

December 29, 2006

Mr. Bill Vinzant
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SUBJECT: COMPLETION OF DECOMMISSIONING ACTIVITIES AT KAISER ALUMINUM
AND CHEMICAL CORPORATION (KAISER) SITE IN TULSA, OKLAHOMA

Dear Mr. Vinzant:

On September 14, 2006, Kaiser notified the U.S. Nuclear Regulatory Commission (NRC) that it had completed decommissioning and final status surveys (FSSs) for Kaiser's Tulsa, Oklahoma Site, in accordance with its approved decommissioning plan (DP). The NRC staff has completed the review of the FSS Reports (FSSRs) and concludes, in accordance with 10 CFR 40.42(k), that: (1) source material has been properly disposed; (2) reasonable effort has been made to eliminate residual radioactive contamination; (3) submitted FSSRs and associated documentation, demonstrate that the facility and site are suitable for release in accordance with the criteria for decommissioning in 10 CFR Part 20, Subpart E; and (4) records required by 10 CFR 40.61(d) and (f) have been received. Therefore, the staff concludes that Kaiser has completed all decommissioning activities described in the approved DP for the site, and the site meets the NRC's criteria for unrestricted use based on an all-pathways analysis of potential doses to the public from residual radioactivity at the site.

Accordingly, the NRC finds that Kaiser has discharged all of its obligations to the NRC with respect to the decommissioning of its Tulsa, Oklahoma site. In accordance with 10 CFR 20.1401(c), NRC will not require Kaiser to perform additional decommissioning activities at the site unless new information demonstrates that the criteria were not met and residual radioactivity at the site could result in a significant threat to public health and safety.

On October 9, 2002, the NRC and the U.S. Environmental Protection Agency (EPA) entered into a Memorandum of Understanding (MOU) titled, "Consultation and Finality on Decommissioning and Decontamination of Contaminated Sites." The MOU provides that, unless an NRC-licensed site exceeds any of three trigger criteria contained in the MOU, EPA agrees to defer to NRC the decision-making on decommissioning without the need for consultation. For sites with residual radioactivity that trigger the criteria in the MOU, NRC will consult with EPA.

On October 27, 2004, NRC informed EPA that the Kaiser site has an approved DP that includes radionuclide concentrations for soil that exceed the values in the MOU for thorium-232 (Th-232) and radium-226. NRC committed to additional consultation with EPA to resolve any remaining issues, if, following remediation activities, remaining levels of residual radioactivity exceeded MOU values. Staff has reviewed the Kaiser FSSR, and has verified that some soil remaining on-site, at 10 feet or more below the surface of the site, has thorium-232 concentrations up to 31 picocuries per gram (pCi/g), exceeding the MOU soil value of 5 pCi/g. However, concentrations of Ra-226 do not exceed the MOU values and radionuclide concentrations in

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groundwater at the site do not exceed the MOU criteria. NRC has informed EPA of the as-left condition of the Kaiser site and has requested that EPA identify any unresolved issues regarding the site. If EPA identifies any unresolved issues associated with the Kaiser site, NRC will contact you. However, as stated above, Kaiser has discharged all of its obligations to the NRC with respect to the decommissioning of its Tulsa, Oklahoma site and NRC will not require Kaiser to perform additional decommissioning activities at the site, unless new information demonstrates that the criteria were not met and residual radioactivity at the site could result in a significant threat to public health and safety.

The staff's review of the FSSRs is documented in Enclosure 1: Safety Evaluation Report. Enclosure 2 is the Notice of Completion of Decommissioning which is being sent to the Office of the Federal Register for publication.

In accordance with NRC's regulations at 10 CFR 2.390, "Rules of General Applicability," a copy of this letter will be available electronically in the NRC Public Document Room or from the Publically Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

If you have any questions please contact John Buckley at (301) 415-6607.

