

UNITED STATES NUCLEAR REGULATORY COMMISSION REGION IV 611 RYAN PLAZA DRIVE, SUITE 400 ARLINGTON, TEXAS 76011-4005

May 5, 2003

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 040-02377/2003-001

Dear Mr. Vinzant:

This refers to the inspection conducted on April 9-10, 2003, at the former Kaiser Aluminum Specialty Products facility in Tulsa, Oklahoma. The purpose of the inspection was to determine whether site activities were being conducted in accordance with the commitments made in your remediation plans and other documents. Radiological surveys were conducted on several site structures to confirm that these structures were free of residual radioactive contamination. In summary, no formerly licensed radioactive material was identified on the accessible walls and roofs of these structures. The enclosed report presents the details of that inspection.

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 the undersigned at (817) 860-8191.

Sincerely,

/RA/

D. Blair Spitzberg, Ph.D., Chief Fuel Cycle and Decommissioning Branch

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

Enclosure: NRC Inspection Report 040-02377/2003-001 Kaiser Aluminum and Chemical Corp.

cc w/enclosure: Mr. Paul Handa, Site Administrator Kaiser Aluminum & Chemical Corporation 7311 East 41st Street Tulsa, Oklahoma 74145

Douglas Wilson Manager, Environmental Services Office of Environmental Services City of Tulsa 4818 South Elwood Avenue Tulsa, Oklahoma 74107-8129

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Oklahoma Radiation Control Program Director

Kaiser Aluminum and Chemical Corp. -3-

bcc w/enclosure (via ADAMS e-mail distribution): EECollins JTBuckley, NMSS/DWM/DCB DBSpitzberg RJEvans JSMcAnallen FCDB NBHolbrook RIV Nuclear Materials File - 5th Floor

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U. S. NUCLEAR REGULATORY COMMISSION REGION IV

Docket No.:	040-02377	
License No.:	STB-472 (Terminated in March 1971)	
Report No.:	040-02377/2003-001	
Property Owner:	Kaiser Aluminum & Chemical Corp. (Kaiser)	
Facility:	Former Kaiser Aluminum Specialty Products Facility	
Location:	7311 East 41st Street Tulsa, Oklahoma 74145	
Inspection Dates:	April 9-10, 2003	
Inspectors:	Robert J. Evans, PE, CHP, Senior Health Physicist Fuel Cycle & Decommissioning Branch	
Accompanied by:	Julia S. McAnallen, Nuclear Safety Intern Special Projects and Inspection Branch Division of Fuel Cycle Safety and Safeguards 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 Kaiser's Facility Analytical Results for Smear Samples from Kaiser Aluminum and Chemical Corporation	

EXECUTIVE SUMMARY

Former Kaiser Aluminum Specialty Products Plant NRC Inspection Report 040-02377/2003-001

This was an announced inspection of the Kaiser Aluminum Specialty Products facility, formerly occupied by Standard Magnesium Company. This inspection included a review of site status, radiation protection, environmental monitoring, and closeout inspection and survey of selected site structures.

Radiation Protection

• Radioactive material signs were conspicuously posted. Gates and fences were in good condition. Material control was adequate. Radiological surveys were conducted by the inspector, and the survey measurements were consistent with previous measurements. Personnel exposures were well below 10 CFR Part 20 requirements. Records of training, audits, and instrument calibrations were being maintained. In summary, Kaiser's radiation protection program was appropriate for the activities being conducted at the site (Section 1).

Environmental Monitoring

• Groundwater monitoring was conducted by Kaiser during the second half of 2002. The sample results suggested that measurable amounts of radioactive material were observed in selected monitoring wells, but the amounts were well below the effluent concentration limits established in NRC regulations (Section 2).

Closeout Inspection and Survey

• A confirmatory survey was conducted in three buildings located in the former operational area. No contamination was identified on the accessible walls, ceilings, and roofs of the warehouse, crusher, and crusher addition buildings in quantities exceeding the release criteria specified in Table 1 to Regulatory Guide 1.86 (Section 3).

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 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 was occurring in phases. Phase I involved remediation of offsite contamination, while Phase II involved remediation of onsite contamination. Offsite remediation was conducted between October 2000 and May 2001. Approximately 285,000 cubic feet of potentially contaminated soil was relocated from offsite into Kaiser's restricted area. The Phase I final radiological status survey report was approved by the NRC on March 7, 2002.

