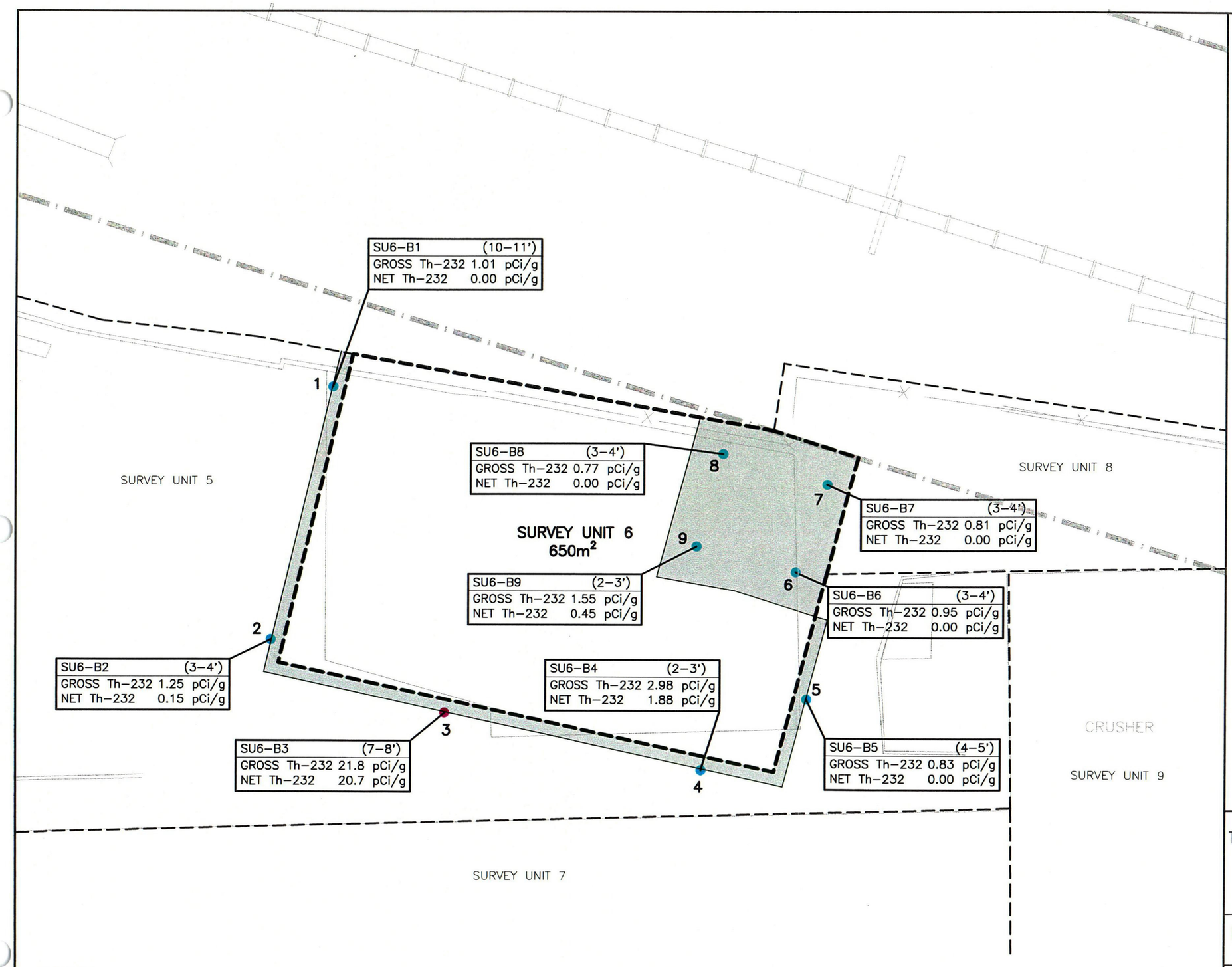

NOTE
BACKGROUND VALUE OF 1.1 pCi/g Th-232 SUBTRACTED FROM GROSS Th-232 ANALYTICAL RESULT.

LEGEND

- SAMPLE POINT WITH NET Th-232 ACTIVITY CONCENTRATION ≤3.0 pCi/g
- SAMPLE POINT WITH NET Th-232 ACTIVITY CONCENTRATION >3.0 pCi/g
- SURVEY UNIT BOUNDARY
- APPROXIMATE RIGHT-OF-WAY
- AREA SAMPLED AND SURVEYED

SAMPLE ID (DEPTH)
GROSS Th-232
NET Th-232

ANALYTICAL RESULTS

N

SCALE - FEET
20 0 20
5 0 5
SCALE - METERS

REFERENCES

DIGITAL MAPPING ASSOCIATES, INC.; AUG. 16, 2001

THE RIGHT-OF-WAY AND PROPERTY LINES WERE OBTAINED FROM A PLAT PREPARED BY DENTON AND WHITE SURVEYING COMPANY ON FEBRUARY 14, 1964.

