable work plan, implementing procedures, and an industry standard. Groundwater and surface water samples were collected and analyzed by both the NRC's and Kaiser's contract laboratories for comparison of the sample results.

1.2 Observations and Findings

Kaiser began collecting water samples on a quarterly basis during September 1999. Kaiser sampled 23 wells and 3 surface water sites. The purpose of the routine water sampling and analysis program was to monitor the nature and extent of any radioactivity in the water within the vicinity of the Retention and Reserve Pond areas. Previous analytical results indicate that the groundwater in the upper-most water bearing unit (the shallow overburden unit) may be impacted by previous disposal of thorium-bearing dross material in and around the surface impoundments, the Retention Pond, and the Reserve Pond. The radionuclides of concern at the Kaiser site include thorium-232, thorium-230, thorium-228, radium-228, and radium-226.

The inspector observed Kaiser's representatives obtain groundwater and surface water samples during the inspection. The work was compared to Kaiser's Work Plan For

Groundwater and Surface Water Monitoring as well as the Ground Water Sampling and the Surface Water Sampling Procedures. The inspector also compared the sampling protocol to the industry standard, "Standard Guide for Sampling Groundwater Monitoring Wells," American Society for Testing and Materials (ASTM) Guide D4448-85a.

The inspector observed Kaiser measure the water level in selected wells, purge the wells, collect the samples, flush the equipment between samples, and conduct field analyses of the samples. The field analyses included measurement of water pH, temperature, conductivity, dissolved oxygen content, and turbidity. Kaiser collected both filtered and unfiltered samples. The filtered samples were collected using a 0.45 micron filter. Kaiser's samples were kept in cold storage until transfer to the local laboratory for analysis. Chain of custody forms were used for all samples collected. Overall, Kaiser conducted the sampling program in accordance with the implementing procedures, work plan, and ASTM guide.

During the inspection, the NRC inspector obtained five water samples, including two surface water and three groundwater samples. The samples were collected at the same time Kaiser collected its samples. The samples were filtered in the field with a 0.45-micron filter. The samples were analyzed by the NRC's contract laboratory, Oak Ridge Institute for Science and Education (ORISE), for comparison to samples analyzed by Kaiser's contract laboratory, Outreach Laboratory. The sample results, in units of picocuries per liter (pCi/l), were:

Fulton Creek (pCi/l)

	Alpha	Th-232	Th-230	Th-228	Ra-228	Ra-226
NRC	1.8 ± 1.7	-0.02±0.14	0.14 ± 0.16	-0.02±0.23	0.48 ± 0.99	0.08 ± 0.18
Kaiser	N/A	0.00 ± .066	.706 ± .180	0.00 ± .075	0.00 ± .050	.349 ± .144

Retention Pond (pCi/l)

	Alpha	Th-232	Th-230	Th-228	Ra-228	Ra-226
NRC	9.2 ± 2.8	0.03 ± 0.09	0.03 ± 0.14	0.00 ± 0.15	2.5 ± 1.0	0.07 ± 0.16
Kaiser	N/A	0.00 ± .063	.506 ± .170	.046 ± .079	1.27 ± .057	1.29 ± .205

Monitoring Well MWD-8 (pCi/l)

	Alpha	Th-232	Th-230	Th-228	Ra-228	Ra-226
NRC	16.1± 4.6	0.04 ± 0.06	0.27 ± 0.17	0.31 ± 0.22	6.9 ± 1.5	0.34 ± 0.25
Kaiser	N/A	0.00 ± .093	.063 ± .132	0.00 ± .098	3.86 ± .068	.987 ± .170

Monitoring Well P-5 (pCi/l)

	Alpha	Th-232	Th-230	Th-228	Ra-228	Ra-226
NRC	12.3± 3.9	0.06 ± 0.07	0.13 ± 0.11	0.26 ± 0.23	1.8 ± 1.2	0.71 ± 0.36
Kaiser	N/A	0.00 ± .053	0.00 ± .099	.008 ± .077	1.79 ± .053	.099 ± .119

Monitoring Well MWD-10 (pCi/l)

	Alpha	Th-232	Th-230	Th-228	Ra-228	Ra-226
NRC	3.2 ± 2.3	0.07 ± 0.10	0.09 ± 0.13	0.07 ± 0.13	0.4 ± 1.2	0.11 ± 0.14
Kaiser	N/A	0.00 ± .090	.229 ± .145	0.00 ± .107	.673 ± .048	0.00 ± .140

Outreach Laboratory was not required to analyze the samples for gross alpha concentrations. Therefore, gross alpha sample results were not provided by this laboratory. The radium-228 sample results from ORISE were considered "qualified" results because the laboratory experienced difficulties in reaching the minimum detectable concentration based on the limited sample volumes available for analyses.