The Phase II Remediation Plan was submitted to the NRC during June 2001 and revised during May 2002. The NRC submitted a request for additional information on October 30, 2002. Kaiser submitted the requested information by letter dated December 20, 2002. The NRC submitted a second request for information on March 24, 2003. Kaiser is expected to submit a revised decommissioning plan to the NRC during May 2003 with all comments incorporated.

During August 2002, Kaiser began construction activities outside of the radiologically restricted area. Contract workers back-filled the Fresh Water Pond with shale and other soils. This 4-acre area may be used as a staging area during future Phase II decommissioning activities. Fulton Creek was re-routed around the former Fresh Water Pond and lined with rip-rap. Vegetation was planted over the former pond area. Also, 700 feet of fence was installed around the western and southern sides of the former Fresh Water Pond area. The construction work was completed during January 2003.

During the summer of 2003, Kaiser plans to demolish several buildings currently located in the former operational area following NRC approval of the decommissioning plan. The removal of these buildings will be necessary for Kaiser to conduct Phase II reclamation activities in this portion of the site. Phase II decommissioning is currently scheduled to commence during March 2004.

1 Radiation Protection (83822)

1.1 <u>Scope</u>

Section 1.2 of the NRC-approved Phase I Adjacent Land Remediation Plan states, in part, that although Kaiser is not a holder of an NRC license for the possession and use of thorium, remediation activities and the related survey and sampling methods must conform to the regulations and guidance including the Code of Federal Regulations, Title 10. The inspectors examined Kaiser's radiation protection program for consistency with the requirements of 10 CFR Part 20 and the Remediation Plan.

1.2 Observations and Findings

a. Site Tours

The inspector conducted site tours and made observations regarding radioactive material control. The inspector observed that radioactive material signs were conspicuously posted around the site as required by 10 CFR 20.1902, and the property fence line was in good condition. Access gates were noted to be locked. Accordingly, security and control of the radioactive material was deemed adequate and in compliance with 10 CFR 20.1801 requirements.

Radiological surveys were conducted during site tours using a Ludlum Model 19 microRoentgen survey meter (NRC No. 015544, calibrated to radium-226). No abnormal survey measurement was observed, and the measurements were consistent with those observed during previous inspections.

b. Personnel Exposures

Section 11.3 of Kaiser's Environmental Health & Safety Plan states that designated personnel protective and safety equipment shall be worn while working within the control zone and decontamination areas. Kaiser continues to provide optically stimulated luminescent dosimeters to personnel entering the restricted area. The inspector reviewed the personnel dosimeter records for the period covering July through December 2002. During this time frame, no individual received a measurable dose. In summary, the dosimeter results indicated that no site worker or visitor received a radiation dose that exceeded the total effective dose equivalent occupational dose limit of 5 rems as specified in 10 CFR 20.1201.

c. <u>Records Review</u>

Kaiser's training records were reviewed. The site administrator received annual hazardous waste operations and emergency response training during August 2002. The consulting radiation safety officer obtained training on a regular basis, in part, to maintain certification as a certified health physicist. The inspector also noted that a health and safety briefing was conducted during early August 2002 for the construction work that was in progress at the site during the inspection. In summary, records indicated that site workers were provided with training prior to start of work activities, and refresher training was provided to key employees on a routine basis.

An audit of onsite activities was conducted during February 2002 by the consulting radiation safety officer. All activities were found to be in accordance with established procedures and good health physics practices. This audit met the intent of an annual program review as stipulated by 10 CFR 20.1101(c). The next audit is due to be completed by the end of calender year 2003.

The inspector reviewed Kaiser's radiological survey instrument calibration records. During the inspection, three survey meters were located onsite. The meter calibrations were noted to be up-to-date. One meter was situated at the entry/exit point for the radiologically restricted area. This survey meter was used for the scanning of equipment and personnel exiting the restricted area. The meter appeared to be fully functional. Additional survey meters had been supplied by contract workers during previous remediation work activities. These records were not available for review during the inspection, although the calibration records for survey meters used during Phase I final surveys were included with the final survey report that was previously submitted to the NRC.

