



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

February 15, 2006

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 040-02377/05-007

Dear Mr. Vinzant:

On December 20-22, 2005, an NRC inspection was conducted at the former Kaiser Aluminum Specialty Products facility in Tulsa, Oklahoma. The preliminary inspection findings were discussed with members of your staff during the exit briefing conducted at the conclusion of the onsite inspection. Following receipt of the remaining confirmatory sample results on February 2, 2006, the final inspection findings were discussed by telephone with the Site Administrator on February 7, 2006. The enclosed report presents the scope and results of the inspection.

The purpose of the inspection was to determine whether decommissioning and remediation activities were being conducted in accordance with the NRC-approved Decommissioning Plan for Phase II Remediation. Within these areas, the inspection consisted of selected examination of procedures, work plans, representative records, and interviews with personnel as they related to safety and compliance with the Commission's rules and regulations. This inspection consisted of confirmatory surveys of a survey unit in the pond parcel area and concrete slabs removed from the former Flux Building parking lot. The results of the confirmatory surveys are provided in the enclosed inspection report. No deviations from NRC commitments were identified, and no response to this letter is required.

In accordance with 10 CFR 2.390 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 NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Kaiser Aluminum and Chemical Corp.

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Should you have any questions concerning this inspection, please contact Ms. Beth Schlapper at (817) 860-8169, Mr. Robert 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  
040-02377/05-007

cc w/enclosure:

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RIV Nuclear Materials File - 5th Floor

SUNSI Review Completed: RJE ADAMS: ☒ Yes ☐ No Initials: RJE

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RJEvans	DBSpitzberg	
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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.: 040-02377/05-007

Property Owner: Kaiser Aluminum & Chemical Corporation

Facility: Former Kaiser Aluminum Specialty Products Facility

Location: 7311 East 41<sup>st</sup> Street  
Tulsa, Oklahoma 74145

Inspection Dates: December 20 - 22, 2005

Inspectors: Robert J. Evans, PE, CHP, Senior Health Physicist  
Fuel Cycle & Decommissioning Branch

Accompanied By: Jerry Holsomback, Deputy Director  
Division of Reactor Safety

Approved By: D. Blair Spitzberg, Ph.D., Chief  
Fuel Cycle & Decommissioning Branch

Attachment: Supplemental Inspection Information

## **EXECUTIVE SUMMARY**

### Former Kaiser Aluminum Specialty Products Plant NRC Inspection Report 040-02377/05-007

This was an inspection of the Kaiser Aluminum Specialty Products facility, formerly occupied by Standard Magnesium Company. The inspection consisted of a closeout inspection and survey of a final status survey unit in the former pond parcel area and concrete slabs removed from the former Flux Building parking lot. In summary, Kaiser was conducting decommissioning in accordance with the NRC-approved Decommissioning Plan.

#### Closeout Inspection and Survey

- Independent confirmatory radiological surveys were conducted in one final status survey unit. Results of the confirmatory surveys were generally consistent with measurements taken by Kaiser. Four soil samples were collected and analyzed for uranium and thorium concentrations. The results of both Kaiser's and NRC's samples were below the NRC-approved wide range derived concentration guideline level for thorium-232 (Section 1).
- Confirmatory surveys were performed on concrete slabs taken from the former Flux Building parking lot. The survey results were less than the NRC-approved free release criteria for total average contamination (Section 1).

## Report Details

### Summary of Site Status

Since the previous inspection, Kaiser continued to conduct Phase II decommissioning of the site in accordance with the NRC-approved Decommissioning Plan (DP). Excavation activities were in progress in Final Status Survey Unit FSS-30. Final Status Survey Unit FSS-23 had been backfilled and was core sampled during the inspection. As of December 19, 2005, Kaiser had shipped 699 rail gondola cars containing more than 68,700 tons of material to an offsite disposal site.

## **1 Closeout Inspection and Survey (83890)**

### **1.1 Scope**

The inspector performed confirmatory surveys to determine if Kaiser was remediating and decontaminating the site to acceptable radiological levels for unrestricted release.

