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Waste Handling Plan for the Surface Impoundments Operable Unit Treatment Plant Equipment at Oak Ridge National Laboratory, Oak Ridge, Tennessee

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ORNL Technical Information Officer Date

BECHTEL JACOBS
Bechtel Jacobs Company LLC

DOE Contract No. DE-AC05-98OR22700
Job No. 23900
WM-SM-2003-0419
July 18, 2003

Ms. Andrea B. Perkins
ORNL Project Team Leader
U.S. Department of Energy
Post Office Box 2001
Oak Ridge, Tennessee 37830

Dear Ms. Perkins:

Transmittal of the *Waste Handling Plan for the Surface Impoundments Operable Unit Treatment Plant Equipment at Oak Ridge National Laboratory, Oak Ridge, Tennessee* (DOE/OR/01 2085&D1)

Enclosed are 10 copies of the subject document, the *Waste Handling Plan for the Surface Impoundments Operable Unit Treatment Plant Equipment at Oak Ridge National Laboratory, Oak Ridge, Tennessee* (DOE/OR/01-2085&D1) for your use and for transmittal to the U. S. Environmental Protection Agency and the Tennessee Department of Environment and Conservation.

If you have any questions regarding these submittals, please contact me at 241-8875 or Charlie Mansfield at 576-1777.

Sincerely,

For J. Rick Dearholt, Manager
ORNL BV Project

JRD:mjm

Enclosures: As stated.

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DOE/OR/01-2085&D1

Waste Handling Plan for the Surface Impoundments Operable Unit Treatment Plant Equipment at Oak Ridge National Laboratory, Oak Ridge, Tennessee

Date Issued— July 2003

Prepared for the
U.S. Department of Energy
Office of Environmental Management

BECHTEL JACOBS COMPANY LLC
Managing the
Environmental Management Activities at the
East Tennessee Technology Park
Y-12 National Security Complex Oak Ridge National Laboratory
Paducah Gaseous Diffusion Plant Portsmouth Gaseous Diffusion Plant
under contract DE-AC05-98OR22700
for the
U.S. DEPARTMENT OF ENERGY

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ACRONYMS

AOC	area of contamination
ARARs	applicable or relevant and appropriate requirements
ASA	auditable safety analysis
BJC	Bechtel Jacobs Company LLC
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	*Code of Federal Regulations*
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EMWMF	Environmental Management Waste Management Facility
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
ILFs	Industrial Landfill Facilities
LDR	Land Disposal Restrictions of 1984
LLW	low-level waste
LLLW	liquid low-level waste
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
PCB	polychlorinated biphenyl
PPE	personal protective equipment
QA/QC	quality assurance/quality control
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act of 1976
SIOU	Surface Impoundments Operable Unit
SOF	sum of fractions
SRC	site-related contaminant
TCLP	Toxicity Characteristic Leaching Procedure
TDEC	Tennessee Department of Environment and Conservation
TSCA	Toxic Substances Control Act
TVA	Tennessee Valley Authority
UCL_{95}	95% upper confidence level
WAC	waste acceptance criteria
Y-12 Complex	Y-12 National Security Complex

EXECUTIVE SUMMARY

This Waste Handling Plan describes the process that will be followed to characterize and remove the Surface Impoundments Operable Unit treatment plant and associated equipment for disposal at either the Environmental Management Waste Management Facility (EMWMF) or the Y-12 National Security Complex Industrial Landfills (ILFs). Based on the historical data taken from waste lot profile 87.1, it is expected that the SIOU treatment plant equipment and materials that came in contact with the SIOU sediment will be disposed at the EMWMF as PCB-contaminated, low-level waste. The remaining waste, surveyed clean by Health Physics, will be disposed at the Y-12 ILFs as clean industrial waste.

The treatment plant waste items were characterized using existing sludge data, with scaling factors applied, to determine the representative contaminant averages of the site-related contaminants for the waste lot to be generated. The information presented in this Waste Handling Plan reflects the outline discussed during meetings, which included the U.S. Department of Energy, the Tennessee Department of Environment and Conservation, and the Environmental Protection Agency.

Based on current schedules, the removal action subcontractor will begin treatment plant demolition in August 2003. Before any waste is dispositioned, a waste profile and data package will be developed and approved by the EMWMF. Off-site shipment of all equipment and materials for disposal is scheduled for completion by September 2003.

1. INTRODUCTION

The Oak Ridge National Laboratory (ORNL) Surface Impoundments Operable Unit (SIOU) sediment was generated from 1943 to 1976 as part of the liquid low-level waste (LLLW) treatment system. The impoundments were used as equalization and settling basins for wastewater prior to discharge into White Oak Creek. The impoundments were remediated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Record of Decision. This SIOU sediment is being removed, treated, and transported off-site to the Environmental Management Waste Management Facility (EMWMF) for disposal under waste lot profile 87.1. The SIOU sediment treatment plant and associated equipment must be removed from the site before final closure can take place.

2. SCOPE

The removal action governing the demolition of the SIOU treatment plant is being conducted under CERCLA in accordance with the *Policy on Decommissioning of Department of Energy Facilities Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)* (DOE and EPA 1995). This policy states "DOE will utilize CERCLA response authority whenever a hazardous substance is released, or there is a substantial threat of release, into the environment, and response is necessary to protect public health, welfare or the environment." The Federal Facility Agreement (FFA) for the Oak Ridge Reservation (ORR) requires the U.S. Department of Energy (DOE) to conduct a comprehensive investigation and, if necessary, respond to any release or substantial threat of a release of hazardous substances, pollutants, or contaminants as defined by CERCLA.

The purpose of this plan is to describe the process that will be followed to characterize and remove the SIOU treatment plant and associated equipment for disposal at the EMWMF. This process adequately characterizes the treatment plant waste items by utilizing existing sludge data, with scaling factors applied, to determine the representative contaminant averages of the site-related contaminants (SRCs) for the waste lot to be generated. The information presented in this Waste Handling Plan reflects the outline discussed during the FFA Manager's Meetings between the DOE, the Tennessee Department of Environment and Conservation (TDEC), and the Environmental Protection Agency (EPA). Because no physical samples will need to be collected to adequately characterize the waste, no investigative-derived waste will be generated or staged on-site during completion of the removal action. Once the concentration for each SRC associated with this waste stream is determined, the data results will be evaluated against the waste acceptance criteria (WAC) for the EMWMF.

The facilities currently planned for waste disposal include the following: (1) the EMWMF and (2) the ORR ILFs. Waste meeting the WAC for the EMWMF will be disposed at that facility. Waste meeting the WAC for the ILFs will be disposed at the ILFs. Health Physics will tag all waste being disposed at the ILFs in accordance with DOE Order 5400.5 (DOE 1993) release limits prior to its release from the site. If waste is generated that cannot be disposed at the EMWMF or ILFs, the waste will be shipped to Envirocare of Utah for disposal. Because the waste contains regulated levels of polychlorinated biphenyls (PCBs), the waste cannot be disposed at the Nevada Test Site.

Based on the existing analytical results of the sludge, plus the fact that waste lot 87.1 is being disposed at the EMWMF, that certain items were never contaminated by the process, and that there are plans to triple rinse all treatment plant equipment (that comes into contact with the sludge), it is expected that all of the waste associated with treatment plant demolition can be disposed at either the EMWMF or ILFs.

