Letter of Transmittal

Penn E&R
Environmental & Remediation, Inc.

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Date: October 4, 2004 **Project No.:** 4000-PA4072-02

To: Mr. John T. Buckley
U.S. Nuclear Regulatory Commission
TWFN, 7F27
Washington, DC 20555

Re: Kaiser Tulsa Site
Thorium Remediation Project

We are sending you the following item(s):

Quantity	Date	No.	Description
1	September 2004		Penn E & R HPM/M-3-6, Revision 2
1	October, 2004		RECON Transportation Work Plan, Revision 2
1	September 2004		RECON Exception for Section 7.2, Calibration of NaI Detector, Revision 2

These are transmitted as checked below:

☐ For your use ☒ Enclosed
☐ As Requested ☐ Under Separate Cover via: _____
☐ Return of requested material
☒ Other: For your information.

Remarks: On behalf of Kaiser Aluminum & Chemical Corporation, the above referenced procedures and plans are transmitted for your information. Please destroy all previous versions of these plans and procedures and replaced with the enclosed.

Copy to: Distribution (see attached) **Signed:** Chuck Beatty

If enclosures are not as noted, please notify our office immediately.

HMSS01

Kaiser Plan and Procedure Distribution

Mr. John T. Buckley US Nuclear Regulatory Commission TWFN, 7F27 Washington, DC 20555 ***FedEx***	Mr. S Paul Handa Kaiser Aluminum & Chemical Corporation 7311 East 41st Street Tulsa, OK 74145 ***(Three copies in one FedEx envelope)***
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PROCEDURE: Penn E & R/HPM/M-3-6

Gross Gamma Surveys of Soil Cores

REVISION: 02

EFFECTIVE DATE: SEPTEMBER 2004

Bill Vinzant

APPROVED BY: J.W. Vinzant, Project Manager

DATE: 9-13-04

PROCEDURE: Penn E & R/IIPM/M-3-6

Gross Gamma Surveys of Soil Cores

REVISION: 02

EFFECTIVE DATE: SEPTEMBER 2004

9/13/04

Prepared by: Date:
Andrew J. Lombardo
Civil & Environmental Consultants, Inc.

9/13/04

Approved by: Date:
M. David Tourdot
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1.0 PURPOSE

The purpose of this procedure is to provide instruction for performing gross gamma surveys of soil boring cores (soil cores) and the subsequent sampling of the core.

2.0 DEFINITIONS

Soil Core: A soil sample obtaining by boring down vertically through soil. The resulting sample is a cylinder in shape with a constant diameter.

3.0 PREREQUISITES/PRECAUTIONS/LIMITATIONS

3.1 Instrument must pass preoperational checks as outlined in Procedure Penn E&R/HPM/M-2-1 and the appropriate instrument procedure. Ensure the preoperational and source checks have been completed prior to initiating survey.

3.2 Background count rates may vary. Background should be determined at least daily on days when cores are counted for each area and counting geometry to be used.

3.3 Before initiating a gross gamma soil survey be sure to record the instrument serial number(s), calibration date(s), date of survey, time of survey, and any other pertinent information.

3.4 The sodium iodide (NaI) detector may be shielded with at least 1/16 inch of lead.

3.5 The detector and the scaler should be configured so that the Health Physics Technician can move the core past the detector (or the detector past the core) while observing the count rate and hear the audible response.

3.6 Ensure that samples are properly labeled by location and depth of collection.

4.0 EQUIPMENT

4.1 2-inch-by-2-inch NaI scintillator detector, Ludlum Model 44-10, or equivalent

4.2 Ludlum Model 2221 Scaler, or equivalent

4.3 Sturdy Mixing Bucket, or equivalent and trowel

4.4 Standard Sample Containers (3)

4.5 Archive Sample Containers (3)

5.0 PROCEDURE

Record the results of measurements on Form HPM/M-3-6-1. Sections of the form that are not applicable to the survey should be marked "N/A."

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5.1 Determine Background

5.1.1 Ensure that the NaI detector is in the standard counting configuration, (e.g., inside of the shield, at the location that scans or fixed counts are to be performed).

5.1.2 Perform five consecutive 1-minute fixed counts with the detector in the desired standard scanning configuration (Ambient Background Geometry). A phantom core segment of background soil may be used to establish background.

5.1.3 Calculate the average background count rate.

5.2 Perform Soil Core Scan

5.2.1 Record the soil core serial number, (e.g. location and depth interval).

5.2.2 With the instrument in the rate mode, move the detector (or the soil core) at a rate of no greater than 1 inch per second, keeping the detector as close as possible to the soil core. Ensure that the scan rate is slow enough to detect changes in the audible response of the instrument.

5.2.3 Record the average count rate observed for each 1-foot segment of the soil core. Core segments are 0 to 1 foot, 1 to 2 feet, 2 to 3 feet, etc.

5.3 Composite Sample Each 1-Meter Section of Core

5.3.1 Separate the core into approximate 1-meter segments using an appropriate tool (e.g. a saw).

5.3.2 Place the 1-meter segment into the bucket (or equivalent mixing container) and mix the core thoroughly with the trowel.