### **1.2 Observations and Findings**

#### **a. Confirmatory Survey of Final Status Survey Unit FSSB-0010**

As part of reclamation, Kaiser excavated the contaminated soil, then sorted the soil for off-site disposal or on-site backfill. On-site backfill, otherwise known as "below criteria material," was used to backfill the excavated areas to a specified depth. The below criteria material was then covered with a minimum of 10 feet of clean soil. Soil core boring was performed in the backfilled areas to determine the "as-left" site conditions for final site dose modeling. The inspector observed core borings of soil in survey unit FSSB-010 and conducted confirmatory sampling of these core samples. Survey unit FSSB-010 was located in the north-central portion of the property.

The soil core is a soil sample obtained by boring down vertically through previously backfilled and compacted soil resulting in a 1-meter sample with a cylindrical shape and constant diameter. A radiation detection scan is performed on each 1-meter section by moving the sodium iodide detector at a rate of no greater than 1-inch per second while keeping the detector close to the soil core. In addition, Kaiser collected a 1-minute static count of each one-foot interval. The 1-meter soil core is then placed into a bucket and mixed thoroughly. A soil sample is taken for analysis, and the remaining composite core sample is then archived.

Kaiser representatives and the NRC inspector scanned the soil corings as the soil samples were being collected. The NRC inspector conducted the radiological survey using a Ludlum Model 18 survey meter (NRC No. 012778, calibration due date of 11/03/06) connected to a SPA-3 sodium iodide detector. The inspector conducted the scan for comparison to Kaiser's results and to select soil samples for split sampling. The background in this survey unit varied from 16,000-18,000 cpm. The inspector's scan measurements (including background) ranged from 19,000 to 22,000 cpm. For comparison, Kaiser's fixed point measurements for the samples ranged from 21,000 to

25,000 cpm. The two sets of results cannot be directly compared to each other because Kaiser used a different model of detector than the inspector.

Kaiser conducted nine core borings in survey unit FSSB-010 and collected 28 soil samples. The inspector collected four split samples, one from each 0-3, 3-6, 6-9, and 9-11 foot depth intervals. The NRC's soil samples were transferred through chain-of-custody records to Oak Ridge Institute for Science and Education (ORISE) for analysis. The samples were analyzed by gamma spectroscopy for uranium and thorium concentrations:

**Table 1**  
Concentrations of Uranium and Thorium Isotopes  
In Survey Unit FSSB-010 Soil Samples

NRC Region IV Sample ID	Radionuclide Concentrations <sup>a,d</sup> (pCi/g wet weight)						
	U-238	U-235	Total U <sup>b</sup>	Th-230	Th-228	Th-232	Total Th <sup>c</sup>
NRC-05-07-01	1.2 ± 1.5	0.16 ± 0.26	2.6 ± 2.1	30 ± 13	10.0 ± 0.84	10.45 ± 0.93	20.5 ± 1.3
NRC-05-07-02	1.0 ± 1.2	0.09 ± 0.21	2.1 ± 1.7	22 ± 11	6.70 ± 0.61	6.48 ± 0.62	13.18 ± 0.87
NRC-05-07-03	0.6 ± 1.0	0.13 ± 0.22	1.3 ± 1.4	20 ± 10	7.38 ± 0.68	7.46 ± 0.69	14.84 ± 0.97
NRC-05-07-04	0.9 ± 1.2	0.17 ± 0.24	2.0 ± 1.7	23 ± 14	6.48 ± 0.56	6.38 ± 0.64	12.86 ± 0.85

<sup>a</sup> The average MDCs for these radionuclides ranges from 0.11 pCi/g for Th-228 by Pb-212 to 14 pCi/g for Th-230

<sup>b</sup> Total uranium is the sum of (2\*U-238) + U-235

<sup>c</sup> Total Thorium is the sum of Th-228 and Th-232

<sup>d</sup> Uncertainties represent the 95 percent confidence level, based on total propagated uncertainties

The NRC-approved wide-range derived concentration guideline level (DCGL<sub>w</sub>) for thorium-232 in soil used as backfill is 31.1 pCi/g with a background of 1.1 pCi/g. The four sample results were less than the NRC approved DCGL<sub>w</sub> of 32.2 pCi/g. There is no DCGL for uranium isotopes for the Kaiser site. The uranium concentration data is presented for consistency and reference purposes only.