To date, approximately 5,500 ft^3 of contaminated in-place treatment plant equipment items (e.g., tanks, pumps, piping, blades, blenders, fencing, and ducting) and personal protective equipment (PPE) have been identified for removal and disposition to the EMWMF. In addition, approximately 4,000 ft^3 of potentially contaminated equipment (e.g., catwalks, rubb tent, barge/dredge, clarifier, filters, filter housing, and compressors) and building materials (e.g., concrete, wood, and sand) have been identified for possible removal and disposition to the EMWMF.

Because of the contamination levels expected to remain on the surfaces of the treatment plant equipment after triple rinsing, only one EMWMF waste lot will be generated during this activity. To ensure that the treatment plant equipment meets the EMWMF WAC, size-reduction activities must take place. Individual items must be placed in soft-sided lift liners or a variance will be requested for certain components. In addition, no equipment items associated with the treatment plant exhibit a characteristic hazard. Current schedules call for the treatment plant and associated equipment to be shipped off-site for disposal by September 2003.

Because the EMWMF has the most restrictive characterization WAC [i.e., must meet 95% upper confidence level (UCL_{95})] of all treatment/disposal facilities being considered, the characterization requirements identified within this plan were written to ensure EMWMF requirements would be met. Consequently, all other treatment/disposal facility requirements (i.e., these require only that a maximum of 90% UCL be met) would also be met.

3. SITE BACKGROUND AND PHYSICAL SETTING

3.1 SITE LOCATION

The ORR is located on approximately 35,800 acres of federally owned land in East Tennessee. ORNL is located in the approximate center of the ORR. The Tennessee Valley Authority (TVA) Melton Hill Reservoir on the Clinch River and the Watts Bar Reservoir on the Tennessee River form the eastern, southern, and western boundaries of the ORR. The northern boundary is within the corporate limits of the city of Oak Ridge, although the ORR is primarily to the west and south of the population center.

3.2 POPULATION AND LAND USE

Except for the city of Oak Ridge, the land within 5 miles of the ORR is predominantly rural and is used primarily for residences and small farms. Fewer than 13,000 people live within 5 miles of the center of the ORR. As of February 1993, approximately 16,000 regular employees worked at the ORR; 5,782 employees worked at ORNL. Most of the employees at ORNL work within the facilities located either within or adjacent to the main plant area of ORNL where the SIOU is located. As stated previously, the city of Oak Ridge, population 27,387, is the closest city. Other nearby communities include Kingston (about 15 miles southwest) with a population of 5,264 and Lenoir City (about 7 miles southeast) with a population of 6,819. The largest nearby population center is Knoxville, located about 15 miles east of

Oak Ridge with a population of 173,890 (687,249 within the metropolitan area) (Bureau of the Census 2000).

Other than industrial activities, most of the transient population within 10 miles of ORNL is engaged in recreational activities such as camping, fishing, boating, swimming, and attending stock car races. About 18 recreational sites are located within a 5-mile radius, including visitor's overlook at the former the gaseous diffusion plant; the historic Graphite Reactor at ORNL; two commercial campgrounds with facilities for fishing, boating, and swimming; and a stock car racetrack. The remaining sites are public lake access and incidental use areas.

3.3 OPERATIONAL HISTORY

The two impoundments associated with this CERCLA removal project include 3513 and 3524. Impoundment 3513 was constructed in 1944 as a settling basin for various low-level waste (LLW) streams that were diluted with process wastewater. The water within the impoundment discharged into White Oak Creek through a series of overflow pipes located in the impoundment's southern berm until 1947, when direct discharge was discontinued. From 1957–1976, this impoundment received wastes that, based on the WAC in place during these years, did not require treatment in the Process Waste Treatment Plant. Effluent from the Process Waste Treatment Plant also was discharged into the impoundment to allow settling of particulates. The impoundment was taken out of service in 1976.

Impoundment 3524 was constructed in 1943 for short-term storage of short-lived radionuclides to allow decay, thus reducing the radioactivity of the wastewater. However, after 1954, the impoundment received only process wastewater. From 1949–1957, the effluent from Impoundment 3524 was pumped to Impoundment 3513. In 1957, the Process Waste Treatment Plant was placed on-line, and Impoundment 3524 was used as an equalization basin for intermediate storage and collection of process wastewater for the Process Waste Treatment Plant until 1989.

4. DATA QUALITY ASSESSMENT AND WAC ATTAINMENT

4.1 SUMMARY OF WASTE CHARACTERIZATION PLANNING MEETING WITH REGULATORY REPRESENTATIVES

On May 7, 2003, a meeting was held to discuss the process that will be used to characterize, remove, and disposition the equipment and miscellaneous materials associated with the SIOU treatment plant. Attending this meeting were representatives from TDEC, DOE, and Bechtel Jacobs Company LLC (BJC). During the meeting, an overview of current equipment slated for disposal, planned disposal facilities, characterization approach, and how anomalies will be handled was presented. The characterization approach included planned decontamination steps to be conducted, expected levels of sediment that will remain after equipment decontamination, and steps that will be taken to visually verify the level of sediment remaining. Specific items of discussion pertaining to the SIOU treatment plant equipment and materials that came out of this meeting included:

- The need to clearly outline the characterization approach within the Waste Handling Plan, including any assumptions made.
- The need to have a documented visual verification plan in place during dismantlement activities.

4.2 PREVIOUS STUDIES AND EXISTING DATA

The data presented in the EMWMF waste lot profile number 87.1 are being used to characterize the SIOU treatment plant equipment and materials for disposal. The data presented in Appendix C, February 2001 Raw Sediment Sampling Event, and Appendix F, 1994 Raw Sediment Sampling Event, of the 87.1 profile provide the needed information to adequately characterize the sediment contaminated pieces of equipment and material associated with the SIOU treatment plant. The data within the profile provide Resource Conservation and Recovery Act (RCRA) Toxicity Characteristic Leaching Procedure (TCLP) results for all RCRA characteristic constituents, total results for metals and organics, PCB results, and numerous concentration results for various radionuclides associated with the actual sediment.

4.3 IDENTIFICATION OF DATA GAPS FOR WAC ATTAINMENT

The data quality objective process described in the *Attainment Plan for Risk/Toxicity-Based Waste Acceptance Criteria at the Oak Ridge Reservation, Oak Ridge, Tennessee* (DOE 2001), was followed to assess and evaluate the data used under this Waste Handling Plan for EMWMF WAC attainment. In addition, the *Risk Assessment Guidance for Superfund (RAGS) Part A* (EPA 1992) was followed during development of waste lot profile 87.1 to determine which data were usable to assess EMWMF WAC attainment. Process knowledge and existing analytical data were used to identify the SRCs that were identified under waste lot profile 87.1, as well as this Waste Handling Plan.

After the data presented in waste lot profile 87.1 were reviewed, it was determined that scaling factors would have to be applied to each identified contaminant. This was based on the fact that the data summary results presented in waste lot profile 87.1 took into account raw sediment and grout being used to form the SIOU waste bricks. Because the sediment remaining in the SIOU treatment plant equipment and materials would not contain grout, each summary value reported was divided by 66% (or multiplied by 1.515151) to account for the increase in activity/concentration due to the absence of grout. In addition, the reported values in waste lot profile 87.1 were based on wet, raw sediment. Because the remaining sediment will be dry, each summary value was multiplied by 5 to account for the increase in activity/concentration due to the absence of water.

