8031 R-020-104.8

TRANSMITTAL OFFERNALD WASTE INFORMATION

04/22/1997

DOE-0834-97
DOE-FEMP DOE-NV
57
MEMORANDUM

DOE F 1325.8
(5-83)

8031

United States Government

Department of Energy
Fernald Area Office

memorandum

DATE: APR 22 1997
DOE-0834-97

REPLY TO
ATTN OF: FEMP:Rast

SUBJECT: TRANSMITTAL OF FERNALD WASTE INFORMATION

TO: Kevin Leary, DOE-NV

This memo is to inform you of recent changes in the Fernald Environmental Management Project (FEMP) Waste Certification (attachment 1) Program and to provide your office with information requested during the recent Waste Generator Workshop for waste profiles (attachment 2).

If you have any questions, please call me at (513) 648-3138.

David M Rast

David M. Rast
Waste Management Engineer

Attachments: As Stated

cc:

N. Hallein, EM-42/CLOV
M. West, FDF/35-1
AR Coordinator/78

Recycled and Recyclable

M-733 DOE (REV. 11/21/95)

Attachment 1

Waste Cerification Official Application Modifications

This attachment is to notify DOE-NV of the current changes in regards to the FEMP "Primary Contacts" listing, and the approved "Waste Certification Official" (WCO) listing, contained in the FEMP Application to Ship Waste to the Nevada Test Site .

Due to reorganizational changes at the FEMP it is necessary to revise the "Primary Contact" listing which now includes Michael F. Ramirez who is the current Team Coach for the Waste Acceptance Program, and Donna Allen who is a Team Member within the Traffic Management Department. Michael F. Ramirez has also been trained and qualified as a WCO and is assigned the position as the Chief Waste Certification Official.

In addition, two former Waste Package Certifiers are qualified as Waste Certification Officials. The new WCOs are Bruce E. Davis the current Team Leader of the Waste Certification, and Kenneth J. Aday currently a Team Member of the Waste Certification section. This change was required to replace one WCO recently transferred and to provide personnel to meet current waste shipment work loads. As required by NVO-325, Revision 1, Sections 6.2 and 6.3, the additional officials have been trained to the FEMP Waste Certification Program Plan and approved by Michael J. Kopp, Chief Waste Certification Official. Mr. Kopp completed the qualification evaluation on January 21, 1997.

To facilitate these changes revised pages for the FEMP application are provided to replace the current lists. Please insert the replacement pages into the current FEMP Application to Ship Waste to the Nevada Test Site, Revision 7, Sections I.E (page 2), I.F.1.0 (page 3), I.F.2.0 (page 3), I.F.3.0 (page 4).

I. GENERATOR INFORMATION

E. Contractor Name and Contacts

Fluor Daniel Fernald
P.O. Box 538704
Cincinnati, OH 45253

Primary Contacts:

Michael F. Ramirez (Team Coach, Waste Acceptance Program)
Fluor Daniel Fernald
(513) 648-5668
Facsimile Number (513) 648-5701

Donna Allen (Team Member, Traffic Management)
Fluor Daniel Fernald
(513) 648-5890
Facsimile Number (513) 648-5708

Alternate Contacts:

Grady J. Calhoun (Team Coach, Health & Safety)
Fluor Daniel Fernald
(513) 648-4312
Facsimile Number (513) 648-5754

F. Waste Certification Official and Alternates

1.0 Chief Waste Certification Official

Michael F. Ramirez
Team Coach, Waste Acceptance Program
Fluor Daniel Fernald
(513) 648-5668
Facsimile No. (513) 648-5701

2.0 Alternate Waste Certification Official

Kenneth J. Aday
Team Member, Waste Certification
Fluor Daniel Fernald
(513) 648-5326
Facsimile No. (513) 648-4925

Bruce E. Davis
Team Leader, Waste Certification
Fluor Daniel Fernald
(513) 648-4934
Facsimile No. (513) 648-4925

Glenna L. Gerster
Team Member, Waste Acceptance Program
Fluor Daniel Fernald
(513) 648-4918
Facsimile No. (513) 648-5701

Richard M. Kirkham
Team Member, Waste Certification
Fluor Daniel Fernald
(513) 648-4923
Facsimile No. (513) 648-4925

John W. Stanzak
Team Member, Waste Certification
Fluor Daniel Fernald
(513) 648-3717
Facsimile No. (513) 648-4925

3.0 Waste Package Certifiers

Michael Clifton
Team Member, Quality Assurance
Fluor Daniel Fernald
(513) 648-4920
Facsimile No. (513) 648-3941

Steven M. Hurley
Team Member, Quality Assurance
Fluor Daniel Fernald
(513) 648-4932
Facsimile No. (513) 648-3683

Susan A. Schehr
Team Member, Waste Certification
Fluor Daniel Fernald
(513) 648-4919
Facsimile No. (513) 648-4925

Leslie A. Williams
Team Member, Quality Assurance
Fluor Daniel Fernald
(513) 648-4254
Facsimile No. (513) 648-3683

Attachment 2

Table Top Audit and Waste Profile Submittal

Per discussions held between Dayne Thomas of Fluor Daniel Fernald (FDF) and members of the DOE/RWAP team during the Waste Generator Workshop Wednesday, March 26th, the following items are submitted for your review:

- Request schedule change to the Department of Energy/Radioactive Waste Acceptance Program (DOE/RWAP) table top audit until October of 1997.

- Four waste profiles of SEG metal melt waste

In addition to the above items, FEMP is also sending a draft profile of stabilized Silo 3 waste. The Silo 3 draft profile was not discussed during the Waste Generator Workshop.

FEMP prepares schedules and budgets for the disposition of waste to the Nevada Test Site in July and August of each year. FEMP did not schedule or budget the additional tasks associated with the changes in the NTSWAC for existing waste streams in July and August of 1997. FDF understands that the NTSWAC does not take affect until after the table top audit of our facility. Therefore, we would like to request that the audit be held at your earliest convenience in FY98. FEMP will schedule and budget for disposition of waste in accordance with the NTSWAC for all FY98 disposal.

SEG metal melt waste was generated and shipped to the Nevada Test Site from 1993 until 1995. Unfortunately, a portion of the slag and all of the oxides did not meet the NVO-325 Rev. 1 requirements for disposal. The waste was characteristic for TC metals. FDF and SEG negotiated a path forward for these materials which included treating the waste to meet the NTS WAC. After treatment the waste was shipped to FDF for storage and then ultimate disposal at the Nevada Test Site. Four profiles were written to demonstrate compliance with the NTSWAC and are as follows:

ONLO000000101- Enviroblended Oxides

Oxides are dirt, rust, paint chips, and small pieces of metal that were separated from the scrap metal during processing at the SEG facility. The waste was stabilized with Enviroblend by SEG and sampled after treatment in accordance with FDF's Prototype Sampling and Analysis Plan for Containerized Waste.

ONLO000000102 - Sulfur Cemented Oxides

Oxides are dirt, rust, paint chips, and small pieces of metal that were separated from the scrap metal during processing at the SEG facility. The waste was stabilized with sulfur cement by SEG and sampled after treatment in accordance with FDF's Prototype Sampling and Analysis Plan for Containerized Waste.

ONLO000000103 - Sulfur Cemented Slag

Slag is the waste portion of the metal melt operation that contains impurities separated from the ferrous metal. The waste was stabilized with sulfur cement by SEG and sampled after treatment in accordance with FDF's Prototype Sampling and Analysis Plan for Containerized Waste.

ONLO000000104 - Slag

Slag is the waste portion of the metal melt operation that contains impurities separated from the ferrous metal. Two containers out of approximately 250 containers of slag that were approved for shipment to the Nevada Test Site in 1994 were not shipped. These two containers were compacted and overpacked into one box. SEG did not ship this container to the Nevada Test Site in 1994 because it is not cost effective to ship a single container from Oak Ridge, Tennessee to the Nevada Test Site.

Currently, one of the most visible projects at the Fernald facility is the management of the Silo wastes. Vitrification was the treatment process originally identified for the Silo waste. After pilot plant surrogate processing and expert review, a recommendation was made to explore alternative treatment for Silo 3. One of the alternatives suggested was to perform stabilization of the Silo 3 waste. Flour Daniel Fernald and DOE/FN are requesting that the DOE/RWAP team review the draft profile for stabilized Silo 3 waste. Profile ONLO000000105, stabilized Silo 3 waste, is being submitted in draft for DOE/RWAPs review. This information is being submitted to obtain DOE/RWAPs support on determining the acceptability of Silo 3 waste treated in this manner. Although the treatment process design has not been completed, FDF is submitting this profile for NTS review on the acceptability of the projected final waste.

Nevada Test Site Waste Profile, Revision 0

A. Generator Information

1. WCO Michael F. Ramirez Phone (513) 648-5668 FAX (513) 648-5701
2. Technical Contact Dayne A. Thomas Phone (513) 648-5672 FAX (513) 648-5649
3. DOE Contact David M. Rast Phone (513) 648-3138 FAX (513) 648-3077
4. Facility Name Fernald Environmental Management Project
   Address P.O. Box 398704
   City Cincinnati State Ohio Zip 45239-8704
5. EPA Identification Number OH6890008976

B. General Waste Stream Information

1. Waste Stream Identification Number ONLO000000101
   Profile Revision Number O Profile Revision Date _____
2. Waste Description SEG Enviroblended Oxides
3. Waste Category ■ Low-Level ☐ Mixed Low-Level (Generated within Nevada only)
4. Generating Process Description This waste is treated oxides generated from the metal melt operation at the Scientific Ecology Group, in Oak Ridge Tennessee. Please See Process Knowledge for MEF 2973 attached.