Sincerely,

/RA/

Keith I. McConnell, Deputy Director
Decommissioning & Uranium Recovery
Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Enclosures:

1. Safety Evaluation Report
2. *Federal Register* Notice

Docket No.: 040-2377

License No.: STB-472

cc: Kaiser Aluminum Service list

SAFETY EVALUATION REPORT
COMPLETION OF DECOMMISSIONING ACTIVITIES
KAISER ALUMINUM & CHEMICAL CORPORATION (KAISER) SITE, TULSA, OKLAHOMA
DOCKET NO. 40-2377

1.0 INTRODUCTION

The Kaiser plant in Tulsa, Oklahoma, was built by the Standard Magnesium Corporation (SMC) in the early to mid-1950s to manufacture magnesium products. Kaiser purchased the facility in 1964. SMC received a source materials license (C-4012) from the Atomic Energy Commission (AEC) in March 1958, authorizing possession and title to magnesium-thorium alloy with up to 4 percent thorium content for processing. The quantity of material SMC, and later Kaiser, were authorized to possess at one time was amended over the years, but generally was limited to 30,000 pounds of magnesium-thorium alloy containing no more than 4 percent thorium. Scrap magnesium-thorium alloy was smelted along with other magnesium materials to recover the magnesium. Thorium alloy material comprised a small fraction of the total magnesium refined on site.

License C-4012 was superceded by License STB-472 in November 1961. License STB-472 was amended in June 1968, to add uranium to the list of authorized materials, but there is no record that uranium-bearing materials were ever received on site. The AEC license was terminated in 1971, by the AEC at Kaiser's request.

The Kaiser facility was placed on the Site Decommissioning Management Plan (SDMP) list in 1994, after the U.S. Nuclear Regulatory Commission (NRC) detected surface contamination on, and adjacent to, the Kaiser property in 1993. Kaiser conducted characterizations of the pond area and areas adjacent to the south and east property boundaries. Contamination of the adjacent properties was found to occur at the ground surface and to reach depths of up to 15 feet. The extent of the contamination was limited to the: Union Pacific Railroad right-of-way, northwest corner of Specific Systems (formerly Unarco) property, along Fulton Creek on the Beejay, Inc. property, north of the north extrusion building, north of the Smalley Equipment property, and adjacent to the Red Man (formerly Premier) property. Contamination also was found along the north side of East 41st Street, between the roadway and the Kaiser building; south of Kaiser's flux building, outside the retention pond property fence, and on Kaiser property between the building and the Union Pacific Railroad property.

Kaiser elected to remediate the site in two phases. In Phase 1, Kaiser remediated the land adjacent to the Kaiser property. In Phase 2, Kaiser remediated the Kaiser property itself. Although Kaiser is not a licensee, it has performed remediation activities in accordance with 10 CFR Part 40.

Kaiser conducted off-site remediation activities from October 2000, through May 2001. Remediation activities primarily involved excavating affected soil and moving it onto Kaiser's property. A final status survey (FSS) was performed following completion of remediation/excavation in each survey unit to demonstrate that post-remediation radiological conditions satisfied the SDMP Action Plan criteria for unrestricted release as specified in the Phase 1 Decommissioning Plan (DP). Following successful remediation, excavations were backfilled. In March 2002, NRC informed Kaiser that the adjacent land areas met NRC's criteria for unrestricted release.

Kaiser submitted the Phase 2 DP on May 25, 2001 (ML011570507, ML011570509, ML011570528) [with revisions on May 31, 2003 (ML031390396, ML031390440, ML031410615, ML031410619, ML031420376, ML031420393, ML031470341, ML031470343, ML031470347, ML031470358, ML031470361, ML031470363, ML031470364, ML031470368, ML031470369, ML031470370, ML031550759, ML031550760), October 6, 2003 (ML032820302), May 5, 2005 (ML051300151), September 8, 2005 (ML052590250) and March 21, 2006 (ML060820317)] and DP Addendum on May 9, 2002 (ML021360148, ML021360217, ML021360268), [with a revision on May 31, 2003 (MI031390605, ML031470360)]. NRC approved these documents on June 8, 2003 (ML031620343), January 7, 2004 (ML040080855), June 22, 2005 (ML051740165), and October 3, 2005 (ML053010154).