With the new specific activity/concentration values calculated for the dried sediment, it was determined that the amount of sediment remaining in or on the equipment and materials would have to be calculated before one could quantify (i.e., pCi or mg) the amount of contamination that will be associated with this waste lot. Tables 1 and 2 were developed to demonstrate how the amount of contamination remaining was calculated. After the amount of contamination was determined, the mass of the combined equipment and materials was divided into the individual SRC amounts to calculate the specific activities and contaminant concentrations associated with the equipment and materials. It is important to mention that a conservative decision was made to underestimate the mass of the metal items (e.g., tanks) in order to ensure that the activities/concentrations associated with the less dense materials (e.g., silt fence) would not be underestimated. Table 3 was created to show this calculation for the applicable EMWMF analytic WAC SRCs.

Table 1. Surface area and equipment weight calculation

	Dimensions (ft)								
Item	Length	Width/ Diameter	Height	# Sides	# Items	Surface Area (ft^2)	Volume (cf)	Weight (lbs)	
Tank sides		22.38	10.77	1	1	757.23			
Tank bottom		22.38	10.77	1	1	393.38			
Tank blades	21.88	0.42	0.04	2	1	18.23	0.38	185.75	
Tank shaft		0.25	10.77	1	1	8.46	0.53	258.52	
Tank (total)		22.38	10.77	1	6	**7063.77**	3583.00	3674.00	lb empty
								6339.63	all tanks+ blades+ shafts
Blender bottom	7.56	3.22	4.68	1	1	23.65			
Blender sides	7.56	3.22	4.68	1	2	8.14			
Blender top	7.56	3.22	4.68	1	1	24.34			
Blender paddles	1.08	0.04	0.17	2	8	2.89	0.01	0.30	
Blender shaft	7.05	0.31		1	1	6.92	0.54	21.64	
B. discharge chute	3.15	0.50			1	4.95			
Blender (total)	7.56	3.22	4.68	1	2	**141.77**	114.00	**8600.00**	blenders
Blender pedestal					2	**64.00**	6.00	**7300.00**	pedestals
3" PVC Pipe	1.00	0.25		1	1	0.79	117.80	150.00	lb/100'
4" PVC Pipe	1.00	0.33		1	1	1.05	96.00	210.00	lb/100'
2" PVC Pipe	1.00	0.17		1	1	0.52	4.36	105.00	lb/100'
1" PVC Pipe	1.00	0.08		1	1	0.26	0.30	75.00	lb/100'
Total:						**2.62**		**6157.5**	
Vent Duct	60.00	2.00	2.00	1	1	**240.00**	5.00	1260.00	
Silt Fence	477.50	0.01	3.00	1	1	**2865.03**	7.46	74.61	
Assumptions:									
SAcylinder = C*h = pi*d*h									
SArectangle = l*w									
SAcircle = pi*d^2/4									
SAtank = SAcylinder (side) +SAcircle (bottom)									
SAblender = 1/2 SAcylinder (bottom) + SAcircle (2sides) + SArectangle (top)									
The surface area of internal components are based upon the shape of each component.									
A nominal thickness was assumed for the blender paddles.									
Tank blade width assumed to be 5 inches.									
Tank blade length assumed to be 6 inches less than tank diameter.									
Tank blade height assumed to be 1/2 inch.									
Tank shaft diameter assumed to be 3 inches.									
pi = 3.14159									
Density of carbon steel = 489 lb/cf									
PVC pipe = Schedule 40									
3" PVC = 150lb/100'									
4" PVC = 210lb/100'									
2" PVC = 105lb/100'									
1" PVC = 75lb/100'									
2400 ft of 3" PVC									
1100 ft of 4" PVC									
50 ft of 1" PVC									
200 ft of 2" PVC									
Weight of pipe sealant is double weight of pipe									
Vent duct = 21lb/linear ft									
Urethane paddles = 40 lb/cf									
Assume only 1 side of the silt fence is contaminated.									
Assume only the inside of the tanks and mixers are contaminated.									
Assume 10 lb/cf density for silt fence (LDPE).									

Table 2. Mass of sediment and equipment

	Estimated Maximum Sediment Thickness	Sediment Thickness	Contact Surface Area	Sediment Volume	Sediment Volume	Sediment Density	Scaling Factor	Total Mass Sediment	Total Mass Equipment	Total Mass Equipment
	mm	ft	ft^2	ft^3	cc	g/cc		g	lb	g
Tanks	0.1	0.000328	7063.77	2.31751	65624.58	1.7		111561.79	6339.6323	2875609
PVC Pipe	0.1	0.000328	2.62	0.00086	24.35249	1.7		41.399233	6157.5	2792995.2
Blenders	3.175	0.010417	141.7727	1.476799	41818.29	2.2	0.666667	61333.492	8600	3900894.6
Blender Pedestals	0.01	3.28E-05	64	0.0021	59.46538	2.2	0.666667	87.215891	7300	3311224.5
Silt Fence	0.01	3.28E-05	2865.031	0.093997	2661.699	1.7		4524.8883	74.609375	33842.245
Ducting	0.01	3.28E-05	240	0.007874	222.9669	1.7		379.04373	1260.00	571526.42
TOTAL:								**177927.83**		**13486092**
NOTE: Dried material associated with blender has about 2/3 settled sediment and 1/3 cement additive										

Table 3. Adjusted values for analytic WAC site-related contaminants

Original Final Waste Form Values (pCi/g or mg/kg) Entered into WACFACS for WL #87.1

	Am-241	C-14	Np-237	Pu-239/240	Tc-99	U-233/234	U-235	U-236	U-238	Barium	Chromium	Lead	Vanadium	Acenaphthene	Acetone	Carbazole	Di-n-butylphthalate	Isophorone	Naphthalene	Phenol	Toluene
Minimum Value	183	106.9	0.38	487.3	0.08	52.94	1.33	0.56	20.35	66.71	46.03	73.8	2.676	0.01	0.03	0.018	0.043	0.08	0.047	0.063	0.008
Median Value	288.2	326.4	1.36	892.8	3.71	79.85	2.84	1.34	43.03	171.74	402.27	1013.6	25.44	0.076	0.14	1.287	0.34	1.29	1.29	1.188	0.034
Maximum Value	399	548.8	2.7	1316.000	18.93	120.40	12.96	11.64	69.06	291.98	818.4	3392.40	41.646	21.78	0.238	21.780	21.78	21.78	21.8	21.78	0.066

Adjusted values (pCi/g or mg/kg) to account for raw sediment based on original values being reduced by 66% to account for the grout additives

	Am-241	C-14	Np-237	Pu-239/240	Tc-99	U-233/234	U-235	U-236	U-238	Barium	Chromium	Lead	Vanadium	Acenaphthene	Acetone	Carbazole	Di-n-butylphthalate	Isophorone	Naphthalene	Phenol	Toluene
Minimum Value	277.27	161.97	0.58	738.33	0.12	80.21	2.02	0.85	30.83	101.08	69.74	111.82	4.05	0.02	0.05	0.03	0.07	0.12	0.07	0.10	0.01
Median Value	436.67	494.55	2.06	1352.73	5.62	120.98	4.30	2.03	65.20	260.21	609.50	1535.76	38.55	0.12	0.21	1.95	0.52	1.95	1.95	1.80	0.05
Maximum Value	604.55	831.51	4.09	1993.94	28.68	182.42	19.64	17.64	104.64	442.39	1240.00	5140.00	63.10	33.00	0.36	33.00	33.00	33.00	33.00	33.00	0.10