FIGURE 4A-14
Th-232 ANALYTICAL RESULTS SOIL CORE SAMPLES
SURVEY UNIT 6
FORMER KAISER ALUMINUM
SPECIALTY PRODUCTS FACILITY
TULSA, OKLAHOMA

PREPARED FOR
KAISER ALUMINUM & CHEMICAL CORPORATION
BATON ROUGE, LOUISIANA

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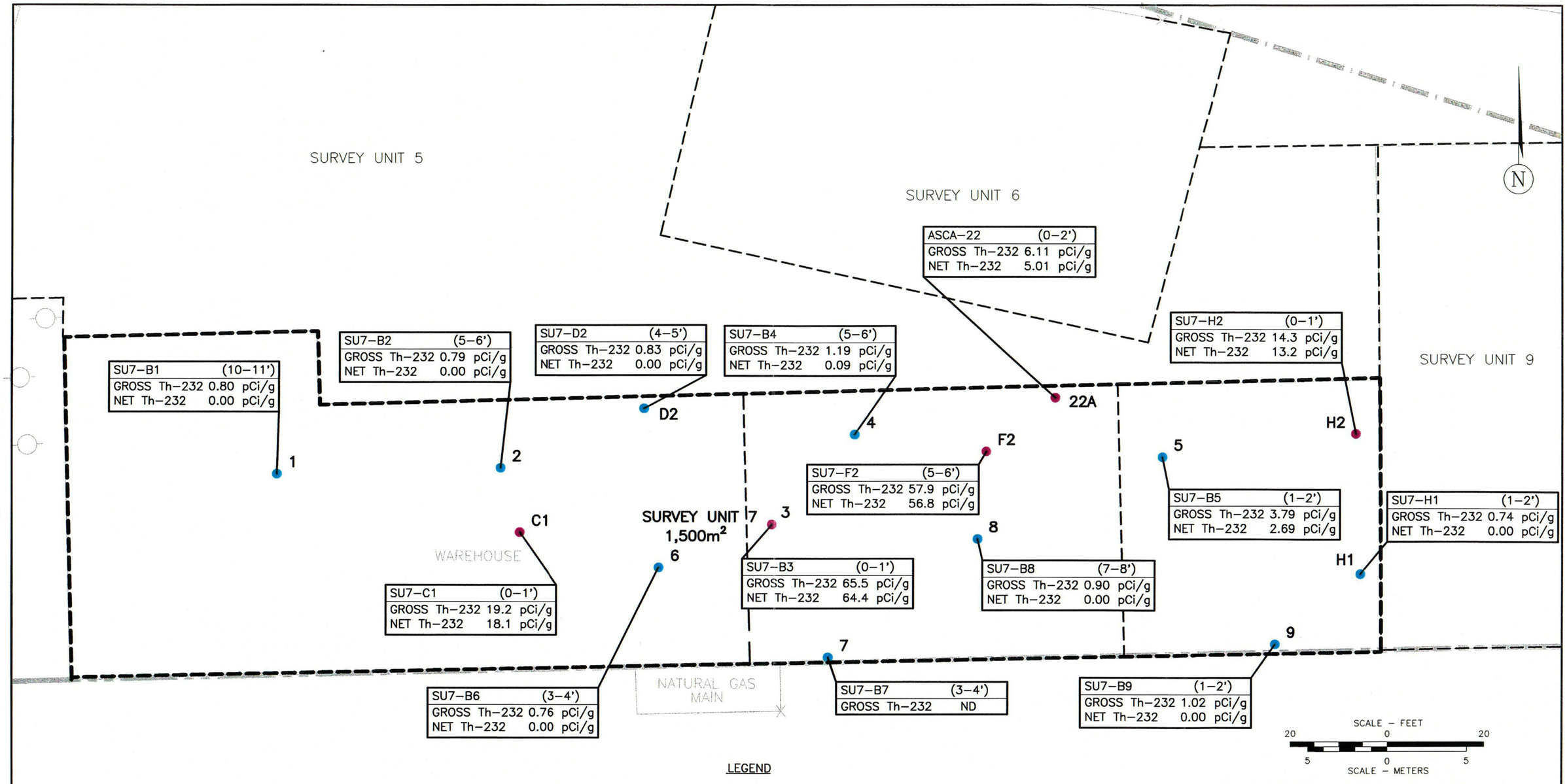

LEGEND

- SAMPLE POINT WITH NET Th–232 ACTIVITY CONCENTRATION ≤3.0 pCi/g
- SAMPLE POINT WITH NET Th–232 ACTIVITY CONCENTRATION >3.0 pCi/g
- SURVEY UNIT BOUNDARY
- APPROXIMATE RIGHT–OF–WAY

SAMPLE ID (DEPTH)
GROSS Th–232
NET Th–232

ANALYTICAL RESULTS

NOTE
BACKGROUND VALUE OF 1.1 pCi/g Th–232 SUBTRACTED FROM GROSS Th–232 ANALYTICAL RESULT.