5.3.3 From the bucket fill a standard soil sample container with the soil. Place the remaining soil into a standard archive container. Clean the bucket and trowel before handling the next sample.

5.3.4 Label the sample containers with sample number and depth interval.

5.4 Calculate the net counts per minute for each measurement by subtracting the appropriate average background.

5.5 Forward the standard soil sample to the laboratory for analysis.

5.6 Store the archive sample in the appropriate storage facility.

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6.0 REFERENCES

6.1 Penn E & R/HPM/M-2-1, Basic Instrument Operation

7.0 ATTACHMENTS

7.1 Forms

Form HPM/M-3-6-1 Soil Core Gross Gamma Survey

Form HPM/M-3-6-1

TRANSPORTATION WORK PLAN
KAISER – TULSA, OK REMEDIATION PROJECT

RECON Quality Control Supervisor Approval: Diana L. Brown Date: 9/28/04

RECON Project Manager Approval: Danny P. Brown Date: 9/28/04

USE Transportation Manager Approval: Rob Rittenberg Date: 9/28/04

Kaiser Project Manager Approval: J. W. (Bill) Vinzant Date: 9/29/04

REVISION NO.: 2
EFFECTIVE DATE: OCTOBER 2004

TRANSPORTATION PLAN
Work Plan

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REFERENCES

1. Kaiser Aluminum and Chemical Corp. Decommissioning Plan, Tulsa Facility, Tulsa, Ok.
2. RECON Environmental Health and Safety Plan
3. RECON Radiation Health and Safety Plan
4. 10 CFR Part 20, "Standards for Protection Against Radiation"
5. 40 CFR Parts 260-299, "EPA Regulations for Hazardous Wastes"
6. 49 CFR Parts 100-185, "Transportation"
7. 49 CFR Parts 393, " Parts and Accessories Necessary for Safe Operation"
8. Emergency Response Guidebook , Department of Transportation
9. US Ecology Idaho, Grand View, Idaho Disposal Facility Waste Acceptance Criteria

DEFINITIONS

A_2 Quantity (49 CFR 173.403): The maximum activity of radioactive material, other than special form or low specific activity (LSA) radioactive material, permitted in a Type A package. See Title 49 CFR 173.435 of Reference 6.

Bulk Packaging (49 CFR 171.8): Packaging other than a vessel or barge, including a transport vehicle or freight container, in which hazardous materials are loaded with no intermediate form of containment and which has:

- A maximum capacity greater than 450 K (119 gallons) as a receptacle for a liquid;
- A maximum net mass greater than 400 kg (882 pounds) or a maximum capacity greater than 450 L (119 gallons) as a receptacle for a solid; or
- A water capacity greater than 454 kg (1000 pounds) as a receptacle for a gas as defined in 49 CFR 173.115.

Carrier: The carrier is an individual or organization engaged in the business of transporting property. Private carriers are carriers who transport their own materials. Contract Carriers are carriers who carry goods for the general public under a specific contract between the shipper and the carrier. Common Carriers are carriers that transport goods under the control of the Interstate Commerce Commission. Transportation regulations for radioactive material are applicable to all three classes of carriers.

Closed Transport Vehicle (49 CFR 173.403): A vehicle equipped with a securely attached exterior enclosure that during normal transportation restricts the access of unauthorized persons to the cargo space containing the radioactive material. The enclosure may be either temporary or permanent, and in the case of packaged materials may be of the see through type and must limit access from top, sides, and ends.

Consignee: The consignee is the individual or organization to whom the shipment is made. For radioactive shipments, the consignee must possess the necessary licenses or permits for possession of the radioactive material.

Empty Packaging (49 CFR 173.428): A package that previously contained Class 7 (radioactive) materials and has been emptied of contents as far as practicable.

Exclusive Use (49 CFR 173.403): The sole use of a conveyance by a single consignor and for which all initial, intermediate, and final loading and unloading are carried out in accordance with the direction of the consignor or consignee. The consignor and the carrier must ensure that any loading or unloading is performed by personnel having radiological training and resources appropriate for safe handling of the consignment. The consignor must issue specific instructions, in writing, for the maintenance of exclusive use shipment controls, including the vehicle survey requirements of 49 CFR 173.443 (c) as applicable, and include them with the shipping paper information provided to the carrier by the consignor.

Hazardous Material (49 CFR 171.8): Is any substance or material, including a hazardous substance, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated.

Hazardous Substance (49 CFR 171.8): Is any material, including its mixtures and solutions, that:

- Is listed in the Appendix to 49 CFR 172.101;
- Is in a quantity, in one package, which equals or exceeds the reportable quantity (RQ) listed in the Appendix to 49 CFR 172.101, and when in a mixture or solution for radionuclides, equals or exceeds unity when all nuclides are placed in a unity equation. For other than radionuclides, is in a concentration by weight which equals or exceeds the concentration corresponding to the RQ of the material, as shown in the following table:

RQ		CONCENTRATION BY WEIGHT	
POUNDS	KILOGRAMS	PERCENT	PPM
5000	2270	10	100,000
1000	454	2	20,000
100	45.4	0.2	2,000
10	4.54	0.02	200
1	0.454	0.002	20

Hazardous Waste (49 CFR 171.8): Any material that is subject to the Hazardous Waste Manifest Requirements of the U.S. Environmental Protection Agency specified in 40 CFR Part 262.