1.3 <u>Conclusions</u>

Radioactive material signs were conspicuously posted. Gates and fences were in good condition. Material control was adequate. Radiological surveys were conducted by the inspector, and the survey measurements were consistent with previous measurements. Personnel exposures were well below 10 CFR Part 20 requirements. Records of training, audits, and instrument calibrations were being maintained. In summary, Kaiser's radiation protection program was appropriate for the activities being conducted at the site.

2 Environmental Monitoring (88045)

2.1 Inspection Scope

The inspector reviewed Kaiser's program to control, monitor, and quantify releases of radioactive materials to the environment. In particular, the inspectors reviewed Kaiser's groundwater and environmental monitoring programs.

2.2 Observations and Findings

Kaiser elected to implement a groundwater monitoring program, in part, to determine the impact of radioactive material on the environs of the site. The original groundwater monitoring program consisted of 23 monitoring wells and 3 surface water sites. Quarterly samples were collected during the third and fourth quarters of 2002.

Effective June 2002, groundwater samples were collected quarterly from nine monitoring wells and annually from two shallow bedrock wells. All wells would still be monitored quarterly for water level. Surface water samples would be collected annually instead of quarterly from the Retention Pond and Fulton Creek. (Samples will no longer be collected from the Fresh Water Pond because the pond was back-filled.)

The inspector reviewed the groundwater sampling results for the last two quarters of 2002. The monitoring wells were sampled for radium-226, radium-228, thorium-228, thorium-230, and thorium-232 as well as a number of chemical constituents. Selected wells could not be sampled because they were dry, including the four shallow overburden unit wells. The samples were collected by a contractor and were analyzed by a state-certified laboratory. The highest sample results for 2002 were:

• 3.93 picocuries per liter (pCi/L) for radium-228. This sample was obtained from deep overburden well MWD-8 during the third quarter of 2002. This well was

located at the eastern end of the property, down-gradient from the former Retention Pond.

- 1.09 pCi/L for radium-226. This sample was obtained from deep overburden well MWD-8 during the fourth quarter of 2002.
- 0.198 pCi/L for thorium-232. This sample was obtained from deep overburden well MWD-9 during the fourth quarter of 2002.

Per 10 CFR Part 20, Appendix B, Table 2, the most restricted effluent concentration limit was 30 pCi/L for thorium-232. All thorium-232 sample results for the second half of 2002 were less than 1 pCi/L. The effluent concentration limit for radium-226 and radium-228 is 60 pCi/L. No radium sample result exceeded this limit. Uranium was not detected in measurable amounts above background levels at any monitoring well.

2.3 <u>Conclusions</u>

Groundwater monitoring was conducted by Kaiser during the second half of 2002. The sample results suggested that measurable amounts of radioactive material were observed in selected monitoring wells, but the amounts were well below the effluent concentration limits established in NRC regulations.

3 Closeout Inspection and Survey (83890)

3.1 Inspection Scope

The objective of this portion of the inspection was to verify that areas where licensed materials may have been used in the past have been decontaminated to acceptable levels and to assure that the facility will not present a radiation hazard to future occupants.

3.2 Observations and Findings

The Kaiser Aluminum site included a 3.5-acre area known as the former operational area. Plant processes and operations occurred in this area. Structures located within the former operational area included the warehouse, crusher, and crusher addition buildings. Section 8.1 of the unapproved decommissioning plan addendum states,

"Kaiser anticipates completing select pre-decommissioning activities prior to undertaking the remediation project described in this decommissioning plan addendum. The most significant pre-decommissioning activity relates to the deconstruction of several non-impacted site structures to facilitate excavation of affected material beneath floor slabs...the warehouse, crusher, and crusher addition buildings will likely be demolished."

Kaiser intends to demolish these three buildings because the land areas underneath the buildings contain formerly licensed radioactive material. Characterization surveys conducted during 2001 confirmed that contamination existed in soils below the building

slabs. Demolition of these buildings was determined to be necessary to allow access to the contaminated soil present below the buildings.

Operations previously conducted within the original crusher building included crushing of dross/slag material that may have contained radioactive material. The crusher building was razed and rebuilt during the 1970's. The new crusher building was not supposed to have been used to process slag containing radioactive material. The crusher building is 6306 square feet in size.

The 13,876-square foot warehouse was an original building that was renovated during the 1950's-1960's. It was used primarily as a location for storing finished products but may have been used for some maintenance activities.