REFERENCES

DIGITAL MAPPING ASSOCIATES, INC.; AUG. 16, 2001

THE RIGHT–OF–WAY AND PROPERTY LINES WERE OBTAINED FROM A PLAT PREPARED BY DENTON AND WHITE SURVEYING COMPANY ON FEBRUARY 14, 1964.

FIGURE 4A–15
Th–232 ANALYTICAL RESULTS SOIL CORE SAMPLES
SURVEY UNIT 7
FORMER KAISER ALUMINUM
SPECIALTY PRODUCTS FACILITY
TULSA, OKLAHOMA

PREPARED FOR
KAISER ALUMINUM & CHEMICAL CORPORATION
BATON ROUGE, LOUISIANA

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SU8–B1	(2–3')
GROSS Th–232	1.00 pCi/g
NET Th–232	0.00 pCi/g

SU8–B2	(5–6')
GROSS Th–232	0.77 pCi/g
NET Th–232	0.00 pCi/g

SU8–B3	(1–2')
GROSS Th–232	22.7 pCi/g
NET Th–232	21.6 pCi/g

SU8–F2	(0–1')
GROSS Th–232	16.4 pCi/g
NET Th–232	15.3 pCi/g

SU8–B5	(1–2')
GROSS Th–232	42.6 pCi/g
NET Th–232	41.5 pCi/g

ASCA–14	(0–1')
GROSS Th–232	6.26 pCi/g
NET Th–232	5.16 pCi/g

ASCA–15	(1–2')
GROSS Th–232	11.1 pCi/g
NET Th–232	10.0 pCi/g

SU8–B6	(6–7')
GROSS Th–232	1.28 pCi/g
NET Th–232	0.00 pCi/g

ASCA–19	(4–5')
GROSS Th–232	5.63 pCi/g
NET Th–232	4.53 pCi/g

ASCA–13	(1–2')
GROSS Th–232	0.86 pCi/g
NET Th–232	0.00 pCi/g

SU8–B4	(4–5')
GROSS Th–232	BDL

SU8–B9	(4–5')
GROSS Th–232	1.03 pCi/g
NET Th–232	0.00 pCi/g

SU8–F1	(0–1')
GROSS Th–232	133.0 pCi/g
NET Th–232	131.9 pCi/g

SU8–B8	(7–8')
GROSS Th–232	0.88 pCi/g
NET Th–232	0.00 pCi/g

SU8–B7	(2–3')
GROSS Th–232	2.91 pCi/g
NET Th–232	1.81 pCi/g

SU8–F3	(0–1')
GROSS Th–232	11.9 pCi/g
NET Th–232	10.8 pCi/g

ASCA–18	(0–1')
GROSS Th–232	1.33 pCi/g
NET Th–232	0.23 pCi/g

ASCA–17	(2–3')
GROSS Th–232	0.67 pCi/g
NET Th–232	0.00 pCi/g

1,350m²

SURVEY UNIT 5

SURVEY UNIT 6

SURVEY UNIT 7

SURVEY UNIT 8

SURVEY UNIT 9

CRUSHER

CRUSHER ADDITION

GATE

GATE

N

LEGEND

- SAMPLE POINT WITH NET Th–232 ACTIVITY CONCENTRATION ≤3.0 pCi/g
- SAMPLE POINT WITH NET Th–232 ACTIVITY CONCENTRATION >3.0 pCi/g
- SURVEY UNIT BOUNDARY
- APPROXIMATE RIGHT–OF–WAY

SAMPLE ID	(DEPTH)
GROSS Th–232	
NET Th–232	

ANALYTICAL RESULTS

NOTE
BACKGROUND VALUE OF 1.1 pCi/g Th–232 SUBTRACTED FROM GROSS Th–232 ANALYTICAL RESULT.

REFERENCES

DIGITAL MAPPING ASSOCIATES, INC.; AUG. 16, 2001

THE RIGHT–OF–WAY AND PROPERTY LINES WERE OBTAINED FROM A PLAT PREPARED BY DENTON AND WHITE SURVEYING COMPANY ON FEBRUARY 14, 1964.

SCALE – FEET
20 0 20
5 0 5
SCALE – METERS

FIGURE 4A–16
Th–232 ANALYTICAL RESULTS SOIL CORE SAMPLES
SURVEY UNIT 8
FORMER KAISER ALUMINUM
SPECIALTY PRODUCTS FACILITY
TULSA, OKLAHOMA

PREPARED FOR
KAISER ALUMINUM & CHEMICAL CORPORATION
BATON ROUGE, LOUISIANA

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SU9–B1 (0–1')
GROSS Th–232 0.53 pCi/g
NET Th–232 0.00 pCi/g

