ENERGYSOLUTIONS	WAG-504

Waste Acceptance Guidelines - Navy

Revision 1

☐ New ☐ Title Change ☒ Revision ☐ Rewrite ☐ Cancellation	Effective Date: 11/25/13

AUTHOR			
DEPARTMENT	PRINTED NAME	SIGNATURE	DATE
Technical Services	Pamela Wolfe	Signature on File	11/19/13

REVIEWERS			
DEPARTMENT	PRINTED NAME	SIGNATURE	DATE
Logistics	Fred Schulz	Signature on File	11/21/13
Radiation Safety	Duane Quayle	Signature on File	11/21/13
Safety	David Joyce	Signature on File	11/19/13
Env. Compliance	Erin Sims-Taylor	Signature on File	11/21/13
Project Management	Greg Lawson	Signature on File	11/22/13
General Manager	Troy Eshleman	Signature on File	11/22/13

AUTHORIZED USER			
DEPARTMENT	PRINTED NAME	SIGNATURE	DATE
Operations	Brian Parsons	Signature on File	11/25/13

OWNER/APPROVER			
DEPARTMENT	PRINTED NAME	SIGNATURE	DATE
Technical Services	Bruce Stephenson	Signature on File	11/25/13

[X] Non-Proprietary

[ ] Proprietary

[ ] Restricted Information

[ ] Safeguards Information

[ ] Sensitive Security Information

Table of Contents

1. RADIOACTIVE WASTE MANAGEMENT

1.1. Purpose and Scope

This document provides Waste Acceptance Guidelines (WAG) for Energy*Solutions* Services, Inc. Tennessee-based Commercial Waste Processing (CWP) facility at Bear Creek. The WAG provides minimum requirements that Navy and other government generators must meet to ship waste to the facility.

Material that does not meet the WAG may be accepted after evaluation of data **PRIOR** to shipment of waste. Material received at Energy*Solutions* that does not meet the WAG and has not been evaluated and approved by Energy*Solutions* will be subject to additional waste processing surcharges and/or returned at the generator's expense.

- Radiological acceptance criteria are provided in Table 1.
- Special waste types requiring prior Energy*Solutions* evaluation and approval before shipping are listed in Table 2.
- Specific waste packaging guidelines are defined in Attachment 1.

Energy*Solutions* conducts routine review of material that does not meet the WAG during "Out-of-WAG" meetings. If the material is approved, additional instructions for packaging, shipping, and scheduling will be provided as required.

1.2. EnergySolutions Facility Information

Bear Creek Facility	*Main Office*
Energy*Solutions* Services, Inc. Bear Creek Operations 1560 Bear Creek Road Oak Ridge, TN 37830	Phone No.: 865-481-0222 Customer Service: 865-220-1230 Customer Service Fax: 865-220-1612

2. COMMITMENTS

2.1. 40 CFR 61.150(d), Subpart M, National Emission Standards for Asbestos

2.2. 40 CFR 261, Identification and Listing of Hazardous Wastes

2.3. 40 CFR 279.11, Used Oil Specifications

2.4. 40 CFR 761, Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions

2.5. 40 CFR 761.45, Marking Formats

2.6. 40 CFR 761.79, Decontamination Standards and Procedures

2.7. 49 CFR, Subtitle B, Chapter I, The Pipeline and Hazardous Materials Safety Administration , Dept. of Transportation

2.8. Tennessee Rule, Chapter 1200-1-11, Hazardous Waste Management

2.9. Tennessee Rule, Chapter 0400-20-05, Standards For Protection Against Radiation

2.10. Tennessee Rule, Chapter 1200-1-7, Solid Waste Processing and Disposal

2.11. 40 CFR 82, Protection of Stratospheric Ozone, Subpart F, Recycling and Emissions Reduction

2.12. 40 CFR 268.7, Testing, tracking, and record keeping requirements for generators, treaters, and disposal facilities

2.13. 29 CFR 1910.1030 Blood Borne Pathogens

2.14. 10 CFR 20, Appendix G Requirements for Transfers of Low-Level Radioactive Waste Intended for Disposal at Licensed Land Disposal Facilities and Manifests

3. REFERENCES AND FORMS

3.1. References

None

3.2. Forms

3.2.1. WAG-501-F1, Shipment Summary Form

3.2.2. WAG-501-F2, Bulk Waste Assay Program Profile

4. SHIPPING, PACKAGING, AND DOCUMENTATION REQUIREMENTS

4.1. Shipments of waste to Energy*Solutions* Tennessee-based processing facilities require

- Compliance with the WAG (including all requirements in Attachment 1).
- Valid contract mechanism established with Energy*Solutions*.
- Shipment scheduling through an Account Executive or Technical Services Coordinator, regardless of carrier.

NOTE

Normal receiving hours are 8 a.m. to 3 p.m. Monday through Thursday and 8 a.m. to 2 p.m. on Fridays. No shipments will be received on:

- Nationally recognized holidays,
- Two working days prior to the full week of the July 4th holiday (including the week of July 4th), and
- Two working days prior to the full week of the Christmas holiday (including the week of Christmas holiday).

4.2. All waste is subject to special packaging and shipping requirements as described in Attachment 1.

4.3. A completed Shipment Summary Form (WAG-501-F1) shall accompany all shipments.

4.4. A completed Bulk Waste Assay Program Profile, WAG-501-F2 (Commitment 2.10). This form is needed for waste described in Section 5.15.

4.5. A valid Category 2 Tennessee Radioactive Materials License-for-Delivery is required unless Energy*Solutions* or another broker acts as a broker on behalf of the generator (Commitment 2.9).