Hazmat Employee (49 CFR 171.8) means a person who is employed by a hazmat employer and who in the course of employment directly affects hazardous materials transportation safety. This term includes an owner-operator of a motor vehicle, which transports hazardous materials in commerce. This term includes an individual, including a self-employed individual, employed by a hazmat employer who, during the course of employment:

- Loads, unloads, or handles hazardous materials;
- Tests, reconditions, repairs, modifies, marks, or otherwise represents containers, drums, or packagings as qualified for use in the transportation of hazardous materials;
- Prepares hazardous materials for transportation;
- Is responsible for safety of transporting hazardous materials; or
- Operates a vehicle used to transport hazardous materials.

Hazmat employer (49 CFR 171.8) means a person who uses one or more of its employees in connection with: transporting hazardous materials in commerce; causing hazardous materials to be transported or shipped in commerce; or representing, marking, certifying, selling, offering, reconditioning, testing, repairing, or modifying containers, drums, or packagings as qualified for use in the transportation of hazardous materials. This term includes an owner operator of a motor vehicle, which transports hazardous materials in commerce. This term also includes any department, agency, or instrumentality of the United States, a State, a political subdivision of a State, or an Indian tribe engaging in an activity described in the first sentence of this definition.

Limited quantity of Class 7 (radioactive) material (49 CFR 173.403) means a quantity of radioactive material not exceeding the materials package limits specified in 49 CFR 173.425 and which conform with requirements specified in 49 CFR 173.421.

Low specific activity material (LSA) (49 CFR 173.403) means Class 7 (radioactive) material with limited specific activity, which satisfies the descriptions and limits set forth below. Shielding materials surrounding the LSA material may not be considered in determining the specific activity of the contents. LSA material must be in one of three groups:

LSA-I

- Uranium and thorium ores, concentrates of uranium and thorium ores and other ores containing naturally occurring radionuclides which are intended to be processed for use of these radionuclides; or
- Solid unirradiated natural uranium or depleted uranium or natural thorium or their solid or liquid compounds or mixtures; or
- Radioactive material other than fissile material for which the A2 value is unlimited; or
- Other radioactive material, excluding fissile material in quantities not excepted under 173.453, in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the values for activity

concentration specified in 173.436 or 30 times the values listed in table 10B of 173.433..

LSA-II

- Water with tritium concentration up to 740 GBq/liter (20.0 Ci/liter); or
- Materials in which the radioactive material is distributed throughout and the average specific activity does not exceed 1E-4 A2/g for solids and gases or 1E-5 A2/g for liquids.

LSA-III

Solids (consolidated wastes, activated materials) that meet the requirements of 49 CFR 173.468 and in which:

- The radioactive material is distributed throughout a solid or collection of solid objects, or is distributed throughout in a solid compact binding agent (such as concrete, bitumen, ceramic, etc.);
- The radioactive material is relatively insoluble, or is intrinsically contained in a relatively insoluble material, so that, even under the loss of packaging, the loss of radioactive material, when placed in water for 7 days would not exceed 0.1 A2; and
- The average specific activity of the solid does not exceed 2E-3 A2/g.

Low Toxicity Alpha Emitters (49 CFR 173.403) are:

- U-nat, U-dep, Th-nat;
- Ores, concentrates or tailings containing U-235, U-238, Th-232, Th-228 and Th-230; or
- Alpha emitters with a half-life of less than 10 days.

Marking (49 CFR 171.8) means a descriptive name, identification number, instructions, cautions, weight, specification, or UN marks, or combinations thereof, required by Part 172 Subpart D of 49 CFR on outer packagings of hazardous materials.

Natural thorium (49 CFR 173.403) means thorium with the naturally occurring distribution of thorium isotopes (essentially 100 weight percent thorium-232).

Non-fixed radioactive contamination (49 CFR 173.403) means radioactive contamination that can be readily removed from a surface by wiping with an absorbent material. Non fixed (removable) radioactive contamination is not significant if it does not exceed the limits specified in 49 CFR 173.443.

Non-bulk packaging (49 CFR 171.8) means a packaging, which has:

- A maximum capacity of 450 L (119 gallons) or less as a receptacle for a liquid;
- A maximum net mass of 400 kg (882 pounds) or less and a maximum capacity of 450 L (119 gallons) or less as a receptacle for a solid; or
- A water capacity of 454 kg (1000 pounds) or less as a receptacle for a gas as defined in 49 CFR 173.115.

Normal form radioactive material (49 CFR 173.403) means radioactive material, which has not been demonstrated to qualify as special form radioactive material.

Package (49 CFR 173.403) means, for Class 7 (radioactive) material, the packaging together with its radioactive contents as presented for transport.