   Process Description Continuation Page Attached ■ Yes ☐ No
   Flow Diagram Attached ☐ Yes ■ No
5. Estimated Rate of Generation ■ One Time Only 37 m^3
   ☐ Ongoing _____ m^3/yr
6. Reason for Submittal (specify one)
   ■ New Waste Stream
   ☐ Modification to Waste Stream Date Change Effective _____
   ☐ Terminate Waste Stream
7. ☐ Yes ■ No Does this waste stream require a WAC deviation? Attach information.

C. Physical Properties

1. Waste Form Description ☐ Solid ☐ Solidified ☐ Encapsulated ☐ Sludge ■ Powder/Dust
   ☐ Sealed Sources ☐ Absorbed Liquids ☐ Other _____

2. List waste stream components — Estimated Percent by ☐ Volume ■ Weight

				Estimated Density (kg/m³)
Enviroblend	30	to	35	826
SEG OXIDES:	65	to	70	1400
-Dirt[1]	25	to	90	
-Rusty Metal[1]	25	to	80	
-Small pieces of metal[1]	0	to	5	
-Paint Chips[1]	0	to	5	

[1] The SEG OXIDES are made up of these items. The ranges reported are as components of the SEG OXIDES not for the waste as a whole.

Component Continuation Page Attached ☐ Yes ■ No

3. Does the waste contain the following as defined in the WAC? If yes, attach information pertaining to WAC compliance (i.e., treatment, packaging). List documentation that demonstrates WAC compliance for each.

☐ Yes	■ No	Free Liquids	Visual Inspection (RTR)
■ Yes	☐ No	Particulates	Containerized in White Metal Box
☐ Yes	■ No	Gases	MEF 2973
☐ Yes	■ No	Etiological Agents	MEF 2973
☐ Yes	■ No	Chelating Agents	MEF 2973
☐ Yes	■ No	Polychlorinated Bihenyls	MEF 2973
☐ Yes	■ No	Explosives	MEF 2973
☐ Yes	■ No	Regulated Asbestos-Containing Material	MEF 2973
☐ Yes	■ No	Radioactive Animal Carcasses	MEF 2973
☐ Yes	■ No	DOE Equivalent Greater-Than-Class C Packages	MEF 2973
☐ Yes	■ No	Other	

D. RCRA Characterization

1. RCRA characterization by □ Process Knowledge □ Sampling and Analysis ■ Both

2 □ Yes ■ No Is the waste hazardous as defined in the WAC? List documentation that demonstrates WAC compliance.

MEF 2973 characterizes this waste

3. Does the waste exhibit any characteristic of hazardous waste as defined in 40 CFR 261.

□ Yes ■ No Ignitability

□ Yes ■ No Corrosivity

□ Yes ■ No Reactivity

□ Yes ■ No Toxicity

4. □ Yes ■ No Is the waste listed as defined in 40 CFR 261?

5. □ Yes ■ No Is the waste hazardous per state-of-generation regulations? State of generation

6. ■ Yes □ No Has the waste been treated? Attach information which verifies WAC compliance.

7. □ Yes ■ No Mixed waste. Attach information which verifies LDR compliance.

8. If sampling and analysis was used for RCRA characterization, complete applicable portions of summary table below. If analytical results are available for additional hazardous constituents, attach an equivalent summary table.

	Known or Expected? Yes	Known or Expected? No	Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level? Yes	Exceeds Regulatory Level? No
TCLP Metals:							
Arsenic	□	■	0.556		0.556	□	■
Barium	□	■	0.022		0.022	□	■
Cadmium	□	■	0.011		0.011	□	■
Chromium	□	■	0.023	0.039	0.022	□	■
Lead	□	■	0.111		0.111	□	■
Mercury	□	■	0.0002		0.0002	□	■
Selenium	□	■	0.333		0.333	□	■
Silver	□	■	0.022		0.022	□	■

	Known or Expected? Yes	No	Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level? Yes	No
TCLP Volatiles:							
Benzene	☐	■	_____	_____	_____	☐	■
Carbon Tetrachloride	☐	■	_____	_____	_____	☐	■
Chlorobenzene	☐	■	_____	_____	_____	☐	■
Chloroform	☐	■	_____	_____	_____	☐	■
1,4-Dichlorobenzene	☐	■	_____	_____	_____	☐	■
1,2-Dichloroethane	☐	■	_____	_____	_____	☐	■
1,1-Dichloroethylene	☐	■	_____	_____	_____	☐	■
Methyl ethyl ketone	☐	■	_____	_____	_____	☐	■
Pyridine	☐	■	_____	_____	_____	☐	■
Tetrachloroethylene	☐	■	_____	_____	_____	☐	■
Trichloroethylene	☐	■	_____	_____	_____	☐	■
Vinyl Chloride	☐	■	_____	_____	_____	☐	■
TCLP Semivolatiles							
o-Cresol	☐	■	_____	_____	_____	☐	■
m-Cresol	☐	■	_____	_____	_____	☐	■
p-Cresol	☐	■	_____	_____	_____	☐	■
Cresol	☐	■	_____	_____	_____	☐	■
2,4-Dinitrotoluene	☐	■	_____	_____	_____	☐	■
Hexachlorobenzene	☐	■	_____	_____	_____	☐	■
Hexachlorobutadiene	☐	■	_____	_____	_____	☐	■
Hexachloroethane	☐	■	_____	_____	_____	☐	■
Nitrobenzene	☐	■	_____	_____	_____	☐	■
Pentachlorophenol	☐	■	_____	_____	_____	☐	■
2,4,5-Trichlorophenol	☐	■	_____	_____	_____	☐	■
2,4,6-Trichlorophenol	☐	■	_____	_____	_____	☐	■

	Known or Expected? Yes	No	Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level? Yes	No
TCLP Pesticides and Herbicides:							
Chlordane	☐	■	_____	_____	_____	☐	■
2,4-D	☐	■	_____	_____	_____	☐	■
Endrin	☐	■	_____	_____	_____	☐	■
Heptachlor (and its hydroxide)	☐	■	_____	_____	_____	☐	■
Lindane	☐	■	_____	_____	_____	☐	■
Methoxychlor	☐	■	_____	_____	_____	☐	■
Toxaphene	☐	■	_____	_____	_____	☐	■
2,4,5-TP (Silvex)	☐	■	_____	_____	_____	☐	■

PLEASE NOTE: *IF THE DETECTION LIMIT AND THE STATISTICAL MEAN ARE BLANK, THE WASTE WAS NOT ANALYZED FOR THOSE CONSTITUENTS. WHEN ONLY A STATISTICAL MEAN AND DETECTION LIMIT ARE REPORTED ALL OF THE SAMPLES WERE REPORTED AS A NON-DETECT FOR THAT ANALYTE.*

E. Radiological Properties

1. Radiological characterization by (check all that apply) ■ Process Knowledge ■ Sampling & Analysis
   ■ Material Control & Accountability ■ Direct Measurement
   ■ Gross Radiation Measurement ☐ Other _____
2. Were the following used in radiological characterization? ☐ Scaling Factors ■ Ratios

3. Reference documents that describe the radiological characterization process.
FEMP Radiological Characterization Program Manual RM-0041
D22-00-003 Documentation for Radiological Characterization of Process Residues and Intermediate Product
MEF 2973

4. Reference documents that describe the method of determining package activity.
MEF 2973 (Letter from SEG to FDF Subject Transmittal of Radiological Activity Assignments of FERMCO Slag and Oxidation) This letter was then confirmed with FDF analysis.

5. List reportable radionuclides as defined in the WAC.

Radionuclide	Activity Range (Bq/m^3)			Activity Representative of Final Waste Form (Bq/m^3)
U-238	1.15E7	to	1.66E8	6.41E7
U-235	3.67E5	to	5.33E6	2.06E6
CO-60	3.77E5	to	5.48E6	2.12E6
CS-137	2.39E5	to	3.47E6	1.34E6
Th-232	1.54E5	to	5.33E6	8.64E5
		to		
		to		
		to		
		to		
		to		
		to		
		to		

Radiological Properties Continuation Page Attached? ☐ Yes ■ No

6. Attach list of chemical form of radionuclide, if known.
Page attached? ☐ Yes ■ No

7. ☐ Yes ■ No Does the waste contain transuranic waste creating nuclides as defined in the WAC? If yes, list below.

Transuranic Nuclides	Activity Range (Bq/m^3)		Activity Repre-Sentative of Final Waste Form (Bq/m^3)
_____	_____	to	_____
_____	_____	to	_____
_____	_____	to	_____
_____	_____	to	_____
_____	_____	to	_____
_____	_____	to	_____
_____	_____	to	_____
_____	_____	to	_____
_____	_____	to	_____
_____	_____	to	_____
_____	_____	to	_____
_____	_____	to	_____

Transuranic Nuclide Continuation Page Attached? ☐ Yes ■ No

8. ☐ Yes ■ No Is the waste TRU? List documentation that demonstrates WAC compliance.

_____

_____

_____

9. ☐ Yes ■ No Is enriched uranium present? If yes, provide enrichment of U-235 by weight percent _____ . Provide maximum mass U-235 per package _____ g/package. Reference controlling documents.

_____

_____

_____

10. ☐ Yes ■ No Are other fissionable nuclides present?