4.6. Asbestos Waste Shipment Record Form accompanying shipment of asbestos waste.

4.7. Uniform Low-Level Radioactive Waste Manifest (540/541 forms) accompanying shipment, except UN2908.

4.8. DOE/NRC Form 741 for quantities of Special Nuclear Material (SNM) exceeding 0.49 grams per shipment or source materials exceeding 0.49 kilograms per shipment.

4.9. Type A test documentation for each Type A package. Test documentation must accompany shipment for each package.

4.10. For shipments of PCB bulk product waste, there must be a unique identification number for each item/container. The following information must be provided for each item/container: the PCB removal-from-service dates, type of PCB, and weight in kilograms. All regulated PCB shipments shall include a hazardous waste manifest (US EPA Form 8700-22). See Section 5.14.

4.11. Disposal site documentation (see Section 7).

4.12. For shipments involving multiple manifests (Broker Shipments) include a Consolidation Sheet (NRC Form 542) that summarizes each Generator's waste and provide the following for each generator: number of packages, weight, volume, total activity, total SNM and total Source material. A sample Consolidation Sheet can be provided upon request.

4.13. For shipments containing refrigeration equipment, refrigerant and oil must be removed.

4.14. For shipments containing Treated Formerly Characteristic Hazardous Waste a Land Disposal Restriction (LDR) Form or a Certification in accordance with 40 CFR 268.7 (Commitment 2.12).

4.15. RCRA hazardous waste shipments must comply with the requirements in Appendix A, Mixed Waste Acceptance Guidelines.

5. WASTE ACCEPTANCE GUIDELINES

NOTE

See Table 2 for waste that requires advance approval from Energy*Solutions* prior to shipment. Contact your Account Executive or Technical Services Coordinator regarding advance approval and receipt schedules.

5.1. Animal/Biological and Infectious Waste

5.1.1. Animal/biological waste that is not infectious, not potentially infectious, nor regulated waste as defined by commitment 2.13 is acceptable.

5.1.2. Non-hazardous rags, wipes, or absorbent materials that may contain minimal amounts of biological material that does not meet the definition of biohazardous or biological waste. The preferred method of packaging this waste shall be a sealed plastic bag inside of a fiberboard or poly container which is marked "Incineration Only". The shipment notes shall identify that the shipment includes a biological waste package, with a basic description of the biological waste packaging.

5.1.3. Infectious and potentially infectious wastes are accepted after sterilization or other treatment by the generator such as autoclaving or use of bleach to render the wastes noninfectious. Infectious and potentially infectious wastes are materials that are:

a. Generated in the diagnosis, treatment, or immunization of humans or animals, or

b. Generated through research involving such beings (including the production or testing of biologicals) that are contaminated or potentially contaminated with infectious agents known or suspected to cause human illness.

c. All discarded sharps (e.g., hypodermic needles, syringes, pasteur pipettes, broken glass, scalpel blades) used in patient care or which have come into contact with infectious agents during use in medical, research, or industrial laboratories.

5.2. **Aqueous Liquids, Sludges, and Resins**

5.2.1. Aqueous liquids are acceptable and must meet the following parameters:

pH range (incineration)	5 to 9
pH range (all liquids)	2 to 12.5
Solids contents (excludes settled sludge)	<1.0% by volume
Oil content	<1.0% by volume
Chelating agents	<1.0% by volume

5.2.2. Aqueous liquids not meeting the above solids criteria are considered sludges because of the special incineration handling requirements.

5.2.3. Aqueous liquids not meeting the above pH criteria may meet the Mixed Waste acceptance criteria set in Appendix A.

5.2.4. Additional criteria for aqueous waste processing in the liquid evaporation system:

Flash Point	>200^{O} F
Oil	<100 ppm
Gross Beta-Gamma	1.0 E-3 µCi/ml
Gross Alpha	1.0 E-6 µCi/ml
Beryllium	< 0.02mg/L

5.2.5. Packages should not arrive bulging and under pressure.

5.3. **Asbestos**

Asbestos is accepted in various forms, however asbestos for compaction must be sized by the generator to dimensions not to exceed 30″W×38″L×44″H. Asbestos shall be double-container (plastic bags, drums, etc.) and marked with the required asbestos warning labels (see Attachment 1 for additional details).

5.4. **Dewatered Liquid Cartridge Filters**

Dewatered liquid filters maybe acceptable for receipt, however require the following documentation:

a. A summary included on the Shipment Summary Form detailing the filters being shipped and how they are packaged in the inbound shipment. This includes notification of bagged or packaged filters in a sea land of Bulk DAW or packaged exclusively in a liner/box/drum, etc. for processing.

b. Total count of filters on a shipment and an isotopic on the hottest filter including weight, volume or dimensions of each different type of filter and how many of each **or** total count of filters on a shipment and an isotopic on each filter including weight, volume or dimensions of each different type of filter and how many of each.

c. Depending on final disposition, filters approaching Class A limits or higher may require a separate isotopic (Including weight, volume and dimensions) on every filter in a package.

5.5. Metals

5.5.1. *Bulk Metals*

a. Bulk metals may be processed through decontamination, volume reduction for burial, or melted for recycling. See Table 2 for size and prior approval requirements.

b. Electric Cables

(1) Metal cabling and painted cables with non-metallic coatings in the form of paint which is very thin and can be melted are acceptable for recycling.