The 3505-square foot crusher addition building was built after magnesium-thorium alloy processing had ceased. Both crusher and crusher addition buildings were supposedly used for aluminum smeltering operations only.

The land areas located below the three buildings were considered impacted based on guidance provided in NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual. Kaiser determined that the building walls, ceilings and roofs were non-impacted because they were not used for processing of magnesium-thorium alloy and were constructed or remodeled following license termination in 1971. During the inspection, these three buildings were radiologically surveyed to ensure that the accessible walls and ceilings were free of formerly licensed material prior to demolition of the buildings.

The north extrusion building was constructed during 1961 and was used for anode extrusion and storage of completed magnesium products. This building was chosen for collection of background samples because it was not supposed to have been used in former magnesium-thorium alloy operations.

The NRC inspector performed confirmatory surveys of the warehouse, crusher, and crusher addition buildings. The radiological survey consisted of direct measurements of ambient gamma exposure rates using a microRoentgen survey meter, direct measurement of beta-gamma surface contamination levels using a count rate meter, and collection of swipe samples for offsite measurement of gross alpha contamination. Background rates varied from 7-10 microRoentgens per hour (μ R/hr) and 50-80 counts per minute (cpm). Radiological measurements were observed to be at background levels in all three buildings with three exceptions:

- In the warehouse, several elevated measurements were observed on or near the floor in discrete locations, up to 100 μ R/hr and 200 cpm. The floor area is scheduled to be remediated in accordance with the Phase II decommissioning plan.
- Outside the crusher building, the exterior of a retaining wall measured 25 µR/hr and 200 cpm. This area is expected to be remediated in accordance with the Phase II decommissioning plan.

 Inside the crusher addition building, brick insulation measured 30 µR/hr and 120 cpm. This material was determined to be naturally occurring radioactive material.

Twenty swipe samples were collected for analysis of removable contamination by Oak Ridge Institute for Science and Education on behalf of the NRC. Samples were collected from both inside and outside walls as well as the roof of the crusher building. Included in the 20 samples were 2 background samples, 8 warehouse samples, 7 crusher building samples, and 3 crusher addition building samples. The samples were analyzed for gross alpha concentrations. All sample results were less than the minimum detectable activity of 10 disintegrations per minute per sample.

In summary, no contamination was identified on the accessible walls, ceilings, and roofs of the warehouse, crusher, and crusher addition buildings in quantities exceeding the release criteria specified in Table 1, "Acceptable Surface Contamination Levels," to Regulatory Guide 1.86, Termination of Operating Licenses for Nuclear Reactors. This regulatory guide is applicable for this facility until the Phase II decommissioning plan is approved by the NRC.

3.3 <u>Conclusions</u>

A confirmatory survey was conducted in three buildings located in the former operational area. No contamination was identified on the accessible walls, ceilings, and roofs of the warehouse, crusher, and crusher addition buildings in quantities exceeding the release criteria specified in Table 1 to Regulatory Guide 1.86.

4 Exit Meeting Summary

The inspectors reviewed the scope and findings of the inspection during the exit briefing that was conducted at the conclusion of the onsite inspection on April 10, 2003. Kaiser did not identify as proprietary any information provided to, or reviewed, by the inspectors.

ATTACHMENT 1

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Kaiser Aluminum & Chemical Corp.

P. Handa, Site Administrator, Kaiser Aluminum & Chemical Corp.

M. Scott, Consultant, Radiation Safety Officer

B. Vinzant, Manager, Corporate Environmental Affairs, Kaiser Aluminum & Chemical Corp.

INSPECTION PROCEDURES USED

IP 83822 Radiation Protection

IP 88045 Environmental Monitoring

IP 83890 Closeout Inspection and Survey

ITEMS OPENED, CLOSED AND DISCUSSED

<u>Opened</u>

None

<u>Closed</u>

None

Discussed

None

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
cpm	counts per minute
IP	Inspection Procedure
µR/her	microRoentgens per hour
pCi/L	picocuries per liter

ATTACHMENT 2



Area of former Fresh Water Pond with new vegetation.



Former Freshwater Pond (left) and Fulton Creek (right) with rip-rap installed.



Warehouse Building.



Crusher and Crusher Addition Buildings.



Crusher Addition Building, rear side.



NRC Inspector conducting survey of Warehouse Building.