Nuclide	Maximum Activity Concentration (Bq/m^3)
_____	_____
_____	_____
_____	_____
_____	_____

Fissionable Nuclide Continuation Page Attached ☐ Yes ■ No

F. Packaging Description

1. ■ Yes □ No Does the waste meet each of the package criteria as defined in the WAC?
   List documentation that demonstrates WAC compliance. Packaging Procedures PT-005, PT-006, PT-007, and PT-011
2. Container type(s) Metal Box
   DOT Specification(s) IP-1
   ■ Yes □ No □ N/A Does container meet 3,375 lb/ft^2 strength test?
3. Standard container external dimensions 3.3'H x 4.8'W x 6.8'L or 4.0'H x 4.0'W x 7.0' L
   Packaged bulk external dimensions N/A
4. Weight Range 982 kg to 4030 kg
5. ■ Yes □ No Waste stream includes unclassified material.
6. □ Yes ■ No Waste stream includes classified material.
7. ■ Yes □ No Estimated radiation dose rate at disposal package surface.
   0.005 to 0.04 mSv/h, at 1 meter 0.001 to 0.004 mSv/h.
8. Reference special handling procedures and ALARA documentation, if appropriate.
   N/A

G. Generator Signature

To the best of my knowledge, the information in this document and attachments is true and accurate. Willful and deliberate omissions have not been made. All known and suspected hazardous materials have been disclosed.

Dayne A. Thomas	Dayne A. Th	4/15/97
Preparer's Printed Name	Signature	Date
MICHAEL F. RAMIREZ	Michael F. Ramirez	4/15/97
WCO's Printed Name	Signature	Date

MEF No.: 2973
MTC: 192 SRC: SEG
SAP No.: 96-1299B

Date: 03/17/97

Process Knowledge File Narrative

Descriptive Name:

This material is Oxides treated with Enviro - Blend.

Process Generating the Waste:

Scrap metal was generated at the FEMP as a result of demolition projects, removal of abandoned equipment, and the upgrade of facilities and vehicles. This material was then contracted to be recycled at Oak Ridge, TN by Scientific Ecology Group, Inc. (SEG). The scrap metal was recycled by melting the scrap metal in an induction furnace at temperatures of up to 3000 °F. There are two different paths that generated oxides at the SEG facility.

1. Prior to the metal being melted it was placed on a sorting floor for size reduction and segregation. The floor sweepings after the metal was sorted and size reduced were swept up and placed into boxes. These floor sweepings were identified as oxides and are part of this waste stream.

2. Four months into the project, SEG determined that the scrap metal that was being melted in the induction furnace was too heavily oxidized. SEG placed a shaker table in the operation which removed rust, dirt, small pieces of metal and paint chips from the scrap metal prior to melting. The shaker table materiasl were identified as oxides and are part of this waste stream.

Prior to treatment, the oxides were characteristic for lead. The elevated lead levels required SEG to treat the oxides. SEG determined that Enviro - Blend would be used to treat the waste. The treatment operation was performed as follows:

1. Open FDF box of oxides.
2. Place opened box of oxides on operation platform
3. Shovel loose powdery oxides into treatment vessel
4. Remove small pieces of metal for processing through induction furnace
5. Size reduce any caked oxides then place into treatment vessel
6. Repeats steps 1-5 until appropriate amount of Oxides were in treatment vessel.
7. Add Enviro - Blend to meet a 30% Enviro - Blend to 70% Oxide weight percent mixture
8. Mix the Oxides with the Enviro - Blend for at least 10 minutes
9. Dump treated oxides into white metal box.

Enviro - Blend chemicals are designed to combine with metals to produce an insoluble salt. The post treated waste was sampled for TC metals which demonstrated that the waste was no longer

characteristic for lead.

Radiological/Chemical Composition:

SEG reported the total Uranium of the waste prior to treatment as 0.5% total U with a U-235 enrichment of 0.53%. The total Uranium was diluted to 0.35% while the enrichment stayed the same.

The chemical composition of this material is made up of 30% Enviro - Blend and 70% oxides. Oxides are a combination of dirt, rust, small pieces of metal, and paint chips. The Enviro - Blend is made up of a combination of Enviro-Mag 75% and Enviro-Phos 25%. Enviro-Mag is mostly magnesium oxide while the Enviro Phos is mostly phosphorus pentoxide.

Please Note: Box 93-5000-110 contained 1005 lbs. of oxides and 154 lbs. of refractory slag. The refractory slag was size reduced into a powder then treated with Enviro-Blend. The treatment of this waste had a separate sample taken, 96-1299B-10. The results were at least one order of magnitude less than the regulatory level for the treated refractory slag. The small amount of waste generated from the treatment of the refractory slag was mixed with the oxides and are part of this waste stream. Please see MEF 2510's PK File Narrative for description of refractory slag. The term refractory slag and slag are synonymous for all SEG waste.

Inventory of Materials:

The Inventory Identification Attachment lists 13 boxes of treated oxides

Reference Documents:

Enviro - Blend product specification document
Enviro-Blend MSDS
SEG Enviro - Blend batch tickets
Galot Mixer Operations for Concrete Encapsulation and Mixed Waste Treatment
Activity Assignment for Fermco Slag and Oxidation Waste
MEF 2510 SEG Slag

Nevada Test Site Waste Profile, Revision 0

A. Generator Information

1. WCO Michael F. Ramirez Phone (513) 648-5668 FAX (513) 648-5701
2. Technical Contact Dayne A. Thomas Phone (513) 648-5672 FAX (513) 648-5649
3. DOE Contact David M. Rast Phone (513) 648-3138 FAX (513) 648-3077
4. Facility Name Fernald Environmental Management Project
   Address P.O. Box 398704
   City Cincinnati State Ohio Zip 45239-8704
5. EPA Identification Number OH6890008976

B. General Waste Stream Information

1. Waste Stream Identification Number ONLO000000102
   Profile Revision Number 0 Profile Revision Date _____
2. Waste Description SEG Sulfur Cemented Oxides
3. Waste Category ■ Low-Level ☐ Mixed Low-Level (Generated within Nevada only)
4. Generating Process Description This waste is treated oxides generated from the metal melt operation at the Scientific Ecology Group, in Oak Ridge Tennessee. Please See Process Knowledge for MEF 2968 attached.

   Process Description Continuation Page Attached ■ Yes ☐ No
   Flow Diagram Attached ☐ Yes ■ No
5. Estimated Rate of Generation ■ One Time Only 1.5 m^3
   ☐ Ongoing _____ m^3/yr
6. Reason for Submittal (specify one)
   ■ New Waste Stream
   ☐ Modification to Waste Stream Date Change Effective _____
   ☐ Terminate Waste Stream
7. ☐ Yes ■ No Does this waste stream require a WAC deviation? Attach information.

C. Physical Properties

1. Waste Form Description ☐ Solid ■ Solidified ☐ Encapsulated ☐ Sludge ☐ Powder/Dust ☐ Sealed Sources ☐ Absorbed Liquids ☐ Other _____

2. List waste stream components — Estimated Percent by ☐ Volume ■ Weight

				Estimated Density (kg/m³)
Sulfur Cement	50	to	60	2070
SEG OXIDES:	40	to	50	1400
-Dirt[1]	25	to	90	
-Rusty Metal[1]	25	to	80	
-Small Pieces of Metal[1]	0	to	5	
-Paint Chips[1]	0	to	5	

[1] The SEG OXIDES are made up of these items. The ranges reported are as components of the SEG OXIDES not for the waste as a whole.

Component Continuation Page Attached ☐ Yes ■ No

3. Does the waste contain the following as defined in the WAC? If yes, attach information pertaining to WAC compliance (i.e., treatment, packaging). List documentation that demonstrates WAC compliance for each.

☐ Yes	■ No	Free Liquids	Visual Inspection (RTR)
☐ Yes	■ No	Particulates	MEF 2968
☐ Yes	■ No	Gases	MEF 2968
☐ Yes	■ No	Etiological Agents	MEF 2968
☐ Yes	■ No	Chelating Agents	MEF 2968
☐ Yes	■ No	Polychlorinated Biphenyls	MEF 2968
☐ Yes	■ No	Explosives	MEF 2968
☐ Yes	■ No	Regulated Asbestos-Containing Material	MEF 2968
☐ Yes	■ No	Radioactive Animal Carcasses	MEF 2968
☐ Yes	■ No	DOE Equivalent Greater-Than-Class C Packages	MEF 2968
☐ Yes	■ No	Other	

D. RCRA Characterization

1. RCRA characterization by ☐ Process Knowledge ☐ Sampling and Analysis ■ Both

2 ☐ Yes ■ No Is the waste hazardous as defined in the WAC? List documentation that demonstrates WAC compliance.

MEF 2968 characterizes this waste

3. Does the waste exhibit any characteristic of hazardous waste as defined in 40 CFR 261.

☐ Yes ■ No Ignitability

☐ Yes ■ No Corrosivity

☐ Yes ■ No Reactivity

☐ Yes ■ No Toxicity

4. ☐ Yes ■ No Is the waste listed as defined in 40 CFR 261?

5. ☐ Yes ■ No Is the waste hazardous per state-of-generation regulations? State of generation

6. ■ Yes ☐ No Has the waste been treated? Attach information which verifies WAC compliance.

7. ☐ Yes ■ No Mixed waste. Attach information which verifies LDR compliance.

8. If sampling and analysis was used for RCRA characterization, complete applicable portions of summary table below. If analytical results are available for additional hazardous constituents, attach an equivalent summary table.