Adjusted values (pCi/g or mg/kg) to account for dry sediment remaining in the equipment (177,927.83 g) after rinsing and the actual mass of the equipment (13,486,092 g) to be disposed. The specific activity for each radionuclide is 5 times higher in dry sediment than in raw sediment. The concentration of chemical contaminants is also 5

	Am-241	C-14	Np-237	Pu-239/240	Tc-99	U-233/234	U-235	U-236	U-238	Barium	Chromium	Lead	Vanadium	Acenaphthene	Acetone	Carbazole	Di-n-butylphthalate	Isophorone	Naphthalene	Phenol	Toluene
Minimum Value	18.29	10.68	0.04	48.71	0.01	5.29	0.13	0.06	2.03	6.67	4.60	7.38	0.27	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
Median Value	28.81	32.62	0.14	89.24	0.37	7.98	0.28	0.13	4.30	17.17	40.21	101.31	2.54	0.01	0.01	0.13	0.03	0.13	0.13	0.12	0.00
Maximum Value	39.88	54.85	0.27	131.53	1.89	12.03	1.30	1.16	6.90	29.18	81.80	339.07	4.16	2.18	0.02	2.18	2.18	2.18	2.18	2.18	0.01
New Arithmetic Mean Value Based on PERT Beta	28.90	32.67	0.14	89.53	0.56	8.21	0.43	0.29	4.36	17.42	41.20	125.28	2.43	0.37	0.01	0.45	0.39	0.45	0.45	0.44	0.00

Estimated Hazard Index and Carcinogenic Sum-of-Fraction based on new PERT Beta Arithmetic Mean

	Am-241	C-14	Np-237	Pu-239/240	Tc-99	U-233/234	U-235	U-236	U-238	Barium	Chromium	Lead	Vanadium	Acenaphthene	Acetone	Carbazole	Di-n-butylphthalate	Isophorone	Naphthalene	Phenol	Toluene
HI Ratio						2.93E-07	4.50E-05	1.04E-06	2.90E-03	1.16E-04	2.94E-04	8.35E-02	9.73E-05	9.44E-07	5.11E-05		2.03E-03	3.00E-05	4.54E-05	1.38E-04	7.14E-08
Carc. Ratio	1.44E-20	1.98E-01	4.44E-04	1.24E-01	3.28E-03	4.83E-03	2.85E-04	1.72E-04	3.63E-03							4.08E-06		7.38E-05			

HI SOF	8.93E-02
Carc. SOF	3.35E-01

4.3.1 Administrative Waste Acceptance Criteria Attainment

As shown in Table 4, sufficient chemical data are available to determine that the SIOU treatment plant equipment and materials do not exhibit any RCRA characteristic hazards. The actual data came from the 2001 SIOU Sediment Sampling Event that was provided in the waste lot profile 87.1. The EMWMF Administrative WAC requires that all RCRA, including land disposal restriction (LDR), requirements be addressed prior to any waste being disposed of at the EMWMF. Because one TCLP sample result for lead was above the regulatory threshold, the UCL_{90} of the sample population was compared to the regulatory threshold to confirm that the UCL_{90} result was below the regulatory threshold. The data quality assessment protocol identified in Chapter 9 of SW-846 (EPA 1984) for determining if a contaminant of concern is present in the waste at a level above its regulatory threshold was followed. Because no RCRA characteristics are exhibited in the sediment, the LDR requirements do not apply.

The raw data to support the following PCB statement came from the 2001 SIOU Sediment Sampling Event that was provided in the waste lot profile 87.1. This data showed that the concentrations were less than 50 ppm (wet weight basis) on in-situ sediments. The current PCB regulations (post-1997 CERCLA Record of Decision) require that the PCB concentration be determined on a dry weight basis on the "as found" waste. The calculated dry weight PCB concentration on the as found sediment (16% solids by weight), using 90% UCL of 12.3 mg/kg, is 76.9 mg/kg and, using a statistical mean of 11.1 mg/kg, the dry weight concentration is 69.3 mg/kg. The current regulations do not impact EMWMF disposal requirements. However, the SIOU treatment plant equipment and materials will have to be disposed as regulated PCB remediation waste in excess of 50 ppm PCBs.

The impoundment sediment does not contain toxic gases, vapors, or fumes, is not capable of detonation or explosive decomposition, does not contain pyrophoric materials, does not contain etiologic agents, and is not infectious waste. Lastly, because the equipment and materials will be dismantled and packaged in a manner to minimize void space, as described in Sects. 4.3.3, 5, and 6, all requirements associated with full compliance of the EMWMF administrative WAC will be met.

4.3.2 ASA-Derived Waste Acceptance Criteria Attainment

Table 5 was developed to identify all chemicals with reportable quantities in 40 *Code of Federal Regulations* (*CFR*) 302.4 that are present in this waste lot. The list of chemicals was taken from waste lot profile 87.1. In addition, Table 6 was developed to identify all radionuclides that are present. This information also was taken from waste lot profile 87.1. The specific activities and concentrations for the various chemicals and radionuclides were adjusted from the original values provided in waste lot profile 87.1 to account for the scaling factors discussed in Sect. 4.3. The calculation used to apply the scaling factors is provided in this section for reference. Based on the results from Tables 5 and 6, no reportable quantity of a chemical will be present in this waste lot. In addition, the total auditable safety analysis (ASA) sum of fractions (SOF) for the waste lot is only 1.75E-02. Therefore, all requirements associated with full compliance of the EMWMF ASA-derived WAC have been met. The results of the radiological and chemical data demonstrating compliance with the ASA criteria will be documented in the waste profile (#87.2) provided to the WAC Attainment Team.