SU9–B2 (6–7')
GROSS Th–232 2.17 pCi/g
NET Th–232 1.07 pCi/g

ASCA–23B (1–2')
GROSS Th–232 45.7 pCi/g
NET Th–232 44.6 pCi/g

SU9–B3 (1–2')
GROSS Th–232 32.0 pCi/g
NET Th–232 30.9 pCi/g

SU9–B4 (0–1')
GROSS Th–232 1.32 pCi/g
NET Th–232 0.00 pCi/g

SU9–B5 (1–2')
GROSS Th–232 49.8 pCi/g
NET Th–232 48.7 pCi/g

SU9–B6 (1–2')
GROSS Th–232 1.00 pCi/g
NET Th–232 0.00 pCi/g

SU9–B7 (6–7')
GROSS Th–232 0.79 pCi/g
NET Th–232 0.00 pCi/g

SU9–B9 (3–4')
GROSS Th–232 0.72 pCi/g
NET Th–232 0.00 pCi/g

ASCA–21 (0–2')
GROSS Th–232 2.69 pCi/g
NET Th–232 1.59 pCi/g

ASCA–20 (0–2')
GROSS Th–232 0.28 pCi/g
NET Th–232 0.00 pCi/g

SU9–B8 (6–7')
GROSS Th–232 0.54 pCi/g
NET Th–232 0.00 pCi/g

ASCA–16 (4–5')
GROSS Th–232 0.66 pCi/g
NET Th–232 0.00 pCi/g

SURVEY UNIT 6
SURVEY UNIT 5
SURVEY UNIT 8
SURVEY UNIT 7
SURVEY UNIT 9
1,200m²
CRUSHER
CRUSHER ADDITION
GATE

1 2 3 4 5 6 7 8 9 16 20 21 23

N

NOTE
BACKGROUND VALUE OF 1.1 pCi/g Th–232 SUBTRACTED FROM GROSS Th–232 ANALYTICAL RESULT.

LEGEND

- SAMPLE POINT WITH NET Th–232 ACTIVITY CONCENTRATION ≦3.0 pCi/g
- SAMPLE POINT WITH NET Th–232 ACTIVITY CONCENTRATION >3.0 pCi/g
- SURVEY UNIT BOUNDARY
- APPROXIMATE RIGHT–OF–WAY

SAMPLE ID (DEPTH)
GROSS Th–232
NET Th–232

ANALYTICAL RESULTS

SCALE – FEET
20 0 20
5 0 5
SCALE – METERS

REFERENCES

DIGITAL MAPPING ASSOCIATES, INC.; AUG. 16, 2001

THE RIGHT–OF–WAY AND PROPERTY LINES WERE OBTAINED FROM A PLAT PREPARED BY DENTON AND WHITE SURVEYING COMPANY ON FEBRUARY 14, 1964.

FIGURE 4A–17
Th–232 ANALYTICAL RESULTS SOIL CORE SAMPLES
SURVEY UNIT 9
FORMER KAISER ALUMINUM
SPECIALTY PRODUCTS FACILITY
TULSA, OKLAHOMA

PREPARED FOR
KAISER ALUMINUM & CHEMICAL CORPORATION
BATON ROUGE, LOUISIANA

APPROVED	RFI 5/02
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5.0 Dose Modeling Evaluations

5.1 Introduction

As defined in the June 2001 Decommissioning Plan (Revised May 2003) for the Kaiser Tulsa facility, the RESRAD model was used to calculate a preliminary $DCGL_w$ for the facility based on site-specific knowledge. The $DCGL_W$ (3.0 pCi/g) was calculated to correspond with the basic dose limit criterion of 25 mrem/yr. Derivation of the $DCGL_W$ incorporated the Unity Rule, which assures that cumulative doses from Th-232, Th-230, and their daughter products do not result in a total dose that exceeds the basic dose limit. The $DCGL_W$ was used to develop a conservative estimate of the volume of impacted soil potentially requiring remediation in the former operational area. This small quantity, 60,000 ft^3, represents approximately 1 percent of the quantity modeled in the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility. This amount is considered insignificant and, therefore, additional dose modeling is not necessary for this DPA. Additional information regarding the dose modeling evaluations for the Tulsa facility is provided in Chapter 5.0 of the June 2001 Decommissioning Plan (Revised May 2003).

5.2 Unrestricted Release Using Site-Specific Information

5.2.1 Source Term

Refer to Section 5.2.1 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.1.1 Principal Radionuclides

Refer to Section 5.2.1.1 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.1.2 Geochemistry

Refer to Section 5.2.1.2 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.1.3 Spatial Distribution and Volume Estimates

Refer to Section 5.2.1.3 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.1.4 Chosen Remedial Action: Off-Site Disposal/Site Restoration

Refer to Section 5.2.1.4 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.2 Critical Groups Scenarios and Pathway Identification and Selection

Refer to Section 5.2.2 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.2.1 Scenario Identification

Refer to Section 5.2.2.1 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.2.2 Critical Group Determination

Refer to Section 5.2.2.2 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.2.3 Exposure Pathways

Refer to Section 5.2.2.3 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.3 Conceptual Model

Refer to Section 5.2.3 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.3.1 Affected Zone

Refer to Section 5.2.3.1 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.3.2 Saturated Zone

Refer to Section 5.2.3.2 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.3.3 Conceptual Model for a Dual Simulation Approach to Dose Modeling

Refer to Section 5.2.3.3 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.4 Calculations and Input Parameters

Refer to Section 5.2.4 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.5 Uncertainty Analysis

Refer to Section 5.2.5 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

5.2.6 Compliance with Radiological Criteria for License Termination

Refer to Section 5.2.6 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

References

1. Earth Sciences, June 2001, Revised May 2003, Decommissioning Plan, Tulsa Facility, Tulsa, Oklahoma, Kaiser Aluminum & Chemical Corporation, Baton Rouge, Louisiana.