During the confirmatory survey of FSSB-010, Kaiser split the four samples with the NRC. The samples were analyzed by Kaiser's contract laboratory. The comparison of the thorium-232 sample results and moisture content were:

**Table 2**  
Comparison Of Split Soil Samples In Survey Unit FSSB-010

Sample ID		Survey Unit	Core Depth (ft)	NRC Analysis (Wet) pCi/g <sup>*</sup>	NRC (Wet) % Moisture	Kaiser Analysis (Wet) pCi/g	Kaiser % Moisture
NRC - RIV	Kaiser						
NRC-05-07-01	K-1371	FSSB-010	0-3	10.45 ± 0.93	16	11.0 ± 0.657	17.4
NRC-05-07-02	K-1387	FSSB-010	6-9	6.48 ± 0.62	15	5.43 ± 0.691	16.4
NRC-05-07-03	K-1392	FSSB-010	9-11	7.46 ± 0.69	14	4.83 ± 0.311	13.7
NRC-05-07-04	K-1394	FSSB-010	3-6	6.38 ± 0.64	15	4.67 ± 0.497	16.2

<sup>\*</sup>Uncertainties represent the 95 percent confidence level, based on total propagated uncertainties



Both Kaiser's and NRC's sample results were below the  $DCGL_w$  of 32.2 pCi/g for thorium-232 concentrations in soil.

b. Confirmatory Survey of Concrete Slabs

Confirmatory surveys were performed on concrete slabs staged for off-site disposal. The concrete slabs were part of the former Flux Building parking lot. The surveys were conducted using an Eberline E600 survey meter (NRC Tag No. 063472, calibration due date of 09/02/06) with an Eberline SHP-380AB alpha-beta probe. The surveys included surface scans for gross alpha and beta radioactivity and 1-minute static measurements for alpha contamination. Swipe sampling was not required because Kaiser was releasing the concrete slabs based on the State's criteria of indistinguishable from background levels, which is lower than the NRC-approved removable contamination free release criteria of 50 dpm/100cm<sup>2</sup>. The NRC-approved average gross alpha DCGL is 230 dpm/100 cm<sup>2</sup>.

Background measurements were obtained from similar concrete located in an area that was unimpacted by previous plant operations. Background measurements averaged 13 cpm (96 dpm/100 cm<sup>2</sup>), resulting in a calculated instrument lower limit of detection of about 33 cpm. Three concrete slabs were surveyed, Nos. 650, 651, and 658. The sample results ranged from 1.4 to 11.58 cpm (10.3 to 85 dpm/100 cm<sup>2</sup>). The sample measurements were indistinguishable from background, and all measurements were below the instrument's calculated lower limit of detection.

1.3 Conclusion

Independent confirmatory radiological surveys were conducted in one final status survey unit. Results of the confirmatory surveys were generally consistent with measurements taken by Kaiser. Four soil samples were collected and analyzed for uranium and thorium concentrations. The results of both Kaiser's and NRC's samples were below the NRC-approved  $DCGL_w$  for thorium-232.

Confirmatory surveys were performed on concrete slabs taken from the former Flux Building parking lot. The survey results were less than the NRC-approved free release criteria for total average contamination.

**3 Exit Meeting Summary**

The inspector reviewed the scope and findings of the inspection during a preliminary exit briefing that was conducted on December 22, 2005, at the conclusion of the onsite inspection. A discussion of the confirmatory survey results and a final exit briefing was conducted via telephone with the Site Administrator on February 7, 2006, following receipt of all laboratory sample results. Kaiser did not identify as proprietary any information provided to, or reviewed by the inspector.

## **ATTACHMENT**

### **SUPPLEMENTAL INFORMATION**

#### **PARTIAL LIST OF PERSONS CONTACTED**

Kaiser Aluminum & Chemical Corp.

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

Penn E&R

David Weyant, Data Manger

David Duffey, Health Physics Technician

#### **INSPECTION PROCEDURES USED**

IP 83890      Closeout Inspection and Survey

#### **ITEMS OPENED, CLOSED AND DISCUSSED**

Opened

None

Closed

None

Discussed

None

#### **LIST OF ACRONYMS USED**

CFR	Code of Federal Regulations
cpm	counts per minute
dpm/100 cm <sup>2</sup>	disintegrations per minute per 100 square centimeters
DCGL <sub>w</sub>	wide area derived concentration guideline level
DP	NRC-Approved Decommissioning Plan
IP	Inspection Procedure
pCi/g	picocuries per gram
m <sup>2</sup>	square meters
MDC	minimum detectable concentration
ORISE	Oak Ridge Institute for Science and Education
FSSB	Final Status Survey - Boring