Table 4. SIOU sediment RCRA determinations

RCRA / LDR Parameters	EPA Code	Analytical Data Available?	Detected Samples	Detection Status (mg/L) unless noted	Regulatory Level (mg/L) unless noted	Constituent Distribution (if required)	Std. Dev.	UCL_{90}	mean	n	More Samples Needed?
Flash Point Closed Cup	D001	NA		Origin aqueous based little organics	<140 deg F	NA					
pH	D002	NA		Solid waste material	<=2.0 & >=12.5	NA					
Cyanide (reactive)	D003	Y^1	0/6 detects	not detected	>= 250 mg/kg	NA					
Sulfide (reactive)	D003	Y^1	0/6 detects	not detected	>= 500 mg/kg	NA					
TCLP METALS											
Arsenic	D004	Y	32/37 detects	max. detect = 0.014	5	NA					
Barium	D005	Y	37/37 detects	max. detect = 2.03	100	NA					
Cadmium	D006	Y	21/37 detects	max. detect = 0.021	1	NA					
Chromium	D007	Y	24/37 detects	max. detect = 0.0527	5	NA					
Lead	D008	Y	37/37 detects	max. detect = 5.1	5	Lognormal		0.323	0.195	37	No UCL-90 is more than an order of magnitude away from Regulatory Limit
Mercury	D009	Y	0/38 detects	not detected	0.2	NA					
Selenium	D010	Y	1/37 detects	max. detect = 0.0075	1	NA					
Silver	D011	Y	0/37 detects	not detected	5	NA					
TCLP PESTICIDES											
Endrin	D012	Y	0/37 detects	not detected	0.02	NA					
Lindane	D013	Y	0/37 detects	not detected	0.4	NA					
Methoxychlor	D014	Y	0/37 detects	not detected	10	NA					
Toxaphene	D015	Y	0/37 detects	not detected	0.5	NA					
Chlordane	D020	Y	0/37 detects	not detected	0.03	NA					
Heptachlor	D031	Y	0/37 detects	not detected	0.008	NA					
Heptachlor epoxide	D031	Y	0/37 detects	not detected	0.008	NA					
TCLP HERBICIDES											
2,4-D	D016	Y	0/37 detects	not detected	10	NA					
Silvex	D017	Y	0/37 detects	not detected	1	NA					
TCLP ORGANICS											
Benzene	D018	Y	0/42 detects	not detected	0.5	NA					
Carbon tetrachloride	D019	Y	0/42 detects	not detected	0.5	NA					
Chlorobenzene	D021	Y	2/42 detects	max. detect = 0.027	100	NA					
Chloroform	D022	Y	0/42 detects	not detected	6	NA					
2-Methylphenol (o-cresol)	D023	Y	0/37 detects	not detected	200	NA					
m+p Methylphenol (m&p cresol)	D24/D25	Y	0/37 detects	not detected	200	NA					
Cresol	D026	Y^2	0/74 detects	not detected	200	NA					
1,4-Dichlorobenzene	D027	Y	0/37 detects	not detected	7.5	NA					
1,2-Dichloroethane	D028	Y	0/42 detects	not detected	0.5	NA					
1,1-Dichloroethene	D029	Y	0/42 detects	not detected	0.7	NA					
2,4-Dinitrotoluene	D030	Y	0/37 detects	not detected	0.13	NA					
Hexachlorobenzene	D032	Y	0/37 detects	not detected	0.13	NA					
Hexachlorobutadiene	D033	Y	0/37 detects	not detected	0.5	NA					
Hexachloroethane	D034	Y	0/37 detects	not detected	3	NA					
Methyl ethyl ketone	D035	Y	0/26 detects	not detected	200	NA					
Nitrobenzene	D036	Y	0/37 detects	not detected	2	NA					
Pentachlorophenol	D037	Y	0/37 detects	not detected	100	NA					
Pyridine	D038	Y	0/37 detects	not detected	5	NA					
Tetrachloroethene	D039	Y	0/37 detects	not detected	0.7	NA					
Trichloroethene	D040	Y	0/42 detects	not detected	0.5	NA					
2,4,5-Trichlorophenol	D041	Y	0/37 detects	not detected	400	NA					
2,4,6-Trichlorophenol	D042	Y	0/37 detects	not detected	2	NA					
Vinyl chloride	D043	Y	0/42 detects	not detected	0.2	NA					

NOTES:

Data obtained from WL #87.1 profile, Table 2.4 and Appendices C and F. Data are actual results from historical solid sediment characterization events during FY2001.

Y^1 - data from SIOU bricks indicating zero detection for the compound even when 66% of bricks are made up of sediment.

Y^2 - sum of o,m,p-cresols used for values in table for Total Cresol

Table 5. ASA-derived WAC chemicals[a]

Compound	Original mean (mg/kg)	Original UCL-95 (mg/kg)	Adjusted UCL-95 (mg/kg) (based on scaling factors)	Total (kg) (based on 177,927.83 g sediment remaining)	RQ (kg)	Is it an RQ?
o-Xylene	0.032	0.0423	0.0042	7.52E-07	454	No
2,4,6-Trichlorophenol	3.08	5.95	0.5947	1.06E-04	4.54	No
2,4-Dinitrotoluene	3.022	6.11	0.6107	1.09E-04	4.54	No
2,6-Dinitrotoluene	3.06	5.94	0.5937	1.06E-04	45.4	No
2-Butanone	0.05	0.057	0.0057	1.01E-06	45.4	No
2-Chlorophenol	3	5.88	0.5877	1.05E-04	45.4	No
2-Methyl-4,6-dinitrophenol (Dinitro-o-cresol)	15.36	30.2	3.0185	5.37E-04	4.54	No
2-Methylnaphthalene	2.77	5.7	0.5697	1.01E-04	n/a	
2-Nitrophenol	1.31	2.46	0.2459	4.37E-05	**	
3,3'-Dichlorobenzidine	2.88	5.78	0.5777	1.03E-04	0.454	No
4-Chloro-3-methylphenol	2.53	5.51	0.5507	9.80E-05	n/a	
4-Methylphenol	3.1	5.96	0.5957	1.06E-04	n/a	
4-Nitrobenzenamine	15.84	30.6	3.0585	5.44E-04	n/a	
4-Nitrophenol	6.91	12.85	1.2844	2.29E-04	45.4	No
Anthracene	2.82	5.75	0.5747	1.02E-04	2270	No
Arsenic	1.51	1.91	0.1909	3.40E-05	0.454	No
Benz(a)anthracene (Benzo[a]anthracene)	2.34	5.33	0.5327	9.48E-05	4.54	No
Benzo(a)pyrene	2.36	5.36	0.5357	9.53E-05	0.454	No
Benzo(b)fluoranthene	2.5	5.47	0.5467	9.73E-05	0.454	No
Benzo(ghi)perylene	3.08	5.95	0.5947	1.06E-04	n/a	
Benzo(k)fluoranthene	2.85	5.76	0.5757	1.02E-04	2270	No
Beryllium	28.44	56	5.5972	9.96E-04	**	
Bis(2-ethylhexyl)phthalate	44.53	71.2	7.1165	1.27E-03	45.4	No
Butyl benzyl phthalate	3.05	5.92	0.5917	1.05E-04	45.4	No
Cadmium	6.48	8.22	0.8216	1.46E-04	**	

[a] Original data reported in WL#87.1 Profile was adjusted to account for grout additive, dry sediment, amount of sediment remaining after rinsing, and mass of equipment to be disposed.

Table 5 (continued)

Compound	Original mean (mg/kg)	Original UCL-95 (mg/kg)	Adjusted UCL-95 (mg/kg) (based on scaling factors)	Total (kg) (based on 177,927.83 g sediment remaining)	RQ (kg)	Is it an RQ?
Chlorobenzene	0.05	0.09	0.0090	1.60E-06	45.4	No
Chrysene	2.24	5.25	0.5247	9.34E-05	45.4	No
Cyanide	1.66	2.18	0.2179	3.88E-05	**	
Dibenz(a,h)anthracene	3.02	5.9	0.5897	1.05E-04	0.45	No
Dibenzofuran	3.08	5.95	0.5947	1.06E-04	45.4	No
Di-n-octylphthalate	3.8	7.71	0.7706	1.37E-04	4.54	No
Endosulfan I	1.03	1.58	0.1579	2.81E-05	0.454	No
Endrin aldehyde	1.3	1.67	0.1669	2.97E-05	0.45	No
Fluoranthene	2.36	5.33	0.5327	9.48E-05	45.4	No
Fluorene	2.82	5.75	0.5747	1.02E-04	2270	No
Indeno(1,2,3-cd)pyrene	2.82	5.75	0.5747	1.02E-04	45.4	No
Mercury	173.1	221.5	22.1390	3.94E-03	**	
Nickel	29.7	35.6	3.5582	6.33E-04	**	
N-Nitrosodiphenylamine	2.83	5.74	0.5737	1.02E-04	0.454	No
PCBs	114	142.7	14.2629	2.54E-03	0.454	No
Pentachlorophenol	14.6	29.6	2.9585	5.26E-04	4.54	No
Phenanthrene	2.31	5.31	0.5307	9.44E-05	2270	No
Pyrene	2.47	5.44	0.5437	9.67E-05	2270	No
Silver	36.6	43.84	4.3818	7.80E-04	**	
Sodium	626.2	1045	104.4480	1.86E-02	4.54	No
Sulfate (Sulfuric Acid)	15	20.6	2.0590	3.66E-04	454	No
Thallium	0.72	0.95	0.0950	1.69E-05	454	No
Zinc	479.78	605	60.4699	1.08E-02	454	No

Table 6. SAS-derived WAC radionuclides

Original data reported in WU#87.1 Profile was adjusted to account for grout additive, dry sediment, amount of sediment remaining after rinsing, and mass of equipment to be disposed.