- Excepted Package means a packaging together with its excepted Class 7 (radioactive) materials as specified in 49 CFR 173.421-173.426, and 173.428.
- Type A Package means a packaging that, together with its contents limited to A1 or A2 as appropriate, meets the requirements of 49 CFR 173.410 and 173.412 and is designed to retain the integrity of containment and shielding required by 49 CFR 173 under normal conditions of transport as demonstrated by the tests in 49 CFR

173.465 or 173.466 as appropriate. A Type A package does not require Competent Authority Approval.

Packaging (49 CFR 173.403) means, for radioactive materials, the assembly of components necessary to ensure compliance with the packaging requirements of 49 CFR 173. It may consist of one or more receptacles, absorbent materials, spacing structures, thermal insulation, radiation shielding, and service equipment for filling, emptying, venting, and pressure relief, and devices for cooling or absorbing mechanical shocks. The conveyance, tie down system, and auxiliary equipment may sometimes be designated as part of the packaging.

Radioactive contents (49 CFR 173.403) means the radioactive material, together with any contaminated liquids or gases, within the package.

Radioactive material (49 CFR 173.403) means any material containing radionuclides where both the activity concentration and total activity in the consignment exceed the values specified in the table in 173.436 or the values derived according to the instructions in 173.433.

Radioactive Waste means, for the purposes of this procedure, radioactive materials that are being transferred to a disposal facility or to a processing facility that forwards the radioactive materials to disposal.

Specific activity (49 CFR 173.403) of a radionuclide means the activity of the radionuclide per unit mass of that nuclide. The specific activity of a material in which the radionuclide is essentially uniformly distributed is the activity per unit mass of the material.

1.0 SCOPE:

The purpose of this plan is to establish guidance to properly describe, package, mark, label, load, inspect and manifest radioactive and/or hazardous materials for transportation via rail from the Kaiser – Tulsa Facility to the US Ecology, Simco and Grand View, Idaho facilities for waste transfer and disposal in accordance with the applicable regulatory requirements.

This plan applies to all project related, US Ecology brokered, Hazardous or Radioactive Materials waste shipments by rail from the Kaiser – Tulsa facility to US Ecology's Simco, Idaho waste transfer facility. This plan has been designed to satisfy DOT regulatory and US Ecology waste acceptance requirements for the types of shipments anticipated to be performed by US Ecology for this project. This plan may be amended as necessary to satisfy changes to project scope, and regulatory or disposal site requirements.

US Ecology shipment of regulated radioactive materials by highway or by a proper shipping name not initially addressed by this plan may be accomplished by utilizing US Ecology approved NARM Services Brokerage Procedures

1.1 Site Location

The Kaiser - Tulsa Facility is located at 7311 East 41st Street in Tulsa, Oklahoma.

1.2 Brief Site History

Site history is detailed in Reference 1.

2.0 PREREQUISITES

2.1 RESPONSIBILITIES

All personnel involved in the shipment of radioactive or hazardous material or with processing the documentation generated by such shipments are responsible to the USE Transportation Manager for compliance with this Plan.

Management responsibilities as related to radioactive or hazardous material shipments are as follows:

2.1.1 Ensuring personnel who are packaging, marking, labeling, shipping or certifying the radioactive and/or hazardous materials for shipment are trained in accordance with Reference 6, Part 172 Subpart H.

2.1.2 Maintaining an updated and approved Transportation Plan

2.1.3 Reviewing shipment manifests and related documentation

2.1.4 Ensuring compliance to plan requirements and DOT regulations

2.1.5 USEI will take title to the waste material when management authorizes gondolas to depart Kaiser's gate destined for disposal at Grand View, Idaho

Additional responsibilities are as follows:

2.1.6 Personnel involved with the shipment of radioactive and/or hazardous material or with processing the documentation generated by such shipment shall be trained in accordance with this plan and applicable sections of Reference 6.

2.1.7 Personnel performing shipment(s) of radioactive materials, in accordance with this plan, may also be responsible for performing, documenting, and reviewing package or vehicle radiation and contamination surveys and assuring compliance with the contamination and radiation limits specified in Reference 6, specifically 49 CFR 173.441 and 173.443.

2.2 SAFETY PRECAUTIONS

2.2.1 All transportation related operations shall comply with the site health and safety requirements of References 2 and 3 and effective Safety Work Permit(s) (SWP's) for the work being performed.

2.2.2 Ensure that proper eye, ear, face, head, and footwear are worn by all personnel handling radioactive material consistent with the operational and environmental conditions present. Safety glasses shall be worn when surveying or inspecting under vehicles and railcars.

2.2.3 All injuries will be reported to the responsible supervisor and/or project manager immediately.

2.2.4 Normally all radioactive materials packages will be handled by mechanical means to reduce potential exposures.

2.2.5 When working around loading and lifting equipment, all individuals involved in the loading shall wear steel-toed footwear and be alert to the movement of loading and other equipment.

2.2.6 When handling radioactive materials, individuals should be aware of the radiation dose rates expected to maintain exposures as low as reasonably achievable (ALARA).

3.0 WASTE DESCRIPTION

3.1 Contaminants of Concern

The areas and materials to be remediated are described in Reference 1 as soils, building materials, and debris contaminated with low levels of process residue. Specifically, the material contains the following known contaminates of concern:

- Natural Thorium (Th-232, Th-228)
- Thorium 230

3.2 Volumes

It is anticipated that approximately 50,000 tons of excavated material will be loaded into gondola railcars and transported offsite for ultimate disposal at USE / Grand View. It is estimated that approximately 500 rail cars of material will be shipped for disposal.