2. U.S. Department of Energy, September 1999, RESRAD for Windows, Version 5.95, Environmental Assessment Division of Argonne National Laboratory.

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6.0 Alternatives Considered and Rationale for Chosen Alternative

A description of the decommissioning alternatives considered and the rationale for the chosen alternative for the Kaiser Tulsa facility was provided in the June 2001 Decommissioning Plan (Revised May 2003). Appropriate sections of the June 2001 Decommissioning Plan (Revised May 2003) are referenced below.

6.1 Chosen Alternative

The decommissioning alternative chosen for implementation closely mirrors that presented in the June 2001 Decommissioning Plan (Revised May 2003). The planned remediation for the former operational area requires excavating material with a net Th-232 activity concentration greater than the established $DCGL_w$ of 3.0 pCi/g based on a dose limit criterion of 25 mrem/yr. The excavated material will be transported to the pond parcel. Material with Th-232 activity concentrations greater than 31.1 pCi/g will be segregated and disposed off site either as exempt or nonexempt material at a permitted facility. Material with activity concentrations less than 31.1 pCi/g Th-232 will be placed in the pond parcel excavation as backfill. The former operational area excavation will be backfilled with clean off-site soil.

Additional information on the chosen alternative relative to the segregation of material for off-site disposal and on-site backfill for the pond parcel excavation is presented in Section 6.1 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

6.2 No-Action Alternative

Refer to Section 6.2 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

Reference

1. Earth Sciences, June 2001, Revised May 2003, Decommissioning Plan, Tulsa Facility, Tulsa, Oklahoma, Kaiser Aluminum & Chemical Corporation, Baton Rouge, Louisiana.

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7.0 ALARA Analysis

The planned remediation method for the former operational area is described in Chapters 6.0 and 8.0 of this DPA. The implementation of this plan results in removal of material with a net Th-232 activity concentration greater than 3.0 pCi/g, based on a dose limit criterion of 25 mrem/yr. The removed material will be transported to the pond parcel area, where it will be segregated according to the June 2001 Decommissioning Plan (Revised May 2003). Excavations in the former operational area as a result of remediation activities will be backfilled with clean off-site soil. The estimated excavation quantity (60,000 ft^3) for the former operational area decommissioning activities represents approximately 1 percent of the quantity modeled in the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility. This amount is considered insignificant and therefore additional ALARA analysis is not necessary for this DPA.

An ALARA analysis of the chosen remediation alternative for the Kaiser Tulsa facility was provided in the June 2001 Decommissioning Plan (Revised May 2003). Appropriate sections of the June 2001 Decommissioning Plan (Revised May 2003) are referenced below.

7.1 Quantitative Cost-Benefit Analysis

Refer to Section 7.1 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

7.1.1 Benefit Calculation

Refer to Section 7.1.1 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

7.1.2 Cost of Remediation

Refer to Section 7.1.2 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

7.1.3 Regulatory Costs

Refer to Section 7.1.3 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

7.1.4 Land Values

Refer to Section 7.1.4 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

7.1.5 Esthetics

Refer to Section 7.1.5 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

7.1.6 Reduction in Public Opposition

Refer to Section 7.1.6 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

7.2 Summary of ALARA Analysis

Refer to Section 7.2 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

References

1. Earth Sciences, June 2001, Revised May 2003, Decommissioning Plan, Tulsa Facility, Tulsa, Oklahoma, Kaiser Aluminum & Chemical Corporation, Baton Rouge, Louisiana.

2. NRC, August 1998, Draft Regulatory Guide DG-4006, Demonstrating Compliance with the Radiological Criteria for License Termination.

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8.0 Planned Decommissioning Activities

A description of the planned decommissioning activities for the affected portions of the 14-acre pond parcel at the former Kaiser Aluminum Specialty Products facility was provided in the June 2001 Decommissioning Plan (Revised May 2003). Chapter 8.0 of this DPA specifically addresses planned decommissioning activities for contaminated soil and structures within the approximate 3.5-acre land area of the Tulsa facility known as the former operation area. The former "operational area" of the facility is defined as the triangular parcel of land north of 41st Street and south of the Union Pacific Railroad right-of-way in which plant processes and operations occurred. The former operational area currently houses several structures including the North Extrusion, Office, Maintenance, Warehouse, Crusher, and Crusher Addition buildings. The Flux Building, located to the northeast of the triangular parcel, is also included as part of the former operational area. The "land areas" of the former operational area consist mainly of land beneath concrete pavement.