	Known or Expected?		Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level?	
	Yes	No				Yes	No
TCLP Metals:							
Arsenic	☐	■	0.556		0.556	☐	■
Barium	☐	■	0.3115	0.35	0.022	☐	■
Cadmium	☐	■	0.027	0.059	0.011	☐	■
Chromium	☐	■	0.027	0.036	0.022	☐	■
Lead	☐	■	1.54	1.923	0.111	☐	■
Mercury	☐	■	0.0002		0.0002	☐	■
Selenium	☐	■	0.333		0.333	☐	■
Silver	☐	■	0.022		0.022	☐	■

	Known or Expected? Yes	No	Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level? Yes	No
TCLP Volatiles:							
Benzene	☐	■	_____	_____	_____	☐	■
Carbon Tetrachloride	☐	■	_____	_____	_____	☐	■
Chlorobenzene	☐	■	_____	_____	_____	☐	■
Chloroform	☐	■	_____	_____	_____	☐	■
1,4-Dichlorobenzene	☐	■	_____	_____	_____	☐	■
1,2-Dichloroethane	☐	■	_____	_____	_____	☐	■
1,1-Dichloroethylene	☐	■	_____	_____	_____	☐	■
Methyl ethyl ketone	☐	■	_____	_____	_____	☐	■
Pyridine	☐	■	_____	_____	_____	☐	■
Tetrachloroethylene	☐	■	_____	_____	_____	☐	■
Trichloroethylene	☐	■	_____	_____	_____	☐	■
Vinyl Chloride	☐	■	_____	_____	_____	☐	■
TCLP Semivolatiles							
o-Cresol	☐	■	_____	_____	_____	☐	■
m-Cresol	☐	■	_____	_____	_____	☐	■
p-Cresol	☐	■	_____	_____	_____	☐	■
Cresol	☐	■	_____	_____	_____	☐	■
2,4-Dinitrotoluene	☐	■	_____	_____	_____	☐	■
Hexachlorobenzene	☐	■	_____	_____	_____	☐	■
Hexachlorobutadiene	☐	■	_____	_____	_____	☐	■
Hexachloroethane	☐	■	_____	_____	_____	☐	■
Nitrobenzene	☐	■	_____	_____	_____	☐	■
Pentachlorophenol	☐	■	_____	_____	_____	☐	■
2,4,5-Trichlorophenol	☐	■	_____	_____	_____	☐	■
2,4,6-Trichlorophenol	☐	■	_____	_____	_____	☐	■

	Known or Expected? Yes	No	Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level? Yes	No
TCLP Pesticides and Herbicides:							
Chlordane	☐	■	_____	_____	_____	☐	■
2,4-D	☐	■	_____	_____	_____	☐	■
Endrin	☐	■	_____	_____	_____	☐	■
Heptachlor (and its hydroxide)	☐	■	_____	_____	_____	☐	■
Lindane	☐	■	_____	_____	_____	☐	■
Methoxychlor	☐	■	_____	_____	_____	☐	■
Toxaphene	☐	■	_____	_____	_____	☐	■
2,4,5-TP (Silvex)	☐	■	_____	_____	_____	☐	■

PLEASE NOTE: *IF THE DETECTION LIMIT AND THE STATISTICAL MEAN ARE BLANK, THE WASTE WAS NOT ANALYZED FOR THOSE CONSTITUENTS. WHEN ONLY A STATISTICAL MEAN AND DETECTION LIMIT ARE REPORTED ALL OF THE SAMPLES WERE REPORTED AS A NON-DETECT FOR THAT ANALYTE.*

E. Radiological Properties

1. Radiological characterization by (check all that apply) ■ Process Knowledge ■ Sampling & Analysis
   ■ Material Control & Accountability ■ Direct Measurement
   ■ Gross Radiation Measurement ☐ Other _____
2. Were the following used in radiological characterization? ☐ Scaling Factors ■ Ratios

3. Reference documents that describe the radiological characterization process.
FEMP Radiological Characterization Program Manual RM-0041
D22-00-003 Documentation for Radiological Characterization of Process Residues and Intermediate Product
MEF 2968

4. Reference documents that describe the method of determining package activity.
MEF 2968 (Letter from SEG to FDF Subject Transmittal of Radiological Activity Assignments of FERMCO Slag and Oxidation) This letter was then confirmed with FDF analysis.

5. List reportable radionuclides as defined in the WAC.

Radionuclide	Activity Range (Bq/m^3)			Activity Representative of Final Waste Form (Bq/m^3)
U-238		to		5.70E7
U-235		to		1.83E6
CO-60		to		1.88E6
CS-137		to		1.19E6
Th-232		to		7.64E5
		to		
		to		
		to		
		to		
		to		
		to		
		to		

PLEASE NOTE: *WHEN THE ACTIVITY REPRESENTATIVE OF THE FINAL WASTE FORM IS THE ONLY FIELD REPORTED, THE VALUES ARE FOR A SINGLE CONTAINER OF WASTE.*

Radiological Properties Continuation Page Attached? ☐ Yes ■ No

6. Attach list of chemical form of radionuclide, if known.
Page attached? ☐ Yes ■ No

7. ☐ Yes ■ No Does the waste contain transuranic waste creating nuclides as defined in the WAC? If yes, list below.

Transuranic Nuclides	Activity Range (Bq/m^3)		Activity Repre-Sentative of Final Waste Form (Bq/m^3)
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____

Transuranic Nuclide Continuation Page Attached? ☐ Yes ■ No

8. ☐ Yes ■ No Is the waste TRU? List documentation that demonstrates WAC compliance.

_____

_____

_____

9. ☐ Yes ■ No Is enriched uranium present? If yes, provide enrichment of U-235 by weight percent _____ . Provide maximum mass U-235 per package _____ g/package. Reference controlling documents.

_____

_____

_____

10. ☐ Yes ■ No Are other fissionable nuclides present?

Nuclide	Maximum Activity Concentration (Bq/m^3)
_____	_____
_____	_____
_____	_____
_____	_____

Fissionable Nuclide Continuation Page Attached ☐ Yes ■ No

F. Packaging Description

1. ■ Yes □ No Does the waste meet each of the package criteria as defined in the WAC? List documentation that demonstrates WAC compliance. Packaging Procedures PT-005, PT-006, PT-007, and PT-011
2. Container type(s) Half High Metal Boxes
   DOT Specification(s) IP-1
   ■ Yes □ No □ N/A Does container meet 3,375 lb/ft^2 strength test?
3. Standard container external dimensions 2'H x 4'W x 7'L
   Packaged bulk external dimensions N/A
4. Weight Range 1880 kg to 1880 kg
5. ■ Yes □ No Waste stream includes unclassified material.
6. □ Yes ■ No Waste stream includes classified material.
7. ■ Yes □ No Estimated radiation dose rate at disposal package surface.
   0.005 to 0.005 mSv/h, at 1 meter 0.001 to 0.001 mSv/h.
8. Reference special handling procedures and ALARA documentation, if appropriate.
   N/A

G. Generator Signature

To the best of my knowledge, the information in this document and attachments is true and accurate. Willful and deliberate omissions have not been made. All known and suspected hazardous materials have been disclosed.

Dayne A. Thomas	Dayne A. Thomas	4/15/97
Preparer's Printed Name	Signature	Date
MICHAEL F. RAMIREZ	Michael F. Ramirez	4/15/97
WCO's Printed Name	Signature	Date

MEF No.: 2968
MTC: 011 SRC: SEG
SAP No.: 96-1299A

Date: 03/31/97

Process Knowledge File Narrative

Descriptive Name:

This material is SEG oxides treated with sulphur cement

Process Generating the Waste:

Scrap metal was generated at the FEMP as a result of demolition projects, removal of abandoned equipment, and the upgrade of facilities and vehicles. This material was then contracted to be recycled at Oak Ridge, TN by Scientific Ecology Group, Inc. (SEG). The scrap metal was recycled by melting the scrap metal in an induction furnace at temperatures of up to 3000 °F. There were two different paths that generated Fernald oxides at the SEG facility.

1. Prior to the metal being melted it was placed on a sorting floor for size reduction and segregation. The floor sweepings after the metal was sorted and size reduced were swept up and placed into boxes. These floor sweepings were identified as oxides and are part of this waste stream.

2. Four months into the project, SEG determined that the scrap metal that was being melted in the induction furnace was too heavily oxidized. SEG placed a shaker table in the operation which removed rust, dirt, small pieces of metal and paint chips from the scrap metal prior to melting. The shaker table materials were identified as oxides and are part of this waste stream.

Prior to treatment, the oxides were characteristic for lead. The elevated lead levels required SEG to treat the oxides. SEG treated the waste with sulfur cement. The treatment operation was performed as follows:

1. Open FDF box of oxide
2. Shovel the two loose powdery oxide boxes into the treatment vessel
3. Add an appropriate amount of sulfur cement and polymer to a mixer.
4. Blend the sulfur cement and the oxides for the prescribed period.
5. Dump treated slag into half-high boxes.

Radiological/Chemical Composition:

SEG reported the total Uranium of the waste prior to treatment as 0.5% total U with a U-235 enrichment of 0.53%. The total Uranium was diluted to 0.22% with the sulfur cement while the enrichment stayed the same.

The chemical composition of this material is made up of oxides, sulfur cement and a polymer. The post-treatment samples showed that the waste was treated so that it no longer exhibits a characteristic.

Inventory of Materials:

The Inventory Identification Attachment lists 1 box of treated oxides. The two boxes of oxides treated with sulfur cement were composited into the final box.

Reference Documents:

Modified Sulfur Cement
SEG Sulfur Cement batch tickets
Galot Mixer Operations for Concrete Encapsulation and Mixed Waste Treatment
Activity Assignment for Fermco Slag and Oxidation Waste
MEF 2510 SEG Slag

Nevada Test Site Waste Profile, Revision 0

A. Generator Information

1. WCO Michael F. Ramirez Phone (513) 648-5668 FAX (513) 648-5701
2. Technical Contact Dayne A. Thomas Phone (513) 648-5672 FAX (513) 648-5649
3. DOE Contact David M. Rast Phone (513) 648-3138 FAX (513) 648-3077
4. Facility Name Fernald Environmental Management Project
   Address P.O. Box 398704
   City Cincinnati State Ohio Zip 45239-8704
5. EPA Identification Number OH6890008976

B. General Waste Stream Information

1. Waste Stream Identification Number ONLO000000103
   Profile Revision Number 0 Profile Revision Date _____
2. Waste Description SEG Sulfur Cemented Slag
3. Waste Category ■ Low-Level ☐ Mixed Low-Level (Generated within Nevada only)
4. Generating Process Description This waste is treated slag generated from the metal melt operation at the Scientific Ecology Group, in Oak Ridge Tennessee. Please See Process Knowledge for MEF 2969 attached.