3.3 Disposal Facility Limits

3.3.1 The US Ecology, Grand View disposal facility waste acceptance criteria are specified in Reference 9. The specific radiological limits, considering the contaminants of concern, ***when averaged over each railcar are:***

- Total specific activity < 2000 pCi/g
- <0.05% by weight Source Material (Thorium) (%Th-232 + %Th-228 +%Th-230)

4.0 CHARACTERIZATION CERTIFICATION REQUIREMENTS

Waste materials shall be characterized in accordance with applicable project plans or procedures and approved by US Ecology prior to shipment. A data package containing Batch Characterization Analysis for each railcar or group of railcars shall be prepared by qualified personnel and provided to the Transportation Manager for evaluation against disposal site waste acceptance criteria. This data may include:

- Batch radiological concentrations per nuclide
- Batch ID number(s)
- Batch gross weight and railcar distribution
- Railcar radiological survey information for US Ecology MicroShield concentration estimates

5.0 TRANSPORTATION

This plan applies to US Ecology brokered railcar waste shipments from the Kaiser – Tulsa facility to the US Ecology, Simco, Idaho waste transfer facility. Shipments to other disposal sites and/or processing facilities are beyond the scope of this plan and may be subject to specific additional requirements referenced and/or provided by the receiving facility.

5.1 General Requirements for US Ecology Radioactive and\or Hazardous Material Shipments

5.1.1 *Pre-Shipment Considerations*

The Transportation Manager shall communicate the need for special packaging instructions including pre-treatment steps required prior to packaging (cutting/drying/draining), how to line the railcar, type and quantity of absorbent, etc.

USE shall verify that the railcar is in satisfactory condition, holes or protrusions into the railcar bed or wall surfaces that could affect liner integrity have been suitably covered or repaired prior to liner placement, the filled liner is securely sealed and the closure device, if any, is correctly applied prior to shipment.

USE will ensure each railcar has been marked, labeled and/or placarded in accordance with Sections 5.7 & 5.8 of this procedure.

SITE RADIATION TECHNICIANS shall perform radiological and contamination surveys to determine, at a minimum, exterior surface contamination levels and the maximum radiation levels on contact with the railcar surface. These surveys shall be documented and reviewed prior to shipment approval.

The Transportation Manager, in consultation with project management, shall schedule railcar pickup and delivery as necessary to support project schedule and needs.

5.2 Waste Characterization / Classification

5.2.1 Waste characterization and classification is fundamental to proper waste management and disposal. It supports both regulatory compliance with DOT, EPA, and NRC Regulations and is necessary to properly transport radioactive and\or hazardous materials. Correct identification and classification is the most important function under the regulations because this determination will establish all other requirements for packaging, marking, labeling, placarding, documentation, carrier requirements and shipment controls. It will also determine what response actions are taken by a first responder in the event of an incident during transportation. With technical grade material, classification will generally be less time and labor intensive and will be as simple as locating the material in the Hazardous Material Table (49

CFR 172.101), contained in Reference 6 and using the hazard class designated there. With materials containing mixtures of two or more hazardous materials, and especially if it is a hazardous waste, this process will require considerably more effort. References 5, 6 and 7 identify appropriate shipping classes and whether adherence to specific air and water regulation is necessary for these types of shipments.

5.2.2 Waste Characterization is the process of determining the radiological and\or hazardous constituents representative of a waste stream or waste material. Thorough sampling of an area or media is necessary in determining the radiological and hazardous characteristics of the materials. The following are methods that can be used to support the characterization process

- Scaling factors derived through historical process/site information
- Customer and historical site Information
- Material Safety Data Sheets (MSDS) and /or procurement information that lists chemical purchases
- Radiological surveys/testing
- Chemical and physical characteristics from past or current sampling events

5.2.3 Initial visual characterization is performed during surveys, site evaluation, and walk downs. Profile development for disposal requires a closer evaluation and sampling of waste to be generated. Suspected hazardous wastes will be sampled if necessary to verify RCRA Hazardous Wastes characteristics. Waste lead is an example of a hazardous waste that does not require verification testing. Block, brick and building materials are an example of materials that do not typically require sampling to verify as a non hazardous waste. Coatings and residual spill material on surfaces may require testing if historical/owner information is not available to make the hazardous/non-hazardous determination.

5.2.4 The scope of this plan is currently limited to the post-characterization, post-classification of materials and delineates the requirements to be followed by qualified project shippers. Project specific characterization procedures may be used to supplement this transportation plan as required.

5.2.5 All materials will be compared and classified according to the applicable sections of References 5, 6 and 9.

5.3 Burial Classification

5.3.1 Each burial site has issued specific permit or license limits for wastes accepted for treatment or disposal. Additionally, burial sites operating under an NRC Part 61 program, or equivalent, require disposal packages to be classified and marked prior to shipment to the respected facility. Waste classification for licensed disposal, if required, will be performed by qualified personnel utilizing project specific or US Ecology approved waste brokerage procedures The issues relative to radioactive waste and disposal classification are independent from the DOT packaging and shipment requirements.