An HSA was performed during late 2001 for the former operational area of the former Kaiser Aluminum Specialty Products facility. The HSA was conducted as the first step toward decommissioning the former operational area at the facility. The objective of the HSA was to compile as much historical information as possible for the facility and, using the MARSSIM guidelines, categorize the land areas and structures of the former operational area of the facility as either impacted or nonimpacted.

The results of the HSA were used to design radiological survey efforts for the structures and land areas of the former operational area. The recommended radiological extended scoping (nonimpacted structures) and characterization (impacted land areas) survey efforts were described in a work plan prepared by Earth Sciences (December 2001). The primary objectives of the extended scoping survey of the six structures was to verify their initial classification of "nonimpacted" during the HSA. The primary objectives of the characterization survey of the "impacted" land areas were to determine the nature and extent of residual radioactive materials within the former operational area and collect sufficient data to support evaluation of remedial alternatives and technologies for the impacted land areas of the former operational area. The radiological survey efforts were completed during the months of January and February 2002. Results of the radiological survey efforts are presented Section 4.1 of the DPA.

Appropriate sections of the June 2001 Decommissioning Plan (Revised May 2003) are referenced or summarized below. Supplemental information relative to the planned decommissioning activities for the former operational area of the facility is provided in the following sections, where appropriate.

8.1 Predecommissioning Activities

Kaiser anticipates completing select predecommissioning activities prior to undertaking the remediation project described in this DPA. The most significant predecommissioning activity relates to the deconstruction of several nonimpacted site structures to facilitate excavation of affected material beneath floor slabs. As shown in Figure 8A-1, the Warehouse, Crusher, and Crusher Addition buildings will likely be demolished.

8.2 Remediation Plan

Presently, none of the original buildings in which magnesium-thorium alloy processing occurred exists on site. With the exception of the Flux Building, there were no buildings in the former operational area of the facility classified as impacted in the HSA. The Flux Building was initially classified as an impacted structure due to past and current uses of the building to house and process soil core and surface samples. Upon completion of decommissioning activities at the site, the Flux Building will be addressed as a Class 1 survey unit.

Sections 3.1 and 4.2 of this DPA present information on the limited amount of sanitary sewer lines, subsurface piping, and culverts which exists within the former operational area of the Tulsa facility. Figure 3A-4 of the DPA shows a layout of the subsurface piping and the sanitary sewer for the Tulsa facility. As shown in that figure, several sections of storm drain/subsurface water piping and plant process piping (associated with the pumping station) were encountered and removed during the ALRP.

Information gathered during an HSA performed during late 2001 does not indicate the use of subsurface piping systems or the sanitary sewer for the conveyance of radioactive material. The pumping station structure identified near the retention pond was used to convey noncontact cooling water used in plant operations. These systems are not expected to contain radiological contamination. Their radiological status will be confirmed when they are encountered during remediation to determine the proper disposition.

The recent characterization survey of the impacted land areas, located within the former operational area of the facility, indicated the presence of residual radioactive material beneath several concrete-paved surfaces and structures and at relatively shallow depths. The presence of this material beneath the concrete paving and structures is most likely the result of historical grading activities. Accordingly, this DPA has been designed to address the remediation of select land areas within the former operational area of the

facility where residual radioactive material was found to be present under paved areas and floor slabs. The land area beneath the Flux Building is addressed in the June 2001 Decommissioning Plan (Revised May 2003).

8.2.1 Summary of Remediation/Removal Activities

A conceptual engineering plan for site decommissioning activities, relative to the former operational area, is presented below. The conceptual engineering plan for the pond parcel is presented in the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility. Subsequent to plan approval by the NRC, designs and specifications will be developed to better detail approaches to accomplish the objectives set forth in the approved plan. These detailed plans and specifications may differ somewhat from the conceptual engineering approach provided herein.

The decommissioning alternative chosen for implementation closely mirrors that presented in the June 2001 Decommissioning Plan (Revised May 2003). The planned remediation for the former operational area requires excavating material with a net Th-232 activity concentration greater than the established DCGLw of 3.0 pCi/g based on a dose limit criterion of 25 mrem/yr. The excavated material will be transported to the pond parcel. Material with Th-232 activity concentrations greater than 31.1 pCi/g will be segregated and disposed off site as either exempt or nonexempt material at a permitted facility. Material with activity concentrations less than 31.1 pCi/g Th-232 will be placed in the pond parcel excavation as backfill. Kaiser will complete the decommissioning with the assistance of contractors, subcontractors, and consultants.

Standard construction equipment will be used to perform decommissioning operations for the former operational area. This equipment will include, but not be limited to, the following:

- Backhoes
- Scrapers
- Excavators
- Bulldozers
- Loaders
- Dump trucks
- Water trucks
- Pickup trucks

In addition, a specialized soil sorting/segregation system may be used for identifying material with concentrations of Th-232 above 31.1 pCi/g. The use of a soil sorting system will provide accurate

segregation of radiologically-contaminated soil. One of the systems being considered is a characterization and sorting technology that measures the radioactivity of soil as it passes underneath a detector array on a conveyor belt, and automatically separates the portion exceeding a defined criterion. The essential advantage is automation, which affords a much higher degree of precision and accuracy compared with manual systems. Also, the soil to be disposed is analyzed, not just sampled, and the level of radioactivity is documented in both the contaminated and clean streams. The radiological performance characteristics of the contaminated soil segregation system or process will be based on vendor documented calibration and correlation evaluations. Alternatively, soil segregation may be accomplished via Health Physics Technician (HPT) scanning activities.