(2) Non-painted cables with non-metallic coatings in the form of wrapping/insulation are acceptable as bulk metal for processing. The metal fittings and connectors will be separated from the cable and processed through Metal Melt recycling. The remaining cables, copper, rubber coating, and insulation adjacent to the fittings and connectors will be routed for volume reduction (compaction or incineration)

c. Hoses with metal fittings are acceptable for processing. The metal fittings will be separated from the hoses and processed through Metal Melt recycling. The remaining hoses will be routed for volume reduction (compaction or incineration).

d. Materials for mandatory recycling require special approval.

e. The following metals require out-of-WAG approval prior to shipment.

Not Candidates for Melting	Not Candidates for Volume Reduction

Non ferrous metals such as brass, bronze, aluminum, cadmium, copper, and chromium (>15 lbs per item)	Lead/lead alloys
Molybdenum	Cadmium
Uranium metals	Chromium/chromium alloys (excluding stainless steel)
Tantalum	Metals contaminated with oils or solvents
Tungsten	Titanium
Zirconium	Magnesium thorium
Oil or solvent contaminated metals	Mercury-contaminated metal
Titanium	
Metals exceeding 20 mRem/hr	
Magnesium thorium	

5.5.2. ***Lead (Pb)***

a. Lead bricks, sheets, or shapes are accepted for recycling through casting. Lead shot and wool are not accepted for recycle but may be acceptable for Mixed Waste treatment under Mixed Waste acceptance criteria set in Appendix A.

b. All lead shapes and waste forms shall be packaged separately from non-lead materials and the Pb package labeled as such.

c. Lead-encased metal shapes (LEMS) are accepted for removal of the encasing material and survey and recycling. All LEMS are considered out of WAG and require prior approval prior to shipment. Schematic diagrams shall be provided for all LEMS prior to shipping.

5.6. **Bulk Dry Active Waste (DAW)**

Waste consisting of paper, plastic, cloth, rubber, wood, and light gauge and small metal pieces are acceptable.

5.7. **Explosives**

Waste cannot be accepted that is readily or potentially capable of detonation or explosive decomposition/reaction at normal temperature and pressure; detonation or explosive reaction if subjected to a strong initiating source or heat under confinement; explosive reaction with water; or defined as an explosive by 49 CFR 173.50.

5.8. **Compressed Gases**

Containerized compressed gases and containers used to hold radioactive gases may be candidates for processing following special review and approval. Aerosol cans that are empty, punctured, and at atmospheric pressure are acceptable for processing.

5.9. **Hazardous Waste**

Hazardous waste as identified in 40 CFR 261 (Commitment 2.2) or Tennessee Rule 1200-1-11 (Commitment 2.8) may meet the Mixed Waste acceptance criteria set in Appendix A.

5.10. **Hot Particle Waste**

Hot particle waste shall be double bagged, or wrapped in plastic, and marked (see Attachment 1 for additional details). The waste generator must reduce hot particle packages to less than 30″W×38″L×44″H for waste designated for compaction.

5.11. **Lead-Acid Batteries**

Sealed batteries that are not internally contaminated are accepted for decontamination and recycling. Broken or leaking batteries may meet the Mixed Waste acceptance criteria set in Appendix A.

5.12. **Oil**

5.12.1. Oil is accepted for energy recovery via incineration provided it meets the definition of *On-Specification Used Oil* (listed below and as provided in 40 CFR 279.11, Commitment 2.3) or is non-hazardous. Oil that does not meet the criteria for on-specification may meet the Mixed Waste acceptance criteria set in Appendix A. Oils for incineration will require submission of analytical data or process knowledge for approval.

On-Specification Used Oil	
Constituent/Property	**Allowable Level**
Arsenic	5 ppm or less
Cadmium	2 ppm or less
Chromium	10 ppm or less
Lead	100 ppm or less
Flashpoint	100° F or higher
PCBs	Less than 2 ppm
Total Halogens	1,000 ppm or less

Note 1: This specification is for Total Metals (per above specifications), not TCLP.
Note 2: Only for total halogen concentrations 1,000 ppm or more for which the presumption of mixing has been successfully rebutted.
Used Oil (as defined by 40 CFR 279.1) means any oil that has been refined from crude oil, or any synthetic oil, that has been used and as a result of such use is contaminated by physical or chemical impurities.

5.12.2. Direct Processing - Oils such as diesel, #4, #6, etc. and lubricating oils meeting the above specifications for used oil or is non-hazardous are accepted for direct processing if they meet the following criteria.

Solids content	≤10% by volume
Aqueous liquid content	≤10% by volume

5.12.3. Synthetic Fluid - Most synthetic fluids, including Fyrquel electro-hydraulic control (EHC) fluid and Mobil SHC lubricating fluids are acceptable as undiluted but must be labeled SYNTHETIC FLUID. All Synthetic Fluid must meet the On-Specification Oil Criteria or be non-hazardous.

5.13. **Paint Chips**

Confirmed non-hazardous (through TCLP and PCB analysis) paint chips are accepted for processing. Hazardous paint chips may meet the Mixed Waste acceptance criteria set in Appendix A.

5.14. **Polychlorinated Biphenyls (PCBs)**

All regulated PCB shipments to Energy*Solutions* require out-of-WAG approval. Out-of-WAG approvals need to be submitted a minimum of 180 days prior to 1 year after the out-of service date. Metallic items (except lead) with PCB-containing coating(s) or defined as PCB bulk product waste per 40 CFR 761 (Commitment 2.4) are acceptable for processing. The PCBs must be part of the original product. Materials that have been decontaminated in accordance with a valid EPA PCB disposal approval, 40 CFR 761.79 (Commitment 2.6), or applicable EPA PCB spill cleanup policies are acceptable. If not previously decontaminated, PCB items meeting an applicable decontamination standard of 40 CFR 761.79(b) (Commitment 2.6) are accepted. Decontaminated items may require additional approval. All regulated PCB shipments to Energy*Solutions* shall include a hazardous waste manifest.