Radionuclide	Atomic No.	Mass No.	Half-life (years)	Is Half-life < 5 yrs?	ASA limit (pCi/g)	UCL-95 value (pCi/g)	Fission Theoretical % yield(1)	Theoretical Activity (pCi/g) (2)	Original UCL-95 Value Used (pCi/G)	Adjusted UCL-95 Value to Use (pCi/G)	SOF	Comments
Ac-227	89	227	21.77	no	1.00E+03		1.00E-05	0.00657	0.00657	0.00066	6.57E-07	
Ag-108m	47	108	130	no	4.90E+06		5.00E-01	329	329	32.84078	6.70E-06	historically less than 1% activity per John Keller, 21 Mar 2001.
Al-26	13	26	7.20E+05	no	5.90E+06		5.00E-01	329	329	32.84078	5.57E-06	
Am-241		241	432.2	no	1.30E+04	338.5			338.5	33.83314	2.60E-03	
Am-243		243	7.40E+03	no	1.30E+04	5.97			5.97	0.59670	4.59E-05	
Ba-133	56	133	10.53	no	2.70E+07		5.00E-01	329	329	32.84078	1.22E-06	
Bi-207	83	207	32.2	no	1.20E+07		1.00E-05	0.00657	0.00657	0.00066	5.47E-11	
C-14		14	5730	no	1.00E+07	439.93			440 –	43.97109	4.40E-06	
Cd-113m	48	113	13.7	no	2.90E+05		3.00E-02	20	20	1.97045	6.79E-06	
Cf-249	98	249	351	no	1.30E+04		1.00E-05	0	0	0.00000	0.00E+00	ORNL policy is to recycle 100% until all Cf is recovered because it is too valuable to throw away.
Cf-250	98	250	13.1	no	2.60E+04		1.00E-05	0	0	0.00000	0.00E+00	ORNL policy is to recycle 100% until all Cf is recovered because it is too valuable to throw away.
Cf-251	98	251	890	no	1.30E+04		1.00E-05	0	0	0.00000	0.00E+00	ORNL policy is to recycle 100% until all Cf is recovered because it is too valuable to throw away.
Cl-36	17	36	3.00E+05	no	8.40E+06		1.00E-05	0.00657	0.00657	0.00066	7.82E-11	
Cm-242	96	242	0.446575	yes	7.90E+05		1.00E-05	0.00657	0.00657	0.00066	8.31E-10	
Cm-243	96	243	28.5	no	2.00E+04		1.00E-05	0.00657	0.00657	0.00066	3.28E-08	historically less than 1% activity per John Keller, 21 Mar 2001.
Cm-244	96	244	18.1	no	2.60E+04		1.00E-05	0.00657	0.00657	0.00066	2.53E-08	
Cm-245	96	245	8.50E+03	no	1.30E+04		1.00E-05	0.00657	0.00657	0.00066	5.05E-08	historically less than 1% activity per John Keller, 21 Mar 2001.
Cm-246	96	246	4.78E+03	no	1.30E+04		1.00E-05	0.00657	0.00657	0.00066	5.05E-08	historically less than 1% activity per John Keller, 21 Mar 2001.
Cm-247	96	247	1.56E+07	no	1.50E+04		1.00E-05	0.00657	0.00657	0.00066	4.38E-08	historically less than 1% activity per John Keller, 21 Mar 2001.
Cm-248	96	248	3.40E+05	no	2.60E+03		1.00E-05	0.00657	0.00657	0.00066	2.53E-07	historically less than 1% activity per John Keller, 21 Mar 2001.
Co-60	27	60	5.272	no	6.90E+06		1.00E-05	0.00657	0.00657	0.00066	9.52E-11	
Cs-135			3.00E+06	no	1.00E+07	22.67			22.67	2.26587	2.27E-07	
Cs-137			30.2	no	1.50E+06	37.62	7		37.62	3.76013	2.51E-06	
Eu-150	63	150	0.001438	yes	9.90E+08		0.3	197	197	19.70447	1.99E-08	
Eu-152			13.4	no	4.90E+06	129.77			129.77	12.97054	2.65E-06	
Eu-154			8.5	no	4.90E+06	36.54			36.54	3.65218	7.45E-07	
Eu-155			4.73	yes	2.30E+07	91.85			91.85	9.18043	3.99E-07	
H-3			12.26	no	4.00E+08		0	0	0	0.00000	0.00E+00	not present in solid form
I-129			1.60E+07	no	1.50E+03		0	0	0	0.00000	0.00E+00	The iodine isotopes are very volatile. It was not reported as being present in the 1994 and 2001 raw sediment sampling campaigns. In addition, it was only reported in one of the SIOU brick samples analyzed, but the data result was rejected by the laboratory. I-129 has a long half-life (1.7 x 107 years), and the laboratory can detect I-129 at a detection limit of approximately 5 pCi/g by LEPS (based on a 25 gram soil sample).
K-40	19	40	1.25E+09	no	4.20E+06		1.00E-05	0.00657	0.00657	0.00066	1.56E-10	
Nb-93m	41	93	13.6	no	4.90E+07		5	3286	3286	328.40781	6.70E-06	
Ni-59	28	59	7.60E+04	no	2.90E+08		1.00E-05	0	0.00657	0.00066	2.26E-12	historically less than 1% activity per John Keller, 21 Mar 2001.
Ni-63	28	63	100	no	1.30E+08		1.00E-05	0	0.00657	0.00066	5.05E-12	historically less than 1% activity per John Keller, 21 Mar 2001.
Np-237			2.14E56	no	1.00E+04	1.91			1.91	0.19090	1.91E-05	
Pa-231	91	231	3.27E+04	no	4.90E+03		1.00E-05	0	7	0.68066	1.39E-04	Has the same activity as U-235, per John Keller on 21 Mar 2001.
Pb-210	82	210	22.3	no	8.90E+03		1.00E-05	0.00657	0.00001	0.00000	1.12E-10	
Pd-107	46	107	6.50E+06	no	1.00E+08		0.3	197	0.30000	0.02999	3.00E-10	historically less than 1% activity per John Keller, 21 Mar 2001.
Pu-236	94	236	2.9	yes	4.90E+04		1.00E-05	0	0.00001	0.00000	2.04E-11	
Pu-238			87.7	no	1.50E+04	23.29			23.29	2.32784	1.55E-04	
Pu-239			2.40E+04	no	1.30E+04	1076.7			1076.73	107.61938	8.28E-03	included in Pu-239/240
Pu-240			6537	no	1.30E+04	0			0	0.00000	0.00E+00	included in Pu-239/240
Pu-241	94	241	14.4	no	7.90E+05		1.00E-05	0	0.00657	0.00066	8.31E-10	
Pu-242	94	242	3.80E+05	no	1.50E+04		1.00E-05	0	0.00657	0.00066	4.38E-08	
Pu-244	94	242	8.20E+07	no	1.50E+04		1.00E-05	0	0.00657	0.00066	4.38E-08	historically less than 1% activity per John Keller, 21 Mar 2001.
Ra-226	88	226	1600	no	3.00E+05		1.00E-05	0	0.00657	0.00066	2.19E-09	
Ra-228	88	228	5.75	no	3.00E+05		1.00E-05	0	0.00657	0.00066	2.19E-09	
Se-79	34	79	6.00E+04	no	8.90E+06		0.07	46	46	4.59771	5.17E-07	
Si-32	14	32	100	no	1.30E+06		1.00E-05	0	0.00657	0.00066	5.05E-10	
Sm-151	62	151	90	no	2.50E+07		0.1	66	66	6.56816	2.63E-07	historically less than 1% activity per John Keller, 21 Mar 2001.
Sn-121m	50	121	55	no	4.40E+07		0.3	197	197	19.70447	4.48E-07	
Sn-126	50	126	1.00E+05	no	4.20E+06		0.3	197	197	19.70447	4.69E-06	historically less than 1% activity per John Keller, 21 Mar 2001.
Sr-90			29	no	4.00E+05	4600	7	4600	4600	459.77094	1.15E-03	
Tc-99			2.13E+05	no	4.20E+07	11.69			11.69	1.16842	2.78E-08	
Th-228			1.9	yes	2.50E+04	53.05			53.05	5.30236	2.12E-04	
Th-229			7.30E+03	no	2.30E+03	6.05			6.05	0.60470	2.63E-04	
Th-230			7.54E+04	no	1.50E+04	12.82			12.82	1.28136	8.54E-05	
Th-232			1.40E+10	no	2.50E+03	50.18			50.18	5.01550	2.01E-03	
U-232			68.9	no	2.00E+04	404.89			404.89	40.46884	2.02E-03	
U-233			1.59E+05	no	1.00E+05	98.92			98.92	9.88707	9.89E-05	included in U-233/234
U-234			2.45E+05	no	1.00E+05	0			0	0.00000	0.00E+00	included in U-233/234
U-235			7.04E+08	no	1.00E+05	6.81			6.81	0.68066	6.81E-06	
U-236			2.34E+07	no	1.00E+05	5.24			5.24	0.52374	5.24E-06	
U-238			4.46E+09	no	1.00E+05	58.52			58.52	5.84909	5.85E-05	
Zr-93	40	93	1.50E+06	no	1.50E+06		6	3943	3943	394.08938	2.63E-04	historically less than 1% activity per John Keller, 21 Mar 2001.
					Total ASA Sum of Fractions:						1.75E-02	