5.4 Shipment Preparation

5.4.1 Preparation for shipment is divided into two major steps. The first step is the selection of the proper shipping name and packaging for the hazardous and\or radioactive material. The second step is to appropriately inspect, load, mark, label, placard and prepare documentation for transportation.

NOTE

All hazardous materials packages must meet the general packaging requirements of Reference 6 (49 CFR 173.24). Additional packaging requirements are contained within and determined by the applicable regulations

used for each shipment of such materials.

5.4.2 Domestic Regulations regarding shipping are found as references in this procedure pertaining to DOT, EPA and NRC Regulations. These regulatory references are the key to navigating through the various regulations that may be used to complete a radioactive and\or hazardous materials shipment.

5.4.3 Domestic transportation regulations are updated frequently. Changes to the regulations will be tracked carefully and this plan revised accordingly to ensure compliance.

5.5 Determination Of Proper Shipping Name

The following proper shipping name determination is based on the only constituents of concern being the radioactivity or radionuclides present in the waste materials at their maximum allowed specific activity and estimated minimum gondola net weight. Subsequent proper shipping name determinations may be necessary if other hazardous constituents are determined to be present in the materials to be shipped

Using the following specific activity limits for Grand View disposal and maximum calculated Th-230 values:

Nuclide	specific activity	RQ	Container activity (95 tons)
Th-232	55 pCi/g	1.0 mCi	4.74 mCi
Th-228	55 pCi/g	10 mCi	4.74 mCi
OR			
Th-nat	110 pCi/g	11 mCi	9.49 mCi
AND			
Th-230	193 pCi/g	10 mCi	16.6 mCi
	Total specific activity	775 pCi/g (28.7 Bq/g)	

Under DOT Regulations in effect prior to October 1, 2004:

Since total specific activity is less than 70 Bq/g (approximately 2000 pCi/g), the material does not meet the definition of a radioactive material and therefore is not subject to Class 7 shipping requirements.

RQ Determination:

Using the unity rule to calculate the total RQ value:

(Th-230 / RQ value + Th-Nat / RQ value) = (16.6/10) + (9.49/11) = 2.52

Since unity equals or exceeds 1.0, the material qualifies as a hazardous substance and therefore is considered as a hazardous material and reportable quantity for transportation purposes (see definitions in 49CFR 171.8). ***This designation as a Reportable Quantity is not affected by the 10/1/04 regulatory changes.***

49 CFR 172.800 security plan requirements will also apply if shipments are required to bear Class 9 placarding or are made in certain bulk packaging.

Proper shipping name:

Environmentally hazardous substances, solid, n.o.s.,9, UN3077, PG III, RQ (Th-Nat, Th-230)

Upon Implementation of HM-230

HM-230 requirements incorporated by this revision will be implemented no later than 10/1/04.

Nuclide	Exempt Concentration Limits	A2 value	LQ limit	LSA-1 limit
Th-232	270 pCi/g	Unlimited	Unlimited	Unlimited
Th-228	27 pCi/g	27 mCi	0.027 mCi	810 pCi/g
Th-Nat	27 pCi/g	Unlimited	Unlimited	Unlimited
Th-230	27 pCi/g	27 mCi	0.027 mCi	810 pCi/g

Exempt concentration (and exempt consignment) limits for Th-nat and Th-230 are exceeded, therefore transportation of this material is subject to Class 7 shipping requirements. 49CFR 173.425 limits are exceeded, therefore the materials may not be shipped under limited quantity provisions. The specific activities are within the LSA-1 limits and the material meets the definition (49 CFR 173.403) of LSA-1. Based on the calculated maximum railcar activities for Th-nat and Th-230, the A2 (normal form type A) limits of 49 CFR 173.435 are not exceeded.

Proper shipping name effective October 1, 2004:

Radioactive Material, Low Specific Activity (LSA-I), 7, UN2912, RQ (Th-Nat, Th-230)

5.6 Packaging and Inspection

5.6.1 The transportation packaging selected for this project consists of sealable super load wrappers contained in gondola style railcars.

This configuration meets the "open top, sift proof rail car" requirement, as authorized by special provision B54 of 172.102, for transport of **Environmentally hazardous substances, solid, n.o.s.**

Radioactive LSA-1 materials may be transported unpackaged when they are (1) "transported in such a manner that under normal conditions of transport there will be no escape of the radioactive contents from the conveyance nor will there be any loss of shielding" and for which (2) "each conveyance must be under exclusive use" controls. This configuration with exclusive use controls satisfies these requirements for transporting "unpackaged" Radioactive LSA-I as specified in 49 CFR 173.427(c).

5.6.2 Prior to loading, each railcar shall be visually inspected to confirm that it complies the pre fill conditions specified in section 5.1.1..

5.6.3 Check that the load wrapper has been properly closed and sealed prior to release for shipment.

5.6.4 Railcars containing materials that are moist or damp shall have sufficient absorbents added to sorb any free liquids released during transport. USE shall perform visual moisture inspections during railcar loading.