During remediation, select land areas of the former operational area will be excavated to depths up to 8 feet and an average depth estimated at 2 feet. Excavation activities probably will not be conducted during winter months. Although excavations are planned to be relatively shallow, some dewatering may be required (see Section 8.2.3.1).

Health Physics Technician (HPT) support will be used to monitor the excavated material, the material left in place, workers, equipment, and loaded cars/containers leaving the site. Radiation control procedures and protection methods are described in Chapters 10.0 through 14.0 of the June 2001 Decommissioning Plan (Revised May 2003).

Once the former operational area is remediated to acceptable levels, it will be cleared through a MARSSIM-directed final status survey. Most likely, this will be conducted in stages where certain survey units will be cleared and backfilled as excavation occurs in other areas. The NRC will be notified prior to any backfilling of excavations and afforded the opportunity to conduct inspections prior to backfilling.

Approximately 60,000 ft^3 of clean fill will be added to backfill the excavations. The site will be graded so that surface water discharge from the site is attenuated. The site also will be vegetated to minimize soil erosion. The final site configuration is shown (conceptually) in Figure 8A-2.

8.2.2 Site Preparation

Site preparation may include construction of drainage channels, berms, erosion and sedimentation controls, and access controls. Site preparation activities will be under the direction of an HPT and will be performed to limit personnel exposure and off-site migration.

8.2.3 Excavation

Decommissioning activities for the former operational area likely will be completed prior to excavation in the pond parcel. However, Kaiser will encourage contractor input regarding work sequencing. The excavation areas are shown in Figure 8A-1. Approximately 60,000 ft^3 of material is expected to be excavated during decommissioning activities for the former operational area.

8.2.3.1 Water Handling

Water will be managed in accordance with applicable federal, state, and local laws, regulations, and permit requirements. If water is encountered in excavations, it will likely be managed using pumps and frac-tanks. For further details regarding water management, refer to Section 8.2.3.5 of the June 2001 Decommissioning Plan (Revised May 2003).

8.2.3.2 Excavation Support

Excavation activities will be conducted in accordance with Occupational Safety and Health Administration (OSHA) safety guidelines. In general, excavation walls will be sloped back. However, in the areas where excavation abuts the property line, vertical support, such as sheeting, may be required to separate the work from the previously completed adjacent land remediation. In addition, special support may be required where excavation is conducted adjacent to building or wall footings.

8.2.4 Backfilling

Off-site borrow material will be necessary to bring the site of the former operational area to the final grades shown (conceptually) in Figure 8A-2. Backfill will be placed in 8-inch loose lifts and suitably compacted. Backfilling activities will be under the direction of a qualified technician or engineer. The NRC will be notified prior to any backfilling of excavations and afforded the opportunity to conduct inspections prior to backfilling.

8.2.5 Off-Site Disposal

A discussion of the off-site disposal for above-criteria material (>31.1 pCi/g Th-232) is presented in the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility.

8.2.6 Site Restoration

The site will be restored as each area is completed so that weathering is minimized. Restoration will include the following:

- placement of vegetative material,
- seeding and mulching,
- permanent surface water controls,
- permanent erosion and sedimentation controls, and
- possible repaving of select areas.

8.3 Decontamination Methods

Decontamination of equipment, tools, vehicles, and materials will be necessary prior to release. Specific decontamination methods will be developed by the future contractor, with approval by Kaiser.

8.4 Procedures and Controls

Kaiser is committed to maintaining occupational exposures ALARA during all operations involving the management of radioactive materials. Decommissioning activities will be conducted in accordance with written approved procedures as outlined in this plan. Dust controls and air monitoring will be maintained. HPT support will be used to monitor the material removed, the material left in place, as well as workers, equipment, and loaded cars/containers leaving the site. Radiation control procedures and protection methods are described in Chapters 11.0 through 14.0 of the June 2001 Decommissioning Plan (Revised May 2003). There are no safety or removal/remediation issues unique to this site. Chapters 10.0 and 11.0 of the June 2001 Decommissioning Plan (Revised May 2003) provide details on the health and safety (H&S) air monitoring and environmental air monitoring programs respectively, which will be implemented during remediation activities at the facility. Details regarding specific enhanced protective measures will be developed as needed during the design and implementation phase. Input from the potential qualified contractors will be encouraged. In any case, Kaiser is committed to maintain exposures ALARA during all operations involving the management of radioactive materials.

Access to all areas within the Kaiser site restricted area will be controlled by Safe Work Permits (SWP) even after these areas have undergone final status survey. The planning and sequence of final status survey activities at the Kaiser site will take into account the future need for area access for personnel and equipment. Consequently, final status survey activities will generally be initiated only after access to an area is no longer required.