   Process Description Continuation Page Attached ■ Yes ☐ No
   Flow Diagram Attached ☐ Yes ■ No
5. Estimated Rate of Generation ■ One Time Only 19 m^3
   ☐ Ongoing _____ m^3/yr
6. Reason for Submittal (specify one)
   ■ New Waste Stream
   ☐ Modification to Waste Stream Date Change Effective _____
   ☐ Terminate Waste Stream
7. ☐ Yes ■ No Does this waste stream require a WAC deviation? Attach information.

C. Physical Properties

1. Waste Form Description ☐ Solid ■ Solidified ☐ Encapsulated ☐ Sludge ☐ Powder/Dust ☐ Sealed Sources ☐ Absorbed Liquids ☐ Other _____

2. List waste stream components — Estimated Percent by ☐ Volume ■ Weight

				Estimated Density (kg/m³)
Sulfur Cement	50	to	60	2070
SEG SLAG	40	to	50	2300
		to		
		to		
		to		
		to		

Component Continuation Page Attached ☐ Yes ■ No

3. Does the waste contain the following as defined in the WAC? If yes, attach information pertaining to WAC compliance (i.e., treatment, packaging). List documentation that demonstrates WAC compliance for each.

☐ Yes	■ No	Free Liquids	Visual Inspection (RTR)
☐ Yes	■ No	Particulates	MEF 2969
☐ Yes	■ No	Gases	MEF 2969
☐ Yes	■ No	Etiological Agents	MEF 2969
☐ Yes	■ No	Chelating Agents	MEF 2969
☐ Yes	■ No	Polychlorinated Biphenyls	MEF 2969
☐ Yes	■ No	Explosives	MEF 2969
☐ Yes	■ No	Regulated Asbestos-Containing Material	MEF 2969
☐ Yes	■ No	Radioactive Animal Carcasses	MEF 2969
☐ Yes	■ No	DOE Equivalent Greater-Than-Class C Packages	MEF 2969
☐ Yes	■ No	Other	

D. RCRA Characterization

1. RCRA characterization by ☐ Process Knowledge ☐ Sampling and Analysis ■ Both

2 ☐ Yes ■ No Is the waste hazardous as defined in the WAC? List documentation that demonstrates WAC compliance.

MEF 2969 characterizes this waste

3. Does the waste exhibit any characteristic of hazardous waste as defined in 40 CFR 261.

☐ Yes ■ No Ignitability
☐ Yes ■ No Corrosivity
☐ Yes ■ No Reactivity
☐ Yes ■ No Toxicity

4. ☐ Yes ■ No Is the waste listed as defined in 40 CFR 261?

5. ☐ Yes ■ No Is the waste hazardous per state-of-generation regulations? State of generation

6. ■ Yes ☐ No Has the waste been treated? Attach information which verifies WAC compliance.

7. ☐ Yes ■ No Mixed waste. Attach information which verifies LDR compliance.

8. If sampling and analysis was used for RCRA characterization, complete applicable portions of summary table below. If analytical results are available for additional hazardous constituents, attach an equivalent summary table.

	Known or Expected? Yes	Known or Expected? No	Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level? Yes	Exceeds Regulatory Level? No
TCLP Metals:							
Arsenic	☐	■	0.556		0.556	☐	■
Barium	☐	■	0.200	0.29	0.022	☐	■
Cadmium	☐	■	0.0114	0.017	0.011	☐	■
Chromium	☐	■	0.0313	0.047	0.022	☐	■
Lead	☐	■	0.66	0.935	0.111	☐	■
Mercury	☐	■	0.0002		0.0002	☐	■
Selenium	☐	■	0.333		0.333	☐	■
Silver	☐	■	0.022		0.022	☐	■

	Known or Expected? Yes	Known or Expected? No	Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level? Yes	Exceeds Regulatory Level? No
TCLP Volatiles:							
Benzene	☐	■	_____	_____	_____	☐	■
Carbon Tetrachloride	☐	■	_____	_____	_____	☐	■
Chlorobenzene	☐	■	_____	_____	_____	☐	■
Chloroform	☐	■	_____	_____	_____	☐	■
1,4-Dichlorobenzene	☐	■	_____	_____	_____	☐	■
1,2-Dichloroethane	☐	■	_____	_____	_____	☐	■
1,1-Dichloroethylene	☐	■	_____	_____	_____	☐	■
Methyl ethyl ketone	☐	■	_____	_____	_____	☐	■
Pyridine	☐	■	_____	_____	_____	☐	■
Tetrachloroethylene	☐	■	_____	_____	_____	☐	■
Trichloroethylene	☐	■	_____	_____	_____	☐	■
Vinyl Chloride	☐	■	_____	_____	_____	☐	■
TCLP Semivolatiles							
o-Cresol	☐	■	_____	_____	_____	☐	■
m-Cresol	☐	■	_____	_____	_____	☐	■
p-Cresol	☐	■	_____	_____	_____	☐	■
Cresol	☐	■	_____	_____	_____	☐	■
2,4-Dinitrotoluene	☐	■	_____	_____	_____	☐	■
Hexachlorobenzene	☐	■	_____	_____	_____	☐	■
Hexachlorobutadiene	☐	■	_____	_____	_____	☐	■
Hexachloroethane	☐	■	_____	_____	_____	☐	■
Nitrobenzene	☐	■	_____	_____	_____	☐	■
Pentachlorophenol	☐	■	_____	_____	_____	☐	■
2,4,5-Trichlorophenol	☐	■	_____	_____	_____	☐	■
2,4,6-Trichlorophenol	☐	■	_____	_____	_____	☐	■

	Known or Expected? Yes	No	Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level? Yes	No
TCLP Pesticides and Herbicides:							
Chlordane	☐	■	_____	_____	_____	☐	■
2,4-D	☐	■	_____	_____	_____	☐	■
Endrin	☐	■	_____	_____	_____	☐	■
Heptachlor (and its hydroxide)	☐	■	_____	_____	_____	☐	■
Lindane	☐	■	_____	_____	_____	☐	■
Methoxychlor	☐	■	_____	_____	_____	☐	■
Toxaphene	☐	■	_____	_____	_____	☐	■
2,4,5-TP (Silvex)	☐	■	_____	_____	_____	☐	■

PLEASE NOTE: *IF THE DETECTION LIMIT AND THE STATISTICAL MEAN ARE BLANK, THE WASTE WAS NOT ANALYZED FOR THOSE CONSTITUENTS. WHEN ONLY A STATISTICAL MEAN AND DETECTION LIMIT ARE REPORTED ALL OF THE SAMPLES WERE REPORTED AS A NON-DETECT FOR THAT ANALYTE.*

E. Radiological Properties

1. Radiological characterization by (check all that apply) ■ Process Knowledge ■ Sampling & Analysis
   ■ Material Control & Accountability ■ Direct Measurement
   ■ Gross Radiation Measurement ☐ Other _____
2. Were the following used in radiological characterization? ☐ Scaling Factors ■ Ratios

3. Reference documents that describe the radiological characterization process.
FEMP Radiological Characterization Program Manual RM-0041
D22-00-003 Documentation for Radiological Characterization of Process Residues and Intermediate Product
MEF 2969

4. Reference documents that describe the method of determining package activity.
MEF 2969 (Letter from SEG to FDF Subject Transmittal of Radiological Activity Assignments of FERMCO Slag and Oxidation) This letter was then confirmed with FDF analysis.

5. List reportable radionuclides as defined in the WAC.

Radionuclide	Activity Range (Bq/m^3)			Activity Representative of Final Waste Form (Bq/m^3)
U-238	5.58E7	to	1.4E8	9.76E7
U-235	1.76E6	to	4.43E6	3.09E6
CO-60	7.06E5	to	1.77E6	1.23E6
CS-137	1.69E6	to	4.24E6	2.96E6
Th-232	8.82E5	to	1.23E7	2.27E6
Mn-54	7.35E5	to	1.05E7	2.54E6
		to		
		to		
		to		
		to		
		to		
		to		

Radiological Properties Continuation Page Attached? ☐ Yes ■ No

6. Attach list of chemical form of radionuclide, if known.
Page attached? ☐ Yes ■ No

7. ☐ Yes ■ No Does the waste contain transuranic waste creating nuclides as defined in the WAC? If yes, list below.

Transuranic Nuclides	Activity Range (Bq/m^3)		Activity Representative of Final Waste Form (Bq/m^3)
		to	
		to	
		to	
		to	
		to	
		to	
		to	
		to	
		to	
		to	
		to	
		to	

Transuranic Nuclide Continuation Page Attached? ☐ Yes ■ No

8. ☐ Yes ■ No Is the waste TRU? List documentation that demonstrates WAC compliance.

9. ☐ Yes ■ No Is enriched uranium present? If yes, provide enrichment of U-235 by weight percent _____ . Provide maximum mass U-235 per package _____ g/package. Reference controlling documents.

10. ☐ Yes ■ No Are other fissionable nuclides present?

Nuclide	Maximum Activity Concentration (Bq/m^3)

Fissionable Nuclide Continuation Page Attached ☐ Yes ■ No

F. Packaging Description

1. ■ Yes □ No Does the waste meet each of the package criteria as defined in the WAC? List documentation that demonstrates WAC compliance. Packaging Procedures PT-005, PT-006 PT-007, and PT-011
2. Container type(s) Half High Metal Boxes
   DOT Specification(s) IP-1
   ■ Yes □ No □ N/A Does container meet 3,375 lb/ft^2 strength test?
3. Standard container external dimensions 2'H x 4'W x 7' L
   Packaged bulk external dimensions N/A
4. Weight Range 1345 kg to 2680 kg
5. ■ Yes □ No Waste stream includes unclassified material.
6. □ Yes ■ No Waste stream includes classified material.
7. ■ Yes □ No Estimated radiation dose rate at disposal package surface.
   0.005 to 0.01 mSv/h, at 1 meter 0.1 to 0.1 mSv/h.
8. Reference special handling procedures and ALARA documentation, if appropriate.
   N/A

G. Generator Signature

To the best of my knowledge, the information in this document and attachments is true and accurate. Willful and deliberate omissions have not been made. All known and suspected hazardous materials have been disclosed.