5.7 Markings

5.7.1 *Bulk Packages (49 CFR 172.302, 304, 310, 322, 331, 332, 334, 336 and 338)*

5.7.1.1 For **"Environmentally hazardous substances, solid, n.o.s"**, each railcar must be marked with the ID number (3077) as specified in 173.332 or 173.504(f)(9).

5.7.1.2 For unpackaged exclusive use **"Radioactive Material, low specific activity (LSA-1)"**, the liner or rail car shall be stenciled or otherwise marked "RADIOACTIVE-LSA" and "RQ"

5.8 Labeling and Placarding

5.8.1 Bulk Packages: Labeling (49 CFR 172.400 and 400a)

5.8.1.1 DOT specification labeling is not required for bulk packaging with a volume of greater than 640 cubic feet (172.400(a)(2)). The load wrapper and gondola railcar bulk packaging configuration being utilized on this project has a volume in excess 640 cubic feet.

5.8.2 Placarding (49 CFR 172.500)

5.2.8.1 For **"Environmentally hazardous substances, solid, n.o.s"**, Class 9 placarding is not required (172.504(f)(9)). If railcars are placarded, this placarding must meet the requirements of 172.508, 514, 516, 519 and 560.

5.2.8.2 For unpackaged exclusive use **"Radioactive Material, low specific activity (LSA-1)"**, Class 7 (Radioactive) is required to be applied to all four sides of each rail car prior to shipment.

5.9 Package Radiation and Contamination Surveys

5.9.1 Removable contamination surveys will be performed by SITE RADIATION TECHNICIANS on each outbound railcar . Administrative levels for removable contamination are 1000 dpm/100 cm2 beta-gamma and 200-dpm/100 cm2 alpha. Railcars with removable contamination above the administrative levels will not be shipped. These administrative limits are more stringent than the non-fixed contamination limits specified in 49 CFR 173.443 for Class 7 shipments.

5.9.2 Outbound railcar radiation surveys will be performed. No railcar with contact radiation levels exceeding 500 micoR/hr will be shipped without the specific approval of the Transportation Manager and the disposal facility Waste Approval Manager (Simco receipt requirement). This administrative limit is more stringent than the radiation level limits specified in 49 CFR 173.441 for Class 7 shipments

5.10 Loading procedure

5.10.1 Inspect the physical integrity of railcar, remove any materials or items and repair or cover any holes or protrusions which could affect the proper installation of or cause damage to the super load wrapper during loading or transport. Upon completion of this inspection, the railcar may be released to RECON for liner installation and loading.

5.10.2 USE and RECON will evaluate the analytical results for the materials to be loaded and agree on a basic loading plan that will provide assurance, to the extent practical, that the loaded materials are essentially homogenous and that the average and maximum (hot spots) concentration of radionuclides do not exceed the disposal facility acceptance criteria.

5.10.3 RECON and USE personnel shall inspect the waste materials during and upon completion of loading to verify that the materials are consistent with the description on the approved waste profile form and that there are no free liquids present. Free liquids shall be solidified, sorbed or removed from the shipping container prior to release.

5.10.4 Upon completion of loading, US Ecology shall perform a Simco pre-receipt railcar radiation survey to obtain data for a comparison of reported average and maximum specific activities to the estimated average specific and maximum activities calculated based on observed radiation levels.

5.10.5 Upon completion of the final waste inspection and approval of the Transportation Manager, the load wrapper may be sealed in preparation for shipment. The load wrapper may be temporarily closed prior to completion of loading during inclement weather or as necessary to support project work schedules.

5.11 Shipment Documentation and Scheduling

5.11.1 Shipping papers are documents or combination of documents containing the information required in Subpart C of Reference 6. (49 CFR 172.200). A rail bill of lading and the individual Non-Hazardous Waste Manifests and NRC Form 540, or equivalent, (if necessary) will be utilized as the shipping papers for this project. These documents will contain, at a minimum, all of the information required by Subpart C (172.200), the additional information specified in 172.204(d), when required for Class 7 shipments and the applicable emergency response information required by Subpart G (172.600).

5.11.2 A Non Hazardous Waste Manifest shall be prepared for each railcar of material being shipped to the Simco facility. A rail Bill of Lading shall be prepared for each group of railcars comprising a shipment from the Tulsa facility.

5.11.3 The Transportation Manager shall coordinate with the US Ecology Corporate Transportation Manager and the local or central office railroad personnel to obtain transporter signatures and schedule rail shipments. The Transportation Manager will also forward completed Non-Hazardous Waste Manifests to the Grand View facility.

5.11.4 The US Ecology Corporate Transportation Manager will track railcar status on a daily basis and provide shipment update reports to the project Transportation Manager.

5.12 Transportation Security Plan Requirements

5.12.1 49 CFR 172.800(b)(4) requires that a security plan for hazardous materials be developed and adhered to by each person who offers for transport "a shipment of a quantity of hazardous materials in a bulk packaging having a capacity equal to or greater than (3,500 gallons) for liquids or (468 cubic feet) for solids."

5.12.2 A project specific risk assessment will be performed and a security plan, which meets the requirements of 172.802, will be developed and implemented prior to the commencement of transportation related hazardous materials handling.