5.15. **Bulk Waste Assay Program**

5.15.1. All BWAP processing requires a full isotopic description, including a 10 CFR 61 profile, for all waste and a TCLP analysis for sludge, paint chips, and grit. Use the WAG-501-F2 form to communicate waste matrices to the account executive. All wastes to be processed through BWAP must have an approved Bulk Waste Assay Profile form (WAG-501-F2). This form requires approval by TDEC and Environmental Compliance.

5.15.2. Waste forms specifically excluded from BWAP processing include:

- Tires
- Liquids
- Hazardous wastes identified per 40 CFR 261 (Commitment 2.2) or Tennessee Rule 1200-1-11 (Commitment 2.8).

5.15.3. Specialty metals (e.g., brass or bronze), computer terminals (CRTs), circuit boards, and universal waste (e.g. lead-acid batteries, fluorescent tubes, mercury switches, etc.) may be accepted for recycle with prior approval, provided they are properly identified and segregated from other waste. All items for recycle must be intact.

5.16. **Pyrophorics**

Pyrophoric materials require Out-of-Wag approval for processing.

5.17. **Sealed Sources**

Sealed sources may be acceptable after evaluation and Out of WAG approval.

5.18. **Tanks and Other Closed Vessels**

Tanks and other closed vessels may be accepted for processing after evaluation and provided that they are completely empty, non-RCRA, and all PCB and asbestos components identified

5.19. **Trans-Shipments for Direct Disposal**

Waste that meets low-level radioactive waste package and waste form disposal requirements is accepted, after evaluation, for trans-shipment from Energy*Solutions*

directly to a licensed low-level radioactive disposal site. Appropriate inspection criteria will be developed based on waste-streams, profile, and disposal destination.

5.20. **Treated Formerly Characteristic Hazardous Waste and RCRA Exempt Materials**

Characteristically hazardous wastes that have been rendered non-hazardous by treatment and containers that qualify as Resource Conservation and Recovery Act (RCRA) empty are acceptable. Shipment paperwork shall include a completed Land Disposal Restriction (LDR) Form **OR** a Certification in accordance with 40 CFR 268.7 (Commitment 2.12).

5.21. **Non-RCRA-Liquid Scintillation Vials (LSV)**

LSVs are acceptable for processing provided that they are packaged in accordance with the requirements of Attachment 1. There are three LSV categories:

- Plastic vials ONLY packaged for direct incineration (most preferred/cost effective)
- Glass and Plastic vials packaged for direct incineration
- Glass or Plastic vials in metal drums for incineration

5.22. **Radioactive Material Quantities of Concern**

Shipment of radioactive material in quantities in excess of the table below must be approved in advance of shipment. In addition, the shipper of record shall contact Energy*Solutions* Emergency Duty Officer (EDO) at 865.220.1555 upon shipment's departure from facility.

RADIOACTIVE MATERIAL QUANTITIES OF CONCERN[3]

Radionuclide [1]	TBq [2]	Curies [2]
Co-60	0.3	8.1
Cs-137	1	27
Gd-153	10	270
Ir-192	0.8	22
Pu-238	0.6	16
Ra-226	0.4	11
Se-75	2	54
Sr-90 (Y-90)	10	270
Yb-169	3	81

[1] If more than one radionuclide is being shipped, the sum of fractions rule applies.
[2] The primary values used for compliance with this Order are TBq. The curie (Ci) values are rounded to two significant figures for informational purposes only.
[3] The QOC Table is abbreviated based on site possession limits.

5.23. **Engineered nanomaterials**

Engineered nanomaterials are not acceptable for inspection or processing at the Bear Creek facility. An Engineered Nanomaterial is any intentionally produced material that has a size in 1, 2, or 3 dimensions of typically between 1-100 nanometers

(example: carbon nanotubes or ultrafine particulates). Buckyballs are also included even though they have a size<1nm. Aggregates and agglomerates with size >100nm are included if breakdown may occur creating particles in the 1-100 nm range during the lifecycle. (Definition based upon the 3-13-07 proposal by the American Chemical Council).

6. RADIOLOGICAL GUIDANCE

General radiological criteria are defined in Table 1.

7. SPECIAL DISPOSAL-SITE REQUIREMENTS

7.1. Clive, Utah

For low-level radioactive waste (LLRW) and mixed waste to be disposed of at Energy*Solutions'* disposal facility in Clive, generators must ensure that all radionuclides in the LLRW shipment are within Class A limits.

Energy*Solutions* requires approval from the low-level radioactive waste compact of origin, or for states unaffiliated with a low-level radioactive waste compact, the state of origin, to the extent a state can exercise such approval. Prior to receiving an initial low-level radioactive waste shipment for disposal from a generator, Energy*Solutions* requires documentation that the waste has been approved for export.

7.2. Barnwell, South Carolina

Atlantic Compact generators with LLRW designated for disposal at the Chem-Nuclear Systems facility in Barnwell must possess a valid South Carolina Radioactive Waste Transport Permit.

7.3. Richland, Washington

For LLRW to be disposed of at the U.S. Ecology commercial disposal facility in Richland, generators must possess a valid Washington Site Use Permit and a U.S. Ecology generator number. NORM/NARM waste must have prior approval from the State of Washington. All Washington Dangerous Material must be identified and are subject to pre-approval.

