ENERGYSOLUTIONS

WAG-501

Waste Acceptance Guidelines

Revision 9

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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 the domestic generator must meet to ship radioactive material to the Bear Creek Operations facilities.

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 – General Radiological Criteria
- Special waste types requiring prior Energy*Solutions* evaluation and approval before shipping are listed in Table 2 – Waste Requiring Prior Approval and Possibly Special Pricing
- Specific waste packaging guidelines are defined in Attachment 1- Specific Waste Packaging and Shipping Guidelines

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. OOWAG Expiration

OOWAG approvals generally expire one year after approval and will need to be re-evaluated by both the customer and OOWAG Committee after one year.

1.3. 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
Gallaher Road Facility EnergySolutions Services, Inc. 628 Gallaher Road Kingston, TN 37763	Bulk Waste Assay Program (BWAP) processing	Phone No.: 865-481-0222 Customer Service: 865-220-1230 Customer Service Fax: 865-220-1612

2. REFERENCES AND FORMS

2.1. References

2.1.1. 40 CFR 261, Identification and Listing of Hazardous Wastes

2.1.2. 40 CFR 761, Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions

2.1.3. 40 CFR 268.7, Testing, Tracking, and Record Keeping Requirements for Generators, Treaters, and Disposal Facilities

2.1.4. 10 CFR 20, Appendix G Requirements for Transfers of Low-Level Radioactive Waste Intended for Disposal at Licensed Land Disposal Facilities and Manifests

2.1.5. Tennessee Rule, Chapter 0400-10-.32, Licensing of Shippers of Radioactive Material Into or Within Tennessee

2.1.6. 10 CFR 37 Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material

2.1.7. 40 CFR 279.11, Used Oil Specifications

2.2. **Forms**

2.2.1. WAG-501-F1, Shipment Summary Form

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

3. SHIPPING, PACKAGING, AND DOCUMENTATION REQUIREMENTS

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

- Compliance with the WAG (including requirements in Attachment 1 Specific Waste Packaging and Shipping Guidelines.).
- Valid contract mechanism established with Energy*Solutions*.
- Shipment scheduling through the designated Account Executive, regardless of carrier.

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

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

3.4. A completed Bulk Waste Assay Program Profile, WAG-501-F2. This form is needed for waste described in Section 4.16.

3.5. 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 (Reference 2.1.5).

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

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

3.8. 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.

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

3.10. 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 PCB shipments shall include a hazardous waste manifest (US EPA Form 8700-22). See Section 4.15.

3.11. Disposal site documentation (see Section 6).

3.12. 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.

3.13. For shipments containing refrigeration equipment, refrigerant and oil must be verified as drained.

3.14. For shipments containing Formerly Characteristic Hazardous Waste a Land Disposal Restriction (LDR) Form or a Certification in accordance with 40 CFR 268.7 (Reference 2.1.3).

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

4. WASTE ACCEPTANCE GUIDELINES

NOTE

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

4.1. Non-Infectious Biological Waste

4.1.1. Non-infectious animal/biological waste is acceptable. These wastes are NOT capable of causing infection/illness via viruses, bacteria and other infectious agents to humans). These wastes are not regulated as medical waste and do not contain blood borne pathogens.

4.1.2 Non-hazardous rags, wipes, or absorbent materials that may contain minimal amounts of biological material that does not meet the definition of bio hazardous or biological waste. The shipment notes shall identify that the shipment includes a biological waste package, with a basic description of the biological waste packaging.

4.2. Infectious/Medical Waste

4.2.1. 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. Sharps as defined by 49 CFR 173.134 means any object contaminated with a pathogen or that may become contaminated with a pathogen through handling or during transportation and also capable of cutting or penetrating skin or a packaging material. Sharps includes needles, syringes, scalpels, broken glass