6.0 TRAINING

6.1 All Hazmat employees shall receive the general and function specific D.O.T Hazardous Materials training as specified in 49 CFR 172.700-704 prior to commencement of their transportation related hazardous materials handling.

6.2 All Hazmat Employees shall successfully complete testing on the subject matter provided in the training described in Section 6.1. Evidence of successful completion of this testing shall be included with the employee Hazmat training records required by 172.704(d).

6.3 Per 172.704(C)(3), "Relevant training received from a previous employer or other source may be used to satisfy the requirements of this subpart provided a current record of training is obtained from the hazmat employees' previous employer". If utilized, evidence of this current (within three years) relevant training must be maintained in the employee's Hazmat training record.

6.4 Security awareness training and Security Plan Implementation training shall be provided to all project employees within 90 days of hire. All initial project hazmat employees shall receive this training prior to commencement of transportation related hazardous materials handling.

Shonka Procedure: SMCM 007 Revision 02

Exception for Section 7.2
Calibration of NaI Detector

Thorium Remediation Project
Tulsa, OK

REVISION: 02

EFFECTIVE DATE: SEPTEMBER 2004

Approved By: J. W. (Bill) Vinzant – Project Manager

9-29-04
Date

Kaiser Aluminum and Chemical Corporation

Shonka Procedure: SMCM 007 Revision 02

Exception for Section 7.2
Calibration of NaI Detector

Thorium Remediation Project
Tulsa, OK

REVISION: **02**

EFFECTIVE DATE: **SEPTEMBER 2004**

9/22/04
Danny P. Brown-Project Manager Date:

9/22/04
Diana L. Brown-Quality Control Date:

Remedial Construction Services, L.P.

DATE: August 31, 2004

TO: Richard Lewis, RECON Quality Control Supervisor

SUBJECT: SMCM Procedure 007, Rev2, Subsurface Multi-Spectral Contamination Monitor, Section 7.2, Exception Request

FROM: Michael Marcial, SRA Project Manager

INTRODUCTION

SRA is requesting that the steps outlined in this document be accepted in lieu of the steps outlined in the SMCM Procedure 007, Rev 2, Subsurface Multi-Spectral Contamination Monitor, Section 7.2 for the calibration performed on 5/11/04.

The exception is based on the KAI-06 procedure that states, "Calibration may be performed by correlation with another calibrated instrument when it is the best reasonable method."

Before any gamma spectroscopy in support of surveys is performed with NaI detectors, all detectors must be calibrated. The data collected from the calibration will be used to calculate calibration factors for the duration of the survey. The calibration factor will convert count rate into volumetric concentrations.

The basic reason for this Exception Request is the calibration method uses conditions of a quantity and quality similar to that which the SMCM system will be used to measure Th-232. A standard calibration source is usually deposited in plastic or plated on stainless steel and does not reflect the actual physical medium that will be surveyed.

Please note that this exception request includes the calibration frequency. SRA requests permission to perform a calibration of the system on an annual basis (12 month interval) instead of the 6 month interval called out in SCM Procedure 007 Rev2, Subsurface Multi-Spectral Contamination Monitor, Section 7.2.7.

CALIBRATION ELEMENTS

The SMCM system calibration will include the following elements that follow the KAI-06 procedure and ANSI N323.

- The calibration standard will be samples taken from material run through the SMCM system and analyzed by an off-site lab. The samples yield conditions of a quantity and quality similar to that which the SMCM system will be used to measure.
- The calibration shall be performed with elevated Th-232 dross/soil material. The sample taken and analyzed by the off-site lab provides the highest traceability practical. The conveyor belt and material on the belt provide a carrier medium to that which is encountered during SMCM system use.
- A calibration label will be affixed to the computer chassis of the SMCM system, identifying the calibration date.
- SMCM system calibrations shall be documented on appropriate forms, records or certificates.
- SMCM system re-calibration will occur on 12 month intervals.
- When necessary, compensation in calibration or conversion factors will be determined and/or applied when calibration conditions do not correlate with actual use. Based on field use, an email will be issued from the SRA Project Manager to the SRA SMCM technician stating any compensation needed as the survey progresses. Compensation made at Tulsa may occur due to a bias between the SMCM and the off-site lab samples.
- The data analysis of the SMCM data, the collected lab samples and computer models will be documented in SRA Tech Notes submitted to RECON.

CALIBRATION STEPS

The calibration of NaI detector will use correlation with another instrument calibrated to measure volumetric samples in pCi/g.

SRA will use the following steps for SMCM system calibration:

- Source Material: Obtain source material of sufficient quantity and activity as directed by the Project Manager.
- Source Count: Perform a survey with the source material present at a distance from the detector that will be encountered during a survey.
- Background Count: Perform a survey without the source material present.
- Net Count: Determine the average net counts per second (cps) in the Tl-208 region of interest.
- Correlation Count: Take one or more samples as directed by the Project Manager and measure them with another calibrated instrument such as an accredited radiation laboratory.
- Calibration Factor: The calibration factor for the SMCM is the net cps divided by the readout of the other calibrated instrument units of measure.