Dayne A. Thomas	Dayne A. Thomas	4/15/97
Preparer's Printed Name	Signature	Date
MICHAEL F. RAMIREZ	Michael F. Ramirez	4/15/97
WCO's Printed Name	Signature	Date

MEF No.: 2969
MTC: 077 SRC: SEG
SAP No.: 96-1300

Date: 03/31/97

Process Knowledge File Narrative

Descriptive Name:

This material is SEG slag treated with sulphur cement

Process Generating the Waste:

Scrap metal was generated at the FEMP as a result of demolition projects, removal of abandoned equipment, and the upgrade of facilities and vehicles. This scrap metal was then contracted to be recycled at Oak Ridge, TN by Scientific Ecology Group, Inc. (SEG). The scrap metal was processed in an induction furnace at temperatures of up to 3000 °F. The scrap metal had perlite ore added to the molten metal as a flocculent that caused the oxides and other impurities to rise to the top. This material is the slag which appears as a black glassey material. The slag was then skimmed from the top of the molten metal and placed in overpack boxes. Approximately six to 7 percent of the feed metal resulted as slag.

A subpopulation of the slag was determined to be hazardous for lead, cadmium, and/or chromium. SEG treated the slag with sulfur cement using the following sulfur cementation process:

1. Open FDF box of slag
2. Crush slag into powdery material
3. Shovel loose powdery slag into a treatment vessel
4. Repeat steps 1-3 until an appropriate amount of slag added.
5. Add an appropriate amount of sulfur cement and polymer to a mixer.

5A. SEG Boxes that received sodium sulfide treatment before sulfur cement

Barcode of Waste Packages Containing Na_2S	Weight of Na_2S Added (lbs.)
95-900-042	100
95-900-043	150
95-900-045	100
95-900-046	100
95-900-047	50
95-900-048	100
95-900-049	50

8. Blend the sulfur cement for prescribed period.

9. Dump treated slag into half-high boxes.

Radiological/Chemical Composition:

SEG reported the total Uranium of the waste prior to treatment as 0.84% total U with a U-235 enrichment of 0.5%. The total Uranium was diluted to 0.15% to 0.50% with the sulfur cement while the enrichment stayed the same.

The sampling of this material for characterization was performed in two steps. The first step was to have SEG analyze each treatment batch for TC metals. (A couple of treatment batches failed the analysis and were retreated.) When all of SEG TC metal results were less than the regulatory level, FERMCO would perform comprehensive sampling and analysis per our Prototype Sampling and Analysis Plan for Containerized Waste.

The chemical composition of this material is made up of slag, sulfur cement and a polymer in all treated boxes, seven of the boxes received sodium sulfide in addition. The post-treatment samples showed that the waste was treated so that it no longer exhibits a characteristic.

Inventory of Materials:

The Inventory Identification Attachment lists 15 boxes of treated slag

Reference Documents:

Modified Sulfur Cement
SEG Sulfur Cement batch tickets
Galot Mixer Operations for Concrete Encapsulation and Mixed Waste Treatment
Activity Assignment for Fermco Slag and Oxidation Waste
MEF 2510 SEG Slag

Nevada Test Site Waste Profile, Revision 0

A. Generator Information

1. WCO Michael F. Ramirez Phone (513) 648-5668 FAX (513) 648-5701
2. Technical Contact Dayne A. Thomas Phone (513) 648-5672 FAX (513) 648-5649
3. DOE Contact David M. Rast Phone (513) 648-3138 FAX (513) 648-3077
4. Facility Name Fernald Environmental Management Project
   Address P.O. Box 398704
   City Cincinnati State Ohio Zip 45239-8704
5. EPA Identification Number OH6890008976

B. General Waste Stream Information

1. Waste Stream Identification Number ONLO000000104
   Profile Revision Number 0 Profile Revision Date _____
2. Waste Description SEG Slag
3. Waste Category ■ Low-Level ☐ Mixed Low-Level (Generated within Nevada only)
4. Generating Process Description This waste is slag generated from the metal melt operation at the Scientific Ecology Group, in Oak Ridge Tennessee. Please See Process Knowledge for MEF 2510 attached.

   Process Description Continuation Page Attached ■ Yes ☐ No
   Flow Diagram Attached ☐ Yes ■ No
5. Estimated Rate of Generation ■ One Time Only 2.1 m^3
   ☐ Ongoing _____ m^3/yr
6. Reason for Submittal (specify one)
   ■ New Waste Stream
   ☐ Modification to Waste Stream Date Change Effective _____
   ☐ Terminate Waste Stream
7. ☐ Yes ■ No Does this waste stream require a WAC deviation? Attach information.

C. Physical Properties

1. Waste Form Description ■ Solid □ Solidified □ Encapsulated □ Sludge □ Powder/Dust □ Sealed Sources □ Absorbed Liquids □ Other _____

2. List waste stream components Estimated Percent by □ Volume ■ Weight

		Estimated Density (kg/m³)
SEG SLAG	____ to 100	2300
	____ to ____	
	____ to ____	
	____ to ____	
	____ to ____	

Component Continuation Page Attached □ Yes ■ No

3. Does the waste contain the following as defined in the WAC? If yes, attach information pertaining to WAC compliance (i.e., treatment, packaging). List documentation that demonstrates WAC compliance for each.

□ Yes	■ No	Free Liquids	Visual Inspection (RTR)
□ Yes	■ No	Particulates	MEF 2510
□ Yes	■ No	Gases	MEF 2510
□ Yes	■ No	Etiological Agents	MEF 2510
□ Yes	■ No	Chelating Agents	MEF 2510
□ Yes	■ No	Polychlorinated Biphenyls	MEF 2510
□ Yes	■ No	Explosives	MEF 2510
□ Yes	■ No	Regulated Asbestos-Containing Material	MEF 2510
□ Yes	■ No	Radioactive Animal Carcasses	MEF 2510
□ Yes	■ No	DOE Equivalent Greater-Than-Class C Packages	MEF 2510
□ Yes	■ No	Other	

D. RCRA Characterization

1. RCRA characterization by ☐ Process Knowledge ☐ Sampling and Analysis ■ Both

2 ☐ Yes ■ No Is the waste hazardous as defined in the WAC? List documentation that demonstrates WAC compliance.

MEF 2510 characterizes this waste

3. Does the waste exhibit any characteristic of hazardous waste as defined in 40 CFR 261.

☐ Yes ■ No Ignitability
☐ Yes ■ No Corrosivity
☐ Yes ■ No Reactivity
☐ Yes ■ No Toxicity

4. ☐ Yes ■ No Is the waste listed as defined in 40 CFR 261?

5. ☐ Yes ■ No Is the waste hazardous per state-of-generation regulations? State of generation

6. ☐ Yes ■ No Has the waste been treated? Attach information which verifies WAC compliance.

7. ☐ Yes ■ No Mixed waste. Attach information which verifies LDR compliance.

8. If sampling and analysis was used for RCRA characterization, complete applicable portions of summary table below. If analytical results are available for additional hazardous constituents, attach an equivalent summary table.

	Known or Expected?		Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level?	
	Yes	No				Yes	No
TCLP Metals:							
Arsenic	☐	■	0.005	0.0068	0.002	☐	■
Barium	☐	■	0.2844	0.35	0.2	☐	■
Cadmium	☐	■	0.042	0.062	0.02	☐	■
Chromium	☐	■	0.41	0.553	0.03	☐	■
Lead	☐	■	0.53	0.722	0.39	☐	■
Mercury	☐	■	0.0005		0.0005	☐	■
Selenium	☐	■	0.006	0.0069	0.01	☐	■
Silver	☐	■	0.002	0.036	0.002	☐	■

	Known or Expected? Yes	Known or Expected? No	Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level? Yes	Exceeds Regulatory Level? No
TCLP Volatiles:							
Benzene	☐	■	_____	_____	_____	☐	■
Carbon Tetrachloride	☐	■	_____	_____	_____	☐	■
Chlorobenzene	☐	■	_____	_____	_____	☐	■
Chloroform	☐	■	_____	_____	_____	☐	■
1,4-Dichlorobenzene	☐	■	_____	_____	_____	☐	■
1,2-Dichloroethane	☐	■	_____	_____	_____	☐	■
1,1-Dichloroethylene	☐	■	_____	_____	_____	☐	■
Methyl ethyl ketone	☐	■	_____	_____	_____	☐	■
Pyridine	☐	■	_____	_____	_____	☐	■
Tetrachloroethylene	☐	■	_____	_____	_____	☐	■
Trichloroethylene	☐	■	_____	_____	_____	☐	■
Vinyl Chloride	☐	■	_____	_____	_____	☐	■
TCLP Semivolatiles							
o-Cresol	☐	■	_____	_____	_____	☐	■
m-Cresol	☐	■	_____	_____	_____	☐	■
p-Cresol	☐	■	_____	_____	_____	☐	■
Cresol	☐	■	_____	_____	_____	☐	■
2,4-Dinitrotoluene	☐	■	_____	_____	_____	☐	■
Hexachlorobenzene	☐	■	_____	_____	_____	☐	■
Hexachlorobutadiene	☐	■	_____	_____	_____	☐	■
Hexachloroethane	☐	■	_____	_____	_____	☐	■
Nitrobenzene	☐	■	_____	_____	_____	☐	■
Pentachlorophenol	☐	■	_____	_____	_____	☐	■
2,4,5-Trichlorophenol	☐	■	_____	_____	_____	☐	■
2,4,6-Trichlorophenol	☐	■	_____	_____	_____	☐	■