(1) Fig. 2-1, *Introduction to Nuclear Engineering*, McGraw-Hill, 1958

(2) Equation: (Theoretical % yield isotope/Theoretical % yield Sr-90)*UCL95 Sr-90.

Scaling Factor Calculation:

[Adjusted UCL_{95}] = [Original UCL_{95} Value] X [1.515151] X [5] X [177,927.83 g] ÷ [13,486,092 g]

where:

1.515151 is the factor to account for lack of grout in the raw sediment;

5 is the factor to account for the increase in activity/concentration due to the absence of water in the dry, raw sediment;

177,927.83 g is the mass of dry, raw sediment present on the equipment and material to be disposed of;

13,456,092 g is the mass of material and equipment.

4.3.3 Physical Waste Acceptance Criteria Attainment

The identified sampling requirements under this plan were evaluated to determine if any data gaps exist to demonstrate compliance with the U.S. Department of Transportation (DOT) regulations. All analytical data were considered during this evaluation. Based on the results, the data set will be sufficient to assess compliance with the DOT requirements.

The identified waste handling requirements under this plan were evaluated to determine if any discrepancies for physical sizing of waste exist to demonstrate compliance with the EMWMF WAC. Because the blenders exceed the EMWMF physical WAC size requirements, a variance from the EMWMF operations subcontractor would normally be needed to allow this requirement to be exceeded. However, because each blender (approximately 4.2 yd^3 and weighing 8,600 lb) will be placed in individual soft-sided lift liners once all void space has been filled with debris and PPE, the configuration of each blender meets the EMWMF requirement that soft-sided waste containers up to 10 yd^3 must be less than or equal to 24, 000 lb. Therefore, no physical WAC variance is required. Nevertheless, all debris will meet size, weight, and void space requirements. The removal action subcontractor will size reduce any pipe exceeding 6 in. in diam and tanks, plus any other applicable items that may be encountered. Items that can be crushed under the weight of a D-7 bulldozer can be shipped directly to the EMWMF.

4.3.4 Analytic Waste Acceptance Criteria Attainment

The EMWMF analytic WAC requires that a 95% confidence and an 80% power be used to determine whether the chemical and radiological contaminants with concentration limits listed in Appendix A, Table A.1 of the WAC are SRCs. To eliminate a constituent as an SRC based on analytical data, the data must demonstrate that the constituent was not detected or the data set contained less than 20% "J" flags with the remaining data points being non-detectable. In addition, a constituent can be eliminated as an SRC based on process knowledge.

Table 3 lists the radionuclides and chemicals that are considered EMWMF analytic WAC SRCs. The remaining chemicals and radionuclides not listed were eliminated as SRCs based on the process knowledge provided in waste lot profile 87.1. The constituents eliminated as SRCs were tritium, iodine-129, antimony, selenium, strontium, tin, benzene, carbon tetrachloride, chloroform, dieldrin, n-nitroso-di-n-propylamine, tetrachloroethene, and trichloroethene.

To develop Table 3, the specific activities and concentrations for the various chemicals and radionuclides were adjusted from the original values provided in waste lot profile 87.1 to account for the scaling factors discussed in Sect. 4.3. Based on the results in Table 3, the Hazard Index SOF and the Carcinogenic SOF for this waste lot are 8.93E-02 and 3.35E-01, respectively. These results clearly demonstrate that the requirements associated with the EMWMF analytic WAC will be met.

5. SAMPLING PLAN AND DATA QUIALITY OBJECTIVES/ QUALITY ASSURANCE PROJECT PLAN

5.1 STATUS OF PROJECT AND

BJC is responsible for overall project execution under the direction of the DOE Project Manager. The subcontractor, URS, is responsible for the removal and disposition of the SIOU treatment plant equipment and materials. Other key BJC staff who oversee and manage this work include the subcontract technical representative, environmental compliance, radiological engineer and technicians, quality assurance, industrial hygiene, industrial safety, and transportation and waste management specialist. As described in the preceding sections, no physical samples need to be collected to accurately characterize the equipment and materials for disposal at the EMWMF. It was determined that the characterization data provided in waste lot profile 87.1 were adequate for use in certifying the waste covered under this Waste Handling Plan.