2.0 EVALUATION

Although Kaiser is not a licensee, it agreed to perform remediation activities in accordance with 10 CFR Part 40. Therefore, consistent with 10 CFR 40.42(k), Kaiser's remediation activities will be complete when the Commission determines that: (1) source material has been properly disposed; (2) reasonable effort has been made to eliminate residual radioactive contamination; (3) submitted FSS reports (FSSRs) and associated documentation, demonstrate that the facility and site are suitable for release in accordance with the criteria for decommissioning in 10 CFR Part 20, Subpart E; and (4) records required by 10 CFR 40.61(d) and (f) have been received. The following is the staff's evaluation of this information.

2.1 Disposal of Nuclear Material

Section 8 of the DP provides a description of the decommissioning activities, including plans for disposal of contaminated material above the unrestricted release criteria at a facility permitted to receive the material. Kaiser submitted a Certificate of Disposition of Materials - NRC Form 314 which provides a detailed accounting of the waste shipments made to U.S. Ecology, located in Grand View, Idaho.

The staff has reviewed the licensee's Certificate of Disposition of Materials and determined that the licensee has properly disposed of its source material in accordance with its approved DP.

2.2 Elimination of Residual Radioactive Contamination

The decommissioning criteria used by Kaiser at the Tulsa, Oklahoma, site are more protective of the public and environment than warranted by the results of the ALARA analysis. Therefore, the staff concludes that a reasonable effort has been made by Kaiser to eliminate residual radioactive contamination.

2.3 Final Status Survey

The FSS is the radiation survey performed after an area has been fully characterized, remediation has been completed, and the licensee believes that the area is ready to be released for unrestricted use. The purpose of the FSS is to demonstrate that the area meets the radiological criteria for license termination.

Details of the FSS results were submitted to the NRC in six volumes:

- Volume 1 - Pond Parcel Excavation Bottom Units (ML060880292, ML060880294, ML060880295, ML060880296, ML062060133, ML062060134);
- Volume 2 - Former Operations Area (ML060880292, ML060890760);
- Volume 3 - Pond Parcel Excavation Backfill Units (ML060880292, ML060890763, ML060890765, ML060890767, ML062060133, ML062060135);
- Volume 4 - Pond Parcel Excavation Bottom Units (ML061660344);
- Volume 5 - Pond Parcel Backfill Units (ML061990526, ML061990528, ML061990535); and
- Volume 6 - Post Operational Area Survey Units and Final Site Documentation (ML06062700322).

The NRC conducted a number of performance-based in-process inspections of the licensee's FSS program during the decommissioning process. The purpose of the inspections was to verify that the FSS was being conducted in accordance with the commitments made by the licensee in the DP, and to evaluate the quality of the FSS by reviewing the FSS procedures, methodology, equipment, surveyor training and qualifications, document quality control, and survey data supporting the FSSRs. In addition, the NRC conducted a number of independent confirmatory surveys to verify the FSS results obtained and reported by the licensee. Confirmatory surveys consisted of surface scans for beta and gamma radiation, direct measurements for total beta activity, and collection of smear samples for determining removable radioactivity levels.

The staff's review and acceptance of the above referenced FSSRs is documented in correspondence with the licensee, and summarized below for completeness.

2.3.1 Final Status Survey Report: Volume I - Pond Parcel Excavation Bottom, Survey Units FSS-001 through FSS-024

Kaiser submitted the FSSR for Pond Parcel Excavation Bottom survey units on March 22, 2006. During its review of the FSSR, the staff identified a number of issues requiring clarification. Kaiser submitted revisions to FSSR Volume 1 on July 12, 2006. After reviewing the revision, the staff concluded that the FSSR demonstrates that the Pond Parcel Excavation Bottom units meet the criteria for unrestricted release in accordance with Chapter 14 of the DP. The staff's conclusion was based on its review of Kaiser's FSSR and the results of confirmatory surveys. Documentation of the confirmatory surveys is presented in NRC Inspection Reports IR 040-02377/04-002 (ML043650421), IR 040-02377/05-002 (ML050980104), IR 040-02377/05-003 (ML052100045), IR 040-02377/05-004 (ML052210552), IR 040-02377/05-005 (ML052870510), and IR 040-02377/05-006 (ML053460484).