	Known or Expected? Yes	No	Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level? Yes	No
TCLP Pesticides and Herbicides:							
Chlordane	☐	■	_____	_____	_____	☐	■
2,4-D	☐	■	_____	_____	_____	☐	■
Endrin	☐	■	_____	_____	_____	☐	■
Heptachlor (and its hydroxide)	☐	■	_____	_____	_____	☐	■
Lindane	☐	■	_____	_____	_____	☐	■
Methoxychlor	☐	■	_____	_____	_____	☐	■
Toxaphene	☐	■	_____	_____	_____	☐	■
2,4,5-TP (Silvex)	☐	■	_____	_____	_____	☐	■

PLEASE NOTE: *IF THE DETECTION LIMIT AND THE STATISTICAL MEAN ARE BLANK, THE WASTE WAS NOT ANALYZED FOR THOSE CONSTITUENTS. WHEN ONLY A STATISTICAL MEAN AND DETECTION LIMIT ARE REPORTED ALL OF THE SAMPLES WERE REPORTED AS A NON-DETECT FOR THAT ANALYTE.*

E. Radiological Properties

1. Radiological characterization by (check all that apply) ■ Process Knowledge ■ Sampling & Analysis
   ■ Material Control & Accountability ■ Direct Measurement
   ■ Gross Radiation Measurement ☐ Other _____
2. Were the following used in radiological characterization? ☐ Scaling Factors ■ Ratios

3. Reference documents that describe the radiological characterization process.
FEMP Radiological Characterization Program Manual RM-0041
D22-00-003 Documentation for Radiological Characterization of Process Residues and Intermediate Product
MEF 2510

4. Reference documents that describe the method of determining package activity.
MEF 2510 (Letter from SEG to FDF Subject Transmittal of Radiological Activity Assignments of FERMCO Slag and Oxidation) This letter was then confirmed with FDF analysis. Shipping papers from SEG to FDF.

5. List reportable radionuclides as defined in the WAC.

Radionuclide	Activity Range (Bq/m^3)			Activity Representative of Final Waste Form (Bq/m^3)
U-238		to		2.6E8
U-235		to		8.37E6
CO-60		to		3.35E7
CS-137		to		8.02E6
Th-232		to		4.17E6
Mn-54		to		3.51E6
		to		
		to		
		to		
		to		
		to		
		to		

PLEASE NOTE: *WHEN THE ACTIVITY REPRESENTATIVE OF THE FINAL WASTE FORM IS THE ONLY FIELD REPORTED, THE VALUES ARE FOR A SINGLE CONTAINER OF WASTE.*

Radiological Properties Continuation Page Attached? ☐ Yes ■ No

6. Attach list of chemical form of radionuclide, if known.
Page attached? ☐ Yes ■ No

7. ☐ Yes ■ No Does the waste contain transuranic waste creating nuclides as defined in the WAC? If yes, list below.

Transuranic Nuclides	Activity Range (Bq/m^3)		Activity Repre-Sentative of Final Waste Form (Bq/m^3)
		to	
		to	
		to	
		to	
		to	
		to	
		to	
		to	
		to	
		to	
		to	
		to	

Transuranic Nuclide Continuation Page Attached? ☐ Yes ■ No

8. ☐ Yes ■ No Is the waste TRU? List documentation that demonstrates WAC compliance.

9. ☐ Yes ■ No Is enriched uranium present? If yes, provide enrichment of U-235 by weight percent _____ . Provide maximum mass U-235 per package _____ g/package. Reference controlling documents.

10. ☐ Yes ■ No Are other fissionable nuclides present?

Nuclide	Maximum Activity Concentration (Bq/m^3)

Fissionable Nuclide Continuation Page Attached ☐ Yes ■ No

F. Packaging Description

1. ■ Yes □ No Does the waste meet each of the package criteria as defined in the WAC? List documentation that demonstrates WAC compliance. Packaging Procedures PT-005, PT-006, PT-007, and PT-011
2. Container type(s) Metal Box B-12
   DOT Specification(s) IP-1
   ■ Yes □ No □ N/A Does container meet 3,375 lb/ft^2 strength test?
3. Standard container external dimensions 2.4'H X 4'W X 6'L
   Packaged bulk external dimensions N/A
4. Weight Range 1680 kg to 1680 kg
5. ■ Yes □ No Waste stream includes unclassified material.
6. □ Yes ■ No Waste stream includes classified material.
7. ■ Yes □ No Estimated radiation dose rate at disposal package surface.
   0.8 to 0.8 mSv/h, at 1 meter 0.1 to 0.1 mSv/h.
8. Reference special handling procedures and ALARA documentation, if appropriate.
   N/A

G. Generator Signature

To the best of my knowledge, the information in this document and attachments is true and accurate. Willful and deliberate omissions have not been made. All known and suspected hazardous materials have been disclosed.

Dayne Thomas	Dayne Thomas	4/15/97
Preparer's Printed Name	Signature	Date
MICHAEL F. RAMIREZ	Michael F. Ramirez	4/15/97
WCO's Printed Name	Signature	Date

April 21, 1994

MEF No.: 2510
MTC: N/A SRC: N/A
SAP No.: 94-591B

Process Knowledge File Narrative

Determination:

RCRA Non-Hazardous

Descriptive Name:

This material is slag generated from the scrap metal recycling project.

Process Generating the Waste:

Scrap metal was generated at the FEMP as a result of demolition projects, removal of abandoned equipment, and the upgrade of facilities and vehicles. This material was then contracted to be recycled at Oak Ridge, TN by Scientific Ecology Group, Inc. (SEG). The scrap metal was processed by melting the scrap metal in an induction furnace at temperatures of up to 3000 °F. The scrap metal had perlite ore added to the molten metal as a flocculent which causes the oxides and other impurities, slag, to rise to the top. The slag is then skimmed from the top of the melted metal and placed in overpack boxes. Approximately six to seven percent of the feed metal results in slag. The waste material characterized by this MEF is the SLAG and materials that might be found in the generation of the slag.

Processing material that could be found in slag boxes include temperature lances and samplers (cardboard tubes with sand/metal tips), cardboard, paper, dirt/dust from the furnace deck, small splashes of metal from the molten bath, alloys (FESi, C, CaSi, and SiMn), burnt/destroyed parts of protective clothing (such as gloves and booties), K-type thermocouple wire, duct tape, and mean streaks. The material mentioned should cover the majority of any additional items found in the slag boxes, however by far the majority of the material will be slag.

Radiological/Chemical Composition:

The composition of the slag will vary depending on the composition of the charge material, but should be similar to typical steel making slags with the exception of oxides of radioactive elements, such as U. The slag primarily should contain simple and complex oxides of Fe, Al, Si, Mn, Cr, Ti, Cu, Pb, Mo, Ca, Zr, Nb, V and U, assuming normal charge material. Other minor oxides could be present depending on the nature of the charge material. Complex nitrides and carbides might also form with the above mentioned elements.

Confirmatory sampling has been completed for TC Metals, and gamma-spectroscopy. The TC metal results were all well below the regulatory level for the samples analyzed. The remaining organic TC constituents were not sampled and analyzed

April 21, 1994

because there is no reasonable explanation for any organics to be in the slag. The average total activity concentration is 2.89 nCi/g.

Inventory of Materials:

This waste stream consists of 113 boxes please see the inventory attachment to the MEF.

Reference Documents:

Removal Action Project Plan (RAPP) For the Removal of Non-RCRA Scrap Metal From the Fernald Environmental Management Project (FEMP) Site
CONVERSATION REPORTS
MSDSs

Nevada Test Site Waste Profile, Revision 0

A. Generator Information

1. WCO Michael F. Ramirez Phone (513) 648-5668 FAX (513) 648-5701
2. Technical Contact Dayne A. Thomas Phone (513) 648-5672 FAX (513) 648-5649
3. DOE Contact David M. Rast Phone (513) 648-3138 FAX (513) 648-3077
4. Facility Name Fernald Environmental Management Project
   Address P.O. Box 398704
   City Cincinnati State Ohio Zip 45239-8704
5. EPA Identification Number OH6890008976

B. General Waste Stream Information

1. Waste Stream Identification Number ONLO000000105
   Profile Revision Number 0 Profile Revision Date _____
2. Waste Description Cement Stabilized Silo 3 Material
3. Waste Category ■ Low-Level ☐ Mixed Low-Level (Generated within Nevada only)
4. Generating Process Description This waste is cement stabilized Silo 3 material generated from the processing of the contents of Silo 3. Please See MEF 2994 which will discuss the generation of this waste. MEF 2994 will be written when the treatment method has been finalized.
   Process Description Continuation Page Attached ☐ Yes ■ No
   Flow Diagram Attached ☐ Yes ■ No
5. Estimated Rate of Generation ■ One Time Only 4,655 m^3
   ☐ Ongoing _____ m^3/yr
6. Reason for Submittal (specify one)
   ■ New Waste Stream
   ☐ Modification to Waste Stream Date Change Effective _____
   ☐ Terminate Waste Stream
7. ☐ Yes ■ No Does this waste stream require a WAC deviation? Attach information.