After remedial action survey data indicate that a survey unit is ready for final status survey, the SWP covering work in the area will require that a barrier (ropes, safety cones, safety fence, or covering as applicable) posted with a "FSS in Progress" posting be erected to isolate and control access to the area. In some instances where the potential for contaminant migration from an adjacent area exists, the isolation barrier

may also consist of a polyethylene geomembrane liner, drainage channels, and/or berms between the survey unit where final status survey activities will be initiated, and adjacent areas if there is a likelihood of contaminant migration. In any case, access control requirements shall be implemented which will require personnel to perform contamination monitoring on themselves and equipment prior to area access after final status survey activities have been initiated to prevent recontamination. Access to structural surfaces that are nonimpacted or undergoing survey for release will be controlled in a similar manner.

Walkover surveys will be performed on land areas that have previously undergone final status survey (or were previously designated as nonimpacted) to ensure that contamination/recontamination has not occurred prior to backfilling and again before the conclusion of the project. These surveys will be performed using a 2-inch-by-2-inch sodium iodide detector and rate meter with audible response.

Likewise, routine structural surface surveys for total and loose alpha contamination will be performed in areas adjacent to restricted work areas. These surveys will focus on areas adjacent to the restricted work areas such as walkways, ledges, and horizontal surfaces where airborne contamination would likely settle or be tracked by personnel and equipment. Action levels for these routine surveys will be based on the gross activity DCGL values presented in Section 2.4 of this DPA.

All soil excavation, segregation, and transport activities will be conducted under an SWP containing the contamination control measures and action levels established for entry and or exit from each area as applicable. For example, trucks delivering below-criteria material to the excavation from the processing area during Phase II activity will be visually inspected as necessary to ensure that they do not have above criteria mud or deposits that could fall into the below-criteria excavation.

Trucks and vehicles that exit the restricted work area will be surveyed for both fixed and loose contamination as well as elevated gamma. Vehicles above the free release limits contained in NRC FC 83-23 will be decontaminated by thorough washing (mechanical brushing/scraping, high pressure cleaning, or steam cleaning, etc.) and resurveyed prior to release. Special attention will be given to tires, the floor of the cab, and tailgates. Wet or muddy surfaces will be cleaned and dried prior to survey. Smears taken will be analyzed for alpha and beta-gamma contamination. Vehicle surveys will be documented.

8.5 Schedule

Upon approval of the June 2001 Decommissioning Plan (Revised May 2003) and this DPA by the NRC, Kaiser will undertake preparation of designs and specifications. Subsequently, a construction contractor

will be selected. Kaiser may choose to develop performance specifications and require the contractor to develop design details. Alternatively, Kaiser may opt to develop detailed designs/specifications. In either case, preconstruction activities are expected to take approximately 9 months.

It is likely that construction activities will not be conducted during the months of December through February. Therefore, remediation is anticipated to begin in March following completion of the design/contractor selection tasks and extend over a period of approximately 3 years. A detailed schedule will be prepared subsequent to NRC approval of the June 2001 Decommissioning Plan (Revised May 2003) and DPA. This schedule will be updated as circumstances dictate.

The tentative schedule for decommissioning activities is outlined in Figures 8-7 and 8-8 of the June 2001 Decommissioning Plan (Revised May 2003) for the Tulsa facility. Because of the relatively small excavation quantity presented in this DPA, the tentative schedule has not been revised.

Reference

1. Earth Sciences, June 2001, Revised May 2003, Decommissioning Plan, Tulsa Facility, Tulsa, Oklahoma, Kaiser Aluminum & Chemical Corporation, Baton Rouge, Louisiana.

Table

Table 8-1
Excavation Volume Estimate
Decommissioning Plan Addendum
Former Operational Area
Kaiser Aluminum Chemical Corporation
Tulsa, Oklahoma

Survey Unit	Excavation Depth (ft)	Area (sf)	Volume (cf)
2	2	1,210	2,420
	4	540	2,160
	6	470	2,820
Unit Total		*2,220*	*7,400*
3	4	810	3,240
Unit Total		*810*	*3,240*
5	2	740	1,480
	4	1,520	6,080
	8	270	2,160
Unit Total		*2,530*	*9,720*
7	2	5,320	10,640
	6	470	2,820
Unit Total		*5,790*	*13,460*
8	2	7,220	14,440
	6	440	2,640
Unit Total		*7,660*	*17,080*
9	2	4,390	8,780
Unit Total		*4,390*	*8,780*
Total		***23,400***	***59,680***

Figures

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FIGURE 8A-1

"EXCAVATION PLAN FORMER OPERATIONAL AREA FORMER KAISER ALUMINUM SPECIALTY PRODUCTS FACILITY TULSA, OKLAHOMA"

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FIGURE 8A-2

"CONCEPTUAL SITE RESTORATION PLAN FORMER OPERATIONAL AREA FORMER KAISER ALUMINUM SPECIALTY PRODUCTS FACILITY TULSA, OKLAHOMA"

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