5.2 SAMPLING ACTIVITIES

The successful application of the data provided in waste lot profile 87.1 is directly related to the assumptions and estimates made in Tables 1 and 2. To ensure that the maximum estimated sediment thickness is not exceeded, the subcontractor will triple rinse the surfaces of the SIOU treatment plant process equipment that come in direct contact with the raw sediment. After the triple rinse process is completed, air will be blown through the process lines to remove any moisture. The subcontractor will develop a visual sediment thickness verification plan that will be used during dismantlement and size-reduction activities. The plan will be based on the estimated thickness provided in Table 2. This plan, as well as the size-reduction activities, will allow the subcontractor to verify the amount of sediment remaining in or on the process equipment and materials. If an excess amount of sediment (i.e., sediment remaining in or on process equipment and materials that exceeds the maximum estimated thickness) is found, it will be removed and collected in a 5-gal container. There it will be stabilized with the grout additive used to stabilize the sediment bricks generated under waste lot profile 87.1. Because the grout and sediment mixture in the 5-gal container(s) will be the same as that present in the bricks, the 5-gal containers will be shipped to the EMWMF under waste lot profile 87.1. Lastly, to help prevent the spread of contamination (i.e., caused from the remaining sediment) during dismantlement activities, the subcontractor will apply dry foam material to the internal surfaces of the equipment. This foam also will eliminate any void space issues from occurring.

6. WASTE MANAGEMENT

6.1 TYPES OF WASTE GENERATED

Based on the historical data taken from waste lot profile 87.1, it is expected that the SIOU treatment plant equipment and materials that came in contact with the sediment will be disposed at the EMWMF as PCB-contaminated, LLW. The remaining materials, surveyed clean by Health Physics, will be disposed at the Y-12 Complex ILFs as clean industrial waste. To date, approximately 4,000 ft^3 of contaminated in-place equipment and material items (predominantly made up of scrap metal, PVC, and plastic) have been identified for removal and disposition.

Tables 1 and 2 describe the majority of the items slated for disposal at the EMWMF. The only item (approximately 1,500 ft^3 expected) not described in Tables 1 and 2 going to the EMWMF PPE generated during the execution of the SIOU removal project. The PPE will be disposed with the remaining material from which it was generated. In addition, other potentially contaminated equipment (e.g., catwalks, rubb tent, barge/dredge, clarifier, filters, filter housing, and compressors) and building materials (e.g., concrete, wood, and sand) may be disposed at the EMWMF. The characterization data used to dispose of the known contaminated equipment and materials will be applied to the PPE and potentially contaminated equipment and building materials.

The remaining materials expected to be disposed of at the Y-12 Complex ILFs are predominantly made up of scrap metal, wood, and plastic that remained outside the contamination boundary of the SIOU treatment plant or were never in contact with the sediment. In addition, if the potentially contaminated equipment and building materials turn out not to be contaminated, these items either will be salvaged for reuse or disposed with other non-contaminated materials at the Y-12 Complex ILFs.

6.2 WASTE QUANTITIES PER LOT

Based on current process knowledge, it is projected that the waste lots, described in Table 7, will be generated during this removal action. Nevertheless, waste lot quantities and volumes may change after receipt of final Health Physics survey data. In addition, the volume of PPE to be disposed is not included with the waste volumes presented in Table 7. The total PPE volume will not be known until final completion of the treatment plant demolition activities. Lastly, based on expected PPE volumes and if the potentially contaminated equipment and building materials turn out to be contaminated, the volume of waste going to the EMWMF may rise to 9,500 ft^3.

Table 7. Projected waste lots

Waste lot	Description of waste	Planned disposal facility	Volume (ft^3)
1	PCB-contaminated LLW SIOU Treatment Plant Equipment, Materials, and PPE	EMWMF	4,000
2	Clean SIOU Treatment Plant Materials (excluding salvage items and concrete pad)	ILFs	5,670

6.3 WASTE CONTAINERS

Specific containers currently planned to be used by the subcontractor include 5-gal containers and soft-sided lift liners. All containers procured for use in the performance of work under the subcontract shall be procured in accordance with the subcontractor Quality Assurance/Quality Control (QA/QC) Program. Prospective suppliers of containers shall be evaluated and selected on the basis of specified criteria. Processes to ensure suppliers continue to provide acceptable containers shall be established and implemented. In addition to the previous mentioned containers, the subcontractor may use B-25 boxes, dump trucks, intermodel containers, etc., to transport the various materials associated with this removal action.

6.4 STORAGE/STAGING

The subcontractor shall manage all waste in accordance with the latest federal and State of Tennessee rules, regulations, requirements, laws, and ordinances. In accordance with 40 *CFR* 300.415(j) of the National Oil and Hazardous Substances Pollutant Contingency Plan and DOE Headquarters guidance, DOE on-site removal actions conducted under CERCLA are required to attain applicable or relevant and appropriate requirements (ARARs) to the extent practicable, considering the exigencies of the situation. Therefore, when generated, the subcontractor shall comply with Toxic Substances Control Act (TSCA) wastes staging and temporary storage requirements for CERCLA waste, as identified in the ARARs governing the removal action. Waste staging and temporary storage activities shall adhere to any established Nuclear Criticality Safety requirements. While waste containers are temporarily staged within the CERCLA Area of Contamination (AOC), a log of wastes added to or removed from each container and the associated dates shall be maintained at the staging area. The subcontractor shall document inspections that meet the intent of these regulations for CERCLA.

Staging of radioactive waste, outside the CERCLA AOC, is restricted to a maximum of 120 days. Radioactive waste staged beyond the 120-day limit shall be managed as storage and the subcontractor shall meet all requirements for DOE Order 435.1 storage compliance. However, waste stored within the AOC of the job site is exempt from this requirement.

6.5 TRANSPORTATION

Based on the hazardous material determination made from the characterization data included in this plan, the subcontractor shall properly package, label, mark, placard, and transport waste in accordance with the regulations identified in the ARARs governing this removal action and 49 *CFR* 170–180 et seq. In addition, CERCLA Section 121(d)(3) provides that the off-site transfer of any hazardous substance, pollutant, or contaminant generated during CERCLA response actions be sent to a treatment, storage, or disposal facility that complies with applicable federal and state laws and has been approved by EPA for acceptance of CERCLA waste. Additionally, the subcontractor shall package and secure wastes in waste containers until final disposition. Waste containers used for storage and shipping shall not leak and shall be roadworthy. In addition, the subcontractor shall be responsible for ensuring that containers do not contain free excess water, moisture and/or condensation. Waste containers shall meet the requirements as established by the waste disposal facility. Waste destined for the ILFs can be transported via open dump truck or any other means approved for a non-DOT regulated shipment. Based on the calculated activity levels, no item exceeds the limits of a strong-tight container.

6.6 OPTIONS FOR WASTE DISPOSITION

The facilities currently planned for waste disposal include the following: (1) the EMWMF and (2) the ORR ILFs. Waste meeting the WAC for the EMWMF will be disposed at that facility. Waste meeting the WAC for the ILFs will be disposed at that facility. Health Physics will tag all waste being disposed at the ILFs in accordance with DOE Order 5400.5 release limits prior to its release from the site. Based on the data results presented in Sect. 4, it is expected that all waste can be disposed either at the EMWMF or the ILFs. However, if waste is generated that cannot be disposed at the EMWMF or ILFs, the waste will be shipped to Envirocare of Utah for disposal. Because the waste contains regulated levels of PCBs, the waste cannot be disposed at the Nevada Test Site.

6.7 SCHEDULE

Based on current schedules, the subcontractor will begin treatment plant demolition in August 2003. Before any material is dispositioned, a waste profile must be developed and approved for this material. In addition, regulatory review and concurrence is required before any waste lot is dispositioned to the EMWMF disposal facility. Lastly, current schedules call for all equipment and materials to be shipped off-site for disposal by September 2003.

7. REFERENCES

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