C. Physical Properties

1. Waste Form Description ☐ Solid ■ Solidified ☐ Encapsulated ☐ Sludge ☐ Powder/Dust ☐ Sealed Sources ☐ Absorbed Liquids ☐ Other _____

2. List waste stream components — Estimated Percent by ☐ Volume ■ Weight

				Estimated Density (kg/m³)
Cement Stabilized Silo 3 Waste	100	to	100	2070
		to		
		to		
		to		
		to		

Component Continuation Page Attached ☐ Yes ■ No

3. Does the waste contain the following as defined in the WAC? If yes, attach information pertaining to WAC compliance (i.e., treatment, packaging). List documentation that demonstrates WAC compliance for each.

☐ Yes	■ No	Free Liquids	Visual Inspection
☐ Yes	■ No	Particulates	MEF 2994
☐ Yes	■ No	Gases	MEF 2994
☐ Yes	■ No	Etiological Agents	MEF 2994
☐ Yes	■ No	Chelating Agents	MEF 2994
☐ Yes	■ No	Polychlorinated Biphenyls	MEF 2994
☐ Yes	■ No	Explosives	MEF 2994
☐ Yes	■ No	Regulated Asbestos-Containing Material	MEF 2994
☐ Yes	■ No	Radioactive Animal Carcasses	MEF 2994
☐ Yes	■ No	DOE Equivalent Greater-Than-Class C Packages	MEF 2994
☐ Yes	■ No	Other	

D. RCRA Characterization

1. RCRA characterization by ☐ Process Knowledge ☐ Sampling and Analysis ■ Both

2 ☐ Yes ■ No Is the waste hazardous as defined in the WAC? List documentation that demonstrates WAC compliance.

MEF 2994 characterizes this waste

3. Does the waste exhibit any characteristic of hazardous waste as defined in 40 CFR 261.

☐ Yes ■ No Ignitability

☐ Yes ■ No Corrosivity

☐ Yes ■ No Reactivity

☐ Yes ■ No Toxicity

4. ☐ Yes ■ No Is the waste listed as defined in 40 CFR 261?

5. ☐ Yes ■ No Is the waste hazardous per state-of-generation regulations? State of generation

6. ■ Yes ☐ No Has the waste been treated? Attach information which verifies WAC compliance.

7. ☐ Yes ■ No Mixed waste. Attach information which verifies LDR compliance.

8. If sampling and analysis was used for RCRA characterization, complete applicable portions of summary table below. If analytical results are available for additional hazardous constituents, attach an equivalent summary table.

	Known or Expected? Yes	Known or Expected? No	Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level? Yes	Exceeds Regulatory Level? No
TCLP Metals:							
Arsenic	☐	■	TBD	<5.0	TBD	☐	■
Barium	☐	■	TBD	<100	TBD	☐	■
Cadmium	☐	■	TBD	<1.0	TBD	☐	■
Chromium	☐	■	TBD	<5.0	TBD	☐	■
Lead	☐	■	TBD	<5.0	TBD	☐	■
Mercury	☐	■	TBD	<0.2	TBD	☐	■
Selenium	☐	■	TBD	<1.0	TBD	☐	■
Silver	☐	■	TBD	<5.0	TBD	☐	■

	Known or Expected? Yes	Known or Expected? No	Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level? Yes	Exceeds Regulatory Level? No
TCLP Volatiles:							
Benzene	☐	■	_____	_____	_____	☐	■
Carbon Tetrachloride	☐	■	_____	_____	_____	☐	■
Chlorobenzene	☐	■	_____	_____	_____	☐	■
Chloroform	☐	■	_____	_____	_____	☐	■
1,4-Dichlorobenzene	☐	■	_____	_____	_____	☐	■
1,2-Dichloroethane	☐	■	_____	_____	_____	☐	■
1,1-Dichloroethylene	☐	■	_____	_____	_____	☐	■
Methyl ethyl ketone	☐	■	_____	_____	_____	☐	■
Pyridine	☐	■	_____	_____	_____	☐	■
Tetrachloroethylene	☐	■	_____	_____	_____	☐	■
Trichloroethylene	☐	■	_____	_____	_____	☐	■
Vinyl Chloride	☐	■	_____	_____	_____	☐	■
TCLP Semivolatiles							
o-Cresol	☐	■	_____	_____	_____	☐	■
m-Cresol	☐	■	_____	_____	_____	☐	■
p-Cresol	☐	■	_____	_____	_____	☐	■
Cresol	☐	■	_____	_____	_____	☐	■
2,4-Dinitrotoluene	☐	■	_____	_____	_____	☐	■
Hexachlorobenzene	☐	■	_____	_____	_____	☐	■
Hexachlorobutadiene	☐	■	_____	_____	_____	☐	■
Hexachloroethane	☐	■	_____	_____	_____	☐	■
Nitrobenzene	☐	■	_____	_____	_____	☐	■
Pentachlorophenol	☐	■	_____	_____	_____	☐	■
2,4,5-Trichlorophenol	☐	■	_____	_____	_____	☐	■
2,4,6-Trichlorophenol	☐	■	_____	_____	_____	☐	■

	Known or Expected? Yes	No	Sample Analysis (mg/L) (Statistical Mean)	90% Upper Confidence Interval	Detection Limit (mg/L)	Exceeds Regulatory Level? Yes	No
TCLP Pesticides and Herbicides:							
Chlordane	☐	■	_____	_____	_____	☐	■
2,4-D	☐	■	_____	_____	_____	☐	■
Endrin	☐	■	_____	_____	_____	☐	■
Heptachlor (and its hydroxide)	☐	■	_____	_____	_____	☐	■
Lindane	☐	■	_____	_____	_____	☐	■
Methoxychlor	☐	■	_____	_____	_____	☐	■
Toxaphene	☐	■	_____	_____	_____	☐	■
2,4,5-TP (Silvex)	☐	■	_____	_____	_____	☐	■

PLEASE NOTE: *IF THE DETECTION LIMIT AND THE STATISTICAL MEAN ARE BLANK, THE WASTE WAS NOT ANALYZED FOR THOSE CONSTITUENTS. WHEN ONLY A STATISTICAL MEAN AND DETECTION LIMIT ARE REPORTED ALL OF THE SAMPLES WERE REPORTED AS A NON-DETECT FOR THAT ANALYTE.*

E. Radiological Properties

1. Radiological characterization by (check all that apply) ■ Process Knowledge ■ Sampling & Analysis
   ■ Material Control & Accountability ■ Direct Measurement
   ■ Gross Radiation Measurement ☐ Other _____
2. Were the following used in radiological characterization? ☐ Scaling Factors ■ Ratios

3. Reference documents that describe the radiological characterization process.
   FEMP Radiological Characterization Program Manual RM-0041
   D22-00-003 Documentation for Radiological Characterization of Process Residues and Intermediate Product
   MEF 2994

4. Reference documents that describe the method of determining package activity.
   MEF 2994

5. List reportable radionuclides as defined in the WAC.

Radionuclide	Activity Range (Bq/m^3)			Activity Representative of Final Waste Form (Bq/m^3)
Ac-227	4.68E6	to	7.26E7	2.26E7
Pb-210	9.07E6	to	3.42E8	9.60E7
Pa-231	5.31E6	to	4.96E7	1.78E7
Ra-224	1.28E6	to	2.41E7	1.06E7
Ra-226	9.33E6	to	3.43E8	1.09E8
Ra-228	1.64E6	to	2.98E7	1.09E7
Th-230	4.20E8	to	3.82E9	1.88E9
Th-232	8.21E6	to	7.73E7	2.4E7
U-235	1.87E6	to	6.23E6	3.43E6
U-238	6.39E6	to	1.09E8	5.49E7
		to		

Radiological Properties Continuation Page Attached? ☐ Yes ■ No

6. Attach list of chemical form of radionuclide, if known.
   Page attached? ☐ Yes ■ No

7. ☐ Yes ■ No Does the waste contain transuranic waste creating nuclides as defined in the WAC? If yes, list below.

Transuranic Nuclides	Activity Range (Bq/m^3)		Activity Representative of Final Waste Form (Bq/m^3)
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____
_____	_____	to _____	_____

Transuranic Nuclide Continuation Page Attached? ☐ Yes ■ No

8. ☐ Yes ■ No Is the waste TRU? List documentation that demonstrates WAC compliance.

_____

_____

_____

9. ☐ Yes ■ No Is enriched uranium present? If yes, provide enrichment of U-235 by weight percent _____ . Provide maximum mass U-235 per package _____ g/package. Reference controlling documents.

_____

_____

_____

10. ☐ Yes ■ No Are other fissionable nuclides present?

Nuclide	Maximum Activity Concentration (Bq/m^3)
_____	_____
_____	_____
_____	_____
_____	_____

Fissionable Nuclide Continuation Page Attached ☐ Yes ■ No

F. Packaging Description

1. ■ Yes □ No Does the waste meet each of the package criteria as defined in the WAC? List documentation that demonstrates WAC compliance. Packaging Procedures PT-005, PT-006 PT-007, and PT-011 or other appropriate procedure

2. Container type(s) To Be Determined (Dose rates estimated for Metal Box)

   DOT Specification(s) _____

   ■ Yes □ No □ N/A Does container meet 3,375 lb/ft^2 strength test?

3. Standard container external dimensions TBD

   Packaged bulk external dimensions N/A

1. 4. Weight Range TBD kg to TBD kg

5. ■ Yes □ No Waste stream includes unclassified material.

6. □ Yes ■ No Waste stream includes classified material.

7. ■ Yes □ No Estimated radiation dose rate at disposal package surface.

   0.05 to 0.10 mSv/h, at 1 meter 0 .01 to 0.03 mSv/h.

8. Reference special handling procedures and ALARA documentation, if appropriate.

   N/A

G. Generator Signature

To the best of my knowledge, the information in this document and attachments is true and accurate. Willful and deliberate omissions have not been made. All known and suspected hazardous materials have been disclosed.

DRAFT	DRAFT	
Preparer's Printed Name	Signature	Date
DRAFT	DRAFT	
WCO's Printed Name	Signature	Date