7.4. Generators in the Southwest Compact, Rocky Mountain Compact, Central Interstates Compact, and Texas Compact are required to have export permits.

Table 1 – General Radiological Criteria

A. RADIATION LEVEL OF WASTE		
Waste Type	**mRem/hr @ Contact With Waste**	**Contamination, Fixed or Removable (dpm/100cm^2)**
Dry Active Waste (DAW)	≤ 200	Not Applicable
Metal	≤ 200	See Table1 B. below
Metal for Melt Only	≤ 20	≤50,000 β–γ
Bulk Waste Assay	≤ 30 microR/hr	Not Applicable
Aqueous liquids poly bottles and sludges,	≤ 20	Not Applicable
Resin	≤ 80	Not Applicable
Lead for Casting	< 5	1,000 α, for Uranium and daughters, 500 α for transuranics and Thorium, and less than 25,000 β–γ

B. REMOVABLE EXTERNAL CONTAMINATION (see Note 1)			
Radiation Type	**Package**	**Waste**	
	dpm/100 cm^2	**Average dpm/100 cm^2**	**Not to Exceed dpm/100 cm^2**
β–γ ***except*** for Sr, I, and Ra	≤ 1,000	≤ 500,000	1,000,000
β–γ for Sr-90, I-126, I-131, and I-133	≤ 100	≤ 50,000	100,000
β–γ for I-125, I-129, and Ra-228	≤ 20	≤ 5,000	10,000
α ***except*** for TRUs, Ac, Ra, and Th	≤ 100	≤ 50,000	100,000
α for TRUs, Ac-227, Ra-226, Th-228/230	≤ 20	≤ 5,000	10,000

Note 1: Generator shall provide notification when the specified contamination levels may be exceeded based on qualitative or quantitative data. Energy*Solutions* does not assume or expect that generators conduct external contamination swipes on waste.

C. RADIONUCLIDE CONCENTRATION (see Note 2)	
Radionuclide concentration per package (e.g., drum or inner-pack box) shall not exceed the following group or individual limits.	
Radionuclides	**Limiting Values**
Total, all radionuclides with >5-yr half-lives ***except*** H-3, C-14 and Tc-99	≤ 0.3 μCi/cm^3
Total, H-3 and C-14	≤ 0.03 μCi/cm3
Other mixed fission and activation products, Z <84	≤ 25 mCi/ft3
Tc-99	≤ 100 μCi/ft3
Be	Special approval required
Th-232	≤ 5 mCi/ft3 or 100 lb Th/ft3 waste
U-238 as metal or oxide	≤ 15 mCi/ft3 or 100 lb U/ft3 waste
Depleted Uranium contaminated materials	≤ 18 nCi/g
TRUs for processing	≤ 0.1 nCi/g and less than 1% of activity
TRUs for trans-shipment	≤ 10 nCi/g
Ra-226	Special approval required
Other SNM/source material (U-233, U-235, or uranium enriched in U-233/235)	Special approval required

Note 1: Sr-90 and I-129 must be < 2% of the total β–γ activity
Note 2: Disposal sites may have more restrictive concentration limits

8. WASTES REQUIRING PRIOR APPROVAL

The items listed in Table 2, on the following page, require advance approval from Energy*Solutions* prior to shipment. Additionally, these items shall be specifically identified on the Shipment Summary Form (WAG-501-F1), which is to be included with the shipment. Contact your account executive regarding advanced approval and receipt schedules. If the following material is shipped to Energy*Solutions* without prior approval, it will be subject to waste processing surcharges or returned at the generator's expense.

Table 2 – Waste Requiring Prior Approval and Possibly Special Pricing

Ref. Section	Requirement
General	Non-radiological hazards to our employees shall be identified
General	Due to the non-routine nature of the types of wastes generated during decommissioning projects, Energy*Solutions* reserves the right to review for approval radioactive wastes that originate from decommissioning projects
General	All cask/OOW shipments (minimum of 3 days prior to arrival of shipment)
General	Wooden or fiber outer containers and poly-wrapped flatbed loads
General	Shipments requiring disposal at Richland, WA, Barnwell, SC, or Andrews, TX
General	Shipments requiring specialty container or dunnage returns
All	Any waste that does not meet the Energy*Solutions* WAG or requires expedited processing
5.2	Resins greater than 80 mR.
5.5	Metal pieces larger than 16 ft × 8 ft × 8 ft per individual piece or combination of integral pieces
5.5	Metal pieces heavier than 20,000 lb per single piece
5.5	Metal melting for the following requires special evaluation:
	• Metals coated with asbestos • Alloys with melting points above 3000 degrees F • Galvanized metal with zinc weight percentage >1% of the galvanized metal weight • Aluminum • Cadmium • Copper/copper alloys (brass, bronze, monel, etc.) • Lead • Stellite • Tin • Crushed metal items that contain entrained nonmetallic materials • Bulk metals containing >2% incinerable by weight (e.g., wire insulation, paint, or other coatings)
5.5.1.e	LEMS
5.8	Compressed gases
5.9	Hazardous waste as identified in 40 CFR 261
5.11	Lead-acid batteries
5.13	Paint chips (requires TCLP and PCB analysis)
5.14	PCB-contaminated material
5.15.3	BWAP processing of specialty metals (e.g. brass or bronze), circuit boards, and lead-acid batteries
5.17	Sealed sources
5.18	Tanks and other closed vessels
5.19	Trans-shipments for direct disposal
5.22	Radioactive Material Quantities of Concern (RAM QC). Please note: manifests for RAM QC shipments must be submitted 5-days prior to the actual shipment arriving at the facility.
5.23	Engineered Nanomaterials
Table 1 – B	When contamination levels in Table 1-B, may be exceeded
Table 1 – C	TRU for processing in concentrations of > 0.1 nCi/g
Table 1 – C	TRU for trans-shipment in concentrations >10 nCi/g
Table 1 – C	Waste containing Ra-226