Water effluent concentrations are specified in Table 2 to Appendix B of 10 CFR Part 20. These concentrations, when averaged over a year, represent effluent limits. The most restrictive radionuclide in the thorium series is thorium-232 which has an effluent concentration limit of 3 E-8 microcuries per milliliter of water, or 30 pCi/l. The effluent concentration limits for both radium-226 and radium-228 is 60 pCi/l. No sample result exceeded any respective effluent concentration limits.

As reference points, the U.S. Environmental Protection Agency provides limits for selected radionuclides in drinking water. 40 CFR 141.15 provides the maximum contaminant levels (MCLs) for community water systems. The MCLs for combined radium-226 and radium-228 is 5 pCi/l, while the gross alpha particle activity (including radium-226 but excluding radon and uranium) is 15 pCi/l. However, according to Kaiser, the site's groundwater is not likely to ever be a drinking water source.

During this sampling event, one NRC sample result exceeded the MCL of 5 pCi/l for combined radium-226 and radium-228. The NRC measured 7.24 pCi/l for combined radium-226 and radium-228 from well MWD-8, while Kaiser measured 4.85 pCi/l for the same well. For comparison, the June 2001 sample result (the last sample result available during the inspection) was 3.35 pCi/l. Well MWD-8 is a deep overburden unit well that is located in the northeastern corner of the property in the general area of the former Reserve Pond.

The sample obtained from MWD-8 also exceeded the gross alpha MCL of 15 pCi/l. The NRC measured 16.1 pCi/l in the water sample obtained from well MWD-8. As noted before, Outreach Laboratory did not measure the MWD-8 sample for gross alpha.

In summary, the sample results were considered to be in reasonable agreement between the two laboratories. A few of the comparisons were not in agreement within the statistical errors but all of the results in these cases were very low and well below any applicable effluent concentration limit. Consequently, the lack of agreement in these cases is not a significant concern to the NRC.

No sample result exceeded the 10 CFR Part 20 effluent concentration limits, while one sample result exceeded the MCLs for community water systems. The sample obtained from well MWD-8 exceeded the gross alpha and combined radium-226 and radium-228 MCLs. Neither the NRC nor Kaiser had attempted to confirm the MWD-8 sample results through subsequent sampling. Additional quarterly sampling will be necessary to establish any trends that may be present in and around the site.

1.3 Conclusions

Kaiser has conducted quarterly sampling of surface and groundwater since 1999. The inspector observed sampling in progress and concluded that Kaiser collected the samples in accordance with the requirements specified in the applicable work plan, implementing procedures, and an industry standard. The samples were analyzed for the radionuclides specifically mentioned in the work plan and implementing procedures.

Five samples were collected by the NRC simultaneously with the collection of Kaiser's samples at the same locations. The samples were analyzed by both the NRC's and Kaiser's contract laboratories. The sample results were considered to be in reasonable agreement. In cases where there was not agreement within the statistical errors, the results were very low and well below any applicable effluent concentration limit. The licensee will continue to sample the surface water and groundwater to identify any radionuclides or trends present in the surface waters and groundwater monitoring wells.

2 Exit Meeting Summary

The inspector reviewed the scope and findings of the inspection during the exit briefing that was conducted at the conclusion of the onsite inspection on December 7, 2001. In addition, a final telephonic exit briefing was conducted on February 1, 2002, to discuss the water sample results. Kaiser did not identify as proprietary any information provided to, or reviewed, by the inspector.

ATTACHMENT 1

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Kaiser Aluminum & Chemical Corp.

D. Anderson, Environmental Specialist, A&M Engineering and Environmental Services, Inc.
P. Handa, Site Administrator, Kaiser Aluminum & Chemical Corp.
I. Taner, Chief Geologist, A&M Engineering and Environmental Services, Inc.

INSPECTION PROCEDURES USED

IP 83890 Closeout Inspection and Surveys

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None.

Closed

None.

Discussed

None.

LIST OF ACRONYMS USED

ASTM	American Society for Testing and Materials
CFR	Code of Federal Regulation
IP	Inspection Procedure
MCL	maximum contaminant level
NRC	Nuclear Regulatory Commission
ORISE	Oak Ridge Institute for Science and Education
pCi/l	picocuries per liter
Ra	radium
Th	thorium

ATTACHMENT 2

WATER SAMPLING AT KAISER ALUMINUM & CHEMICAL CORP.

Kaiser representatives collecting surface water samples from Fulton Creek.

Conducting field analyses of water samples, including pH, conductivity, dissolved oxygen, temperature, and turbidity.