2.3.2 Final Status Survey Report: Volume II - Former Operations Area, Survey Units FSSFOA-001 through FSSFOA-009

Kaiser submitted the FSSR for the Former Operations Area on March 22, 2006. The staff concluded that the FSSR demonstrates that the Former Operations Area meets the criteria for unrestricted release in accordance with Chapter 14 of the DP. The staff's conclusion was based on its review of Kaiser's FSSR and the results of confirmatory surveys. Documentation of the confirmatory surveys is presented in NRC Inspection Reports IR 040-02377/02-002 (ML021280399), IR 040-02377/03-001 (ML031250604), IR 040-02377/03-002 (ML032690322), IR 040-02377/04-003 (ML050600446), IR 040-02377/05-001 (ML050870612), IR 040-02377/05-002 (ML050980104), IR 040-02377/05-003 (ML052100045), IR 040-02377/05-004 (ML052210552), IR 040-02377/05-005 (ML052870510), IR 040-02377/05-006 (ML053460484), IR 040-02377/05-007 (ML060460613), and IR 040-02377/06-001 (ML060930699).

2.3.3 Final Status Survey Report: Volume III - Pond Parcel Excavation Backfill, Survey Units FSSB-01 through FSSB-009

Kaiser submitted the FSSR for the Pond Parcel Excavation Backfill Units FSSB-01 through FSSB-009 on March 22, 2006. During its review of the FSSR, the staff identified a number of issues requiring clarification. Kaiser submitted revisions to FSSR Volume III on July 12, 2006. After reviewing the revision, the staff concluded that the FSSR demonstrates that the Pond Parcel Excavation Backfill Units meet the criteria for unrestricted release in accordance with Chapter 14 of the DP. The staff's conclusion was based on its review of Kaiser's FSSR and the results of confirmatory surveys. Documentation of the confirmatory surveys is presented in NRC Inspection Reports IR 040-02377/05-006 (ML053460484), IR 040-02377/05-007 (ML060460613), and IR 040-02377/06-001 (ML060930699).

2.3.4 Final Status Survey Report: Volume IV - Pond Parcel Excavation Bottom, Survey Units FSS-025 through FSS-030

Kaiser submitted the FSSR for Pond Parcel Excavation Bottom Units FSS-025 through FSS-030 on June 13, 2006. The staff concluded that the FSSR demonstrates that these survey units meet the criteria for unrestricted release in accordance with Chapter 14 of the DP. The staff's conclusion was based on its review of Kaiser's FSSR.

2.3.5 Final Status Survey Report: Volume V - Pond Parcel Excavation Backfill Units, Survey Units Kaiser-FSSB-010 through FSSB-015

Kaiser submitted the FSSR for Pond Parcel Excavation Backfill Units Kaiser-FSSB-010 through FSSB-015 on July 14, 2006. The staff concluded that the FSSR demonstrates that these additional survey units meet the criteria for unrestricted release in accordance with Chapter 14 of the DP. The staff's conclusion was based on its review of Kaiser's FSSR and the results of confirmatory surveys. Documentation of the confirmatory surveys is presented in NRC Inspection Reports IR 040-02377/05-007 (ML060460613), IR 040-02377/06-001 (ML060930699), and IR 040-02377/06-003 (ML061800480).

2.3.6 Final Status Survey Report: Volume VI - Post Operational Area Survey Units and Final Site Documentation

Volume VI reported the results of a final site walk-over gross gamma scan survey, and the results of a "resurvey" of several remediated adjacent land areas in response to a commitment made in the Adjacent Land Remediation Project (ALRP) FSS Report. The "resurvey" of some adjacent land areas was required because gamma radiation emitted by the thoriated material on the Kaiser property influenced exposure rate readings in Phase 1 Survey Units 4D, 2F, 2B, and 2C. Survey Unit 4D was located along the Union Pacific Railroad track just south of the ALRP on-site stockpile. The other three units were located just west of the Specific Systems Property. Elevated readings for these three units were the result of the dross in the Retention Pond area. The staff concludes that the FSSR demonstrates that these Survey Units meet the criteria for unrestricted release in accordance with Chapter 14 of the DP.