Table 1 – C	Waste containing Special Nuclear Material or Source Material
Appendix A	Mixed Waste

9. **ATTACHMENTS**

Attachment 1, Specific Waste Packaging and Shipping Guidelines

10. **APPENDICES**

Appendix A, Mixed Waste Acceptance Guidelines

ATTACHMENT 1, Specific Waste Packaging and Shipping Guidelines

All wastes shipped to Energy*Solutions*, shall be delivered in a manner consistent with the requirements of 49 CFR. Wood, fiberboard, or super-sack containers require special coordination for storage purposes.

Unless prior written approval is provided, all containers without lifting devices over 75 lb must be palletized, excluding standard drums (i.e. 30, 55, or 85-gal). Cu. Yd. boxes may be double stacked provided they contain legs or have 2"x4" wood spacer boards sized to fit the containers placed vertically on the floor and between the boxes in order to be removed by a Fork Lift without manual lifting. The boards will be considered sacrificial and incinerated with the boxes, unless requested to be returned with the conveyance.

Waste Types

The guidance provided in this attachment applies to packaging for the following waste types. See Energy*Solutions* Waste Acceptance Guidelines for waste form guidance and required documentation.

- DAW for Direct Compaction
- DAW in Bulk Containers for Sorting, Compaction, and Incineration
- DAW in Non-Bulk Containers for Direct Incineration
- Oil for Direct Incineration
- Aqueous Liquids for Direct Incineration
- Animal/Biological Waste for Direct Incineration
- Resins and Sludges for Drying/Incineration
- Potentially Clean Waste for BWAP
- Sealed Sources for Encapsulation
- PCB Bulk Product Metal
- Cask Shipments
- Non-RCRA Liquid Scintillation Vials Shipments
- Mixed Waste

DAW for Direct Compaction

1. Energy*Solutions* requires the customer ensure waste packaged for direct compaction has been sorted to remove non-conforming materials.

2. Package DAW for direct compaction in 55-gal, 30-gal steel drums or Energy*Solutions*-provided inner-pack (IP) boxes.

   NOTE

   Energy*Solutions* does not consider inner-pack boxes strong-tight containers. Therefore, inner-pack boxes must be shipped inside another qualified outer container.

3. Do not place large metal pieces, such as piping, rods, or steel bars, in the drum or inner-pack box vertically. Place other miscellaneous metal pieces either horizontally or diagonally in the inner-pack box or drum.

4. **Asbestos (friable and non-friable) material** received for compaction in packages other than 55-gal drums or Energy*Solutions* inner-pack boxes must be size reduced prior to receipt to less than 30″Wx38″Lx44″H. Asbestos shall be double bagged, OSHA recommends six mil poly, and marked with the required asbestos warning labels. In addition, a Waste Shipment Record per 40 CFR 61.150(d) (Commitment 2.1) must accompany the shipment.

DAW in Bulk Containers for Sorting, Compaction, and Incineration

1. Place waste to be sorted inside poly-bags and load the poly-bags into bulk containers.

   NOTE

   Bulk containers larger than 100 ft^3 containers shall be capable of being off-loaded through the end. Also note that large cargo containers of DAW accepted at Energy*Solutions* are limited to top and end-loading sealand type containers. Intermodals may be acceptable with prior approval.

2. Segregate materials with different radionuclide content or total activity from the remaining materials. Identify these materials separately on the manifest.

3. **Hot particle waste** received in packages other than 55-gal drums or Energy*Solutions* inner-pack boxes must be size reduced prior to receipt to less than 30″Wx38″Lx44″H. Hot particle waste shall be double bagged, or wrapped in plastic, and marked on the outermost container:

   CONTAINS HOT PARTICLE WASTE—DO NOT OPEN

4. **Co-mingled incinerable/compactable waste** for sorting shall be positioned in the bulk container to allow off-loading first. DAW for compaction or incineration which is packaged within the same bulk container (e.g., metal boxes, cargo containers) as wastes that require other processing methods (i.e., metals processing, BWAP) shall be clearly labeled and either segregated by use of partitions or placed in separate containers within the bulk package unless easily identified (e.g., clearly labeled). Materials needing other processing methods that are packaged within the same bulk container as wastes for sorting and incineration are also subject to the specific waste packaging guidelines for the applicable processing method.

5. **Sharp metal pieces** shall be bagged and marked SHARPS. Hypodermic needles and scalpels shall be packaged in a leak-proof and puncture resistant "sharps container."

DAW in Non-Bulk Containers for Direct Incineration

1. Energy*Solutions* requires the customer ensure waste packaged for direct incineration has been sorted to remove non-conforming materials.

2. Place waste to be incinerated in clear poly-bags and place the bags in strong tight cardboard boxes or strong tight fiberboard drums. If fiber drums are used, do not include any non-incinerable material (e.g., metal). Metal or poly outer containers are not required.

   NOTE

   The package is limited to one cubic yard with no single dimension greater than 36" and 300 lb gross weight per package. Wood cribbing and/or pallets may be required as specified by the beginning of Attachment 1 for containers over 75 lb.

Excessive package weights may incur additional charges. Use of other packaging configurations requires special approval from Energy*Solutions*.

3. Clearly mark each package with the generator's name, address, and number the package to correspond with the manifest entry. Each package shall contain only one generator's waste.

Oil for Direct Incineration

1. Synthetic fluids, including EHC fluids and SHC lubricating fluids, must be packaged in separate shipping containers from petroleum-based oils.
2. Use 55-gal non-leaking steel or polyethylene containers for oil. In addition, ensure the containers are compatible with the oil being transported.
3. Put the primary containers in steel or poly outer-packs to provide double containment in the event of leakage or spillage from the primary container.
4. Over-packed packages containing oil may be packaged within the same bulk container as wastes that require other processing methods; however, the packages need to be segregated by use of partitions. Oils should be positioned in the bulk container to allow off-loading first.
5. Drums shall not be double stacked unless palletized and secured as to prevent shifting during transport.

Aqueous Liquids for Incineration (Non-Hazardous Only)

1. Put the primary containers in over-packs to provide double containment in the event of leakage or spillage from the primary container.
2. Over-packed packages containing aqueous liquid may be packaged within the same bulk container as wastes that require other processing methods; however, the packages need to be segregated by use of partitions. Materials for sorting and incineration should be positioned in the bulk container to allow off-loading first.
3. Drums shall not be double stacked unless palletized and secured as to prevent shifting during transport.
4. Bulk quantities of aqueous liquids are acceptable in DOT-certified tankers and DOT-certified portable tanks designed with forklift pockets compatible with standard fork trucks.

Animal/Biological Waste for Direct Incineration

1. **Inner Wrapping:** Double wrap animal/biological waste that contains liquids or could decompose to produce liquids/fluids using two 4-mil clear poly-bags. Close each bag by heat sealing or taping. Put the bag into a cardboard box or fiberboard drum, with a minimum of 2 in. of incinerable absorbent in the bottom. In all instances, use boxes/drums with no metal parts.

   Wrap other animal/biological waste, including contaminated nonmetal laboratory equipment and trash, in one 4-mil clear poly-bag. Heat seal or tape the bag prior to placing it into the cardboard box or fiberboard drum. Biological wastes shall not be mixed with non-incinerables in the same container.
2. **Outer Container:** Only one generator's waste shall be placed in an individual box/drum. Use cardboard boxes or fiberboard drums with no metal parts. Securely close each box/drum

with duct tape so that all edges or flaps are not visible. The box or drum is limited to a maximum of 21″x21″x21″ and 75 lb gross weight per package.

Clearly mark each package with the generator's name, and number the package to correspond with the manifested entry. Mark the top of the container, **THIS END UP**. Mark at least two opposite sides of the container, **BIOLOGICAL WASTE — FOR INCINERATION ONLY**.

Animal carcasses/tissue shall arrive frozen at Energy*Solutions*.

3. **Bulk Container Packaging:** All packaging requirements for individual packages apply to each package in the bulk container.

   Packages containing animal/biological waste may be packaged within the same bulk container as wastes that require other processing methods; however, the packages need to be segregated by use of partitions. Wastes for sorting and incineration should be positioned in the bulk container to allow off-loading first.

Resins and Sludges for Drying/Incineration

Resins and sludges may be packaged in steel or poly liners provided the liner is overpacked in a cask and the resin/sludge can be transferred directly from the liner while in the cask. Liners placed directly on the floor of the conveyance or bulk container (e.g., Sealand) are strictly prohibited. Energy*Solutions* will accept DOT drums designed for liquids, DOT portable tanks (with fork pockets), and DOT-certified tankers. Small (<30 gallons) polyethylene containers must be overpacked.

NOTE

The preferred packaging for low-dose-rate *sludges* (<50 mRem/hr) for incineration is steel or poly drums or boxes (preferably 50 ft^3 type).

Dewatering laterals that contain multiple-cartridge filters (filter trees) make liners unusually difficult to empty and should be avoided.

Potentially Clean Waste (PCW) for BWAP

1. General PCW Packaging Guidelines
   - PCW may be packaged in 55-gal drums. Energy*Solutions* prefers that large quantities of drums be banded and placed on pallets for shipping.
   - PCW may be packaged in "super sacks," on pallets, or in B-25 or B-12 type containers. Maximum package size is 4′W× 6′L× 4′H and 9,500 lb net waste weight.
   - PCW may be packaged in sealand containers. Maximum container weight is approximately 25,000 lb gross weight.
2. **"Co-mingled" PCW and Radioactive Waste Packaging Requirements**
   - Notify an Account Executive or Technical Services Coordinator prior to a "co-mingled" shipment.
   - Do not co-mingle packages and segregate PCW from radwaste inside shipping container (i.e., use cargo nets or equivalent to segregate load).

- Clearly identify PCW by using proper markings, labels, etc.
- Load PCW into shipping container so that it can be unloaded **AFTER** the radwaste is unloaded.

3. **"Special" PCW Packaging Requirements**

3.1. ***Low-Density Trash PCW***

- Package PCW trash in transparent yellow bags (no herculite or opaque bags) with standard external tags attached, weighing less than approximately 50 lbs. each.

3.2. ***Asbestos PCW***

- The PCW asbestos must be double-contained (plastic bags, drums, etc.), with the container free of any tears or punctures on receipt. (For asbestos waste containing sharp objects that might tear a bag, Energy*Solutions* recommends that asbestos bags be packaged in super sacks.)
- Each outer container must be properly marked for asbestos.
- No other radioactive markings/labels on or in the asbestos waste, since this waste cannot be shredded after bulk assay.
- No yellow "rad" bags.
- Asbestos Waste Shipment Record must accompany shipment.