Kaiser also submitted contour maps and cross sections of the as-left condition of the site. The staff reviewed the maps and concluded that the Pond Parcel Excavation areas have a cover of at least 10 feet of clean fill accordance with Chapter 14 of the DP.

2.4 Documents Required to Complete Decommissioning

10 CFR 40.42 requires licensees to forward specific records to NRC as the last steps in decommissioning. These requirements include:

- NRC Form 314, Disposition of Materials, or equivalent;
- Final Status Survey Report;
- Records of disposal of licensed material made under 20.2002 (including burials authorized before January 28, 1981), 20.2003, 20.2004, 20.2005; and
- Records required by 20.2103(b)(4).

Kaiser has submitted all of these documents to NRC for review and approval. Kaiser submitted NRC Form 314, along with notification that it had completed decommissioning activities at the Tulsa site on September 14, 2006 (ML062700322).

As detailed in Section 2.3 above, Kaiser submitted its FSSR to NRC in six separate volumes with the final volume submitted on September 14, 2006.

Section 2.0 of the DP contains information about the nuclear operating history of the Kaiser site, including a discussion of past waste disposals on-site. Kaiser disposed of licensed material on site under 10 CFR 20.304. It is this material that Kaiser removed during the remediation of the Tulsa site.

10 CFR 20.2103(b)(4) addresses records associated with the release of radioactive effluents to the environment. Section 11.2 of the DP describes Kaiser's effluent monitoring program during site decommissioning. In accordance with Section 11.2, Kaiser submitted Semiannual Groundwater Quality Reports documenting the results of the environmental monitoring program (ML021630122, ML021630178, ML030240304, ML030350575, ML031040017, ML031040058,

ML040260018, ML061140237, and ML061510206). Kaiser submitted the final Effluent Monitoring Report to the NRC on May 9, 2006 (ML061510109), with an addendum submitted on September 14, 2006 (ML062630396).

3.0 DOSE ASSESSMENT

Kaiser conducted dose modeling evaluations for the development of the DP. Based on these evaluations, Kaiser selected a decommissioning approach to achieve unrestricted release of the Tulsa, Oklahoma, site.

In FSSR Volume III, Appendix E, Kaiser presents the results of a bounding as-left condition dose assessment. For this dose assessment, Kaiser revised the initial DP dose assessment to reflect the bounding as-left conditions of the site. The resulting maximum dose is 1.33 mrem/yr. This estimated dose represents a small fraction of the 25 mrem/yr all pathways allowable dose (10 CFR 20.1402) for unrestricted release of a site.

The staff reviewed Kaiser's dose assessment and concludes that the source term, scenario, and exposure pathways used in the assessment were appropriate. Further, staff believes that the conceptual model as well as input parameters are consistent with site conditions. The staff concludes that the bounding assessment is acceptable and provides reasonable assurance that the dose criterion in 10 CFR 20.1402 will be met for unrestricted release of the site.

4.0 STATE CONSULTATION

This SER was prepared by the NRC staff without input from the State of Oklahoma. However, the State is on distribution for all correspondence between NRC and Kaiser, has observed several NRC inspections, and thus has been informed of NRC's intention to approve completion of decommissioning at the Kaiser site.

5.0 ENVIRONMENTAL CONSIDERATIONS

Pursuant to 10 CFR Part 51, an environmental assessment (EA) was prepared and a finding of no significant impact (FONSI) was published in the Federal Register on June 9, 2003 (68 FR 34422-34425), for approval of the Phase 2 DP. This SER documents Kaiser's acceptable implementation of the approved DP. Accordingly, no EA or FONSI will be prepared for completion of decommissioning activities at the Kaiser Tulsa site.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (i) The remaining decommissioning has been performed in accordance with the approved DP; (ii) The FSS and associated documentation demonstrate that the Kaiser Tulsa site meets the criteria for decommissioning and release of the site for unrestricted use that are stipulated in the DP; and (iii) Kaiser has met the Part 40 requirements for forwarding of specific records to NRC prior to completion of decommissioning.

Principal Contributor: J. Buckley, FSME/DWMEP/DURLD

Date: December 29, 2006

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