3.3. ***Sludges PCW***

- Package PCW sludges in metal drum, boxes, or equivalent.
- An internal plastic bag or liner should be placed in drum or box before filling.
- Each "batch" of sludge waste must be sampled and analyzed (by TCLP methods) for hazardous metals. This TCLP analysis must be included with each waste shipping manifest.
- No freestanding liquid.

3.4. ***Paint Chips PCW***

- Package PCW paint chips in metal drums, boxes (or equivalent).
- Each "batch" of paint chip waste must be sampled and analyzed (TCLP) for hazardous metals. This TCLP analysis and/or a Material Safety Data Sheet (MSDS) must be included with each waste shipping manifest.

3.5. ***Water-Filtration Media (i.e., resin, charcoal) PCW***

- Package PCW filtration media in metal drums, boxes, liners, or equivalent.
- No freestanding liquid.

3.6. ***High-Density (i.e., metals, soil, concrete, asphalt) PCW***

- Package high-density waste in metal drums, boxes, or super sacks or shrink-wrapped on pallets.
- Notify an Account Executive prior to any shipment of overweight containers or very large metal components (i.e., tanks, equipment).
- Maximum dimensions for large metal components are 5' x 5' x 5'.

- Maximum container weight is 43,000 lb gross weight.

Sealed Sources

Shall be characterized, packaged and shipped in accordance with DOT regulations. Sealed sources generally do not meet the definition of LSA or SCO, so bulk packaging and mixing with other DAW type materials is discouraged.

PCB Bulk Product Waste for Metals Processing

1. **Bulk Container Packaging:** Use DOT specification bulk containers for PCB-contaminated metallic items. Clearly mark the package and the PCB item with the PCB "M_L" sticker as required by 40 CFR 761.45 (Commitment 2.5) and the generator's name, address, contact name, and phone number. Number the package to correspond with the manifest entry. Each package shall contain only one generator's waste. Each PCB item must be marked with PCB out-of-service date.
2. PCB wastes shall be packaged separately and not co-mingled with non-PCB wastes.

Cask Shipments of High Radioactivity Waste

1. All cask shipments require prior approval from Energy*Solutions*.
2. Customers using an NRC-licensed or other cask not owned by Energy*Solutions* or subsidiaries shall ensure that Energy*Solutions* is a "Registered User" of the licensed cask prior to shipment to an Energy*Solutions* facility.
3. Third-party cask documents (Certificate of Compliance, SAR, and handling and maintenance procedures and drawings) shall be made available to Energy*Solutions* as the NRC Registered User of the cask prior to shipment of the cask to a Energy*Solutions* facility.
4. Individual internal packages need to be clearly marked to match the itemized manifest line items on 541. Additional description of package/loading configuration (e.g. super-sack, drum pallet, rigging) needs to be noted on Shipment Summary Form.
5. Any external smearable levels on packages inside cask exceeding 1,000 dpm/100 cm2 beta/gamma and 100 dpm/100 cm2 alpha requires prior notification.
6. All shipments shall strictly comply with the applicable Certificate of Compliance for the cask in use (i.e., lid torquing, sealing gaskets, weight restrictions, shoring requirements).

   - Liners containing "grapple bails" are to be identified on the Waste Manifest Form.

     NOTE

     Liners containing non-Energy*Solutions* grapple bails must have appropriate lifting cables attached.

   - All drums shall be palletized and pallets shall have proper lifting devices attached. Boxes shall be equipped with appropriate lifting devices or palletized.
   - Disposal container and/or pallet shall have the lifting device secured at the top of the container(s). This is to prevent the cable from becoming caught under or between the container(s) or pallet.

     NOTE

Lifting devices shall be of sufficient length to allow retrieval and crane hook-up without physically entering the cask. Ensure lifting devices are secured as to prevent them from getting trapped between packages and cask wall.

- For shipments consisting of high-integrity containers, the pallets on which the containers are placed are considered sacrificial since the pallets are used for proper placement in the concrete vaults.
- When using liners to ship high rad DAW, "wide mouth" liners must be used if the liner is to be returned to the customer. "Small mouth" liners will be cut up and processed as waste.
- When using pallets, the containers shall be positioned to remain balanced and stable on the pallet when lifted clear of the cask.
- When tall, slender containers (i.e., demineralizers) are loaded on a pallet inside a cask, the containers shall be tied or secured together at the tops to prevent containers from falling off the pallets during off-loading. This is not required for a single tier of drums that are placed on a pallet.
- Palletized drums inside a cask shall be loaded to prevent shifting of drums resulting in increased radiation levels measured outside the cask.
- Soft side packages shipped in cask shall be closed per manufacturer's specifications and shall include appropriately rated and accessible lifting devices.

Non-RCRA Liquid Scintillation Vials (LSVs) Shipments

LSVs are acceptable only if packaged in accordance with the following.

Fiberboard containers —

- Shall be double-bagged in sturdy and leak-resistant polyethylene liners. Add enough incinerable absorbent in each bag (e.g., saw dust, corn cobs) to absorb double the amount of liquid contained in the package. Non-incinerable absorbent material (e.g., kitty litter and diatomaceous earth or vermiculite) is not accepted without prior approval.
- Must not exceed 110 lb container gross weight. Wood cribbing and/or pallets may be required as specified by the beginning of Attachment 1 for containers over 75 lb.

Poly or Fiber drums —

- If packaged in open head drum, shall be double-bagged, containing enough incinerable absorbent to absorb double the amount of liquid contained in the package.
- Packages exceeding 75 lb need to be palletized or loaded with wood runners underneath the packaging.

Poly and fiber drums for direct incineration shall not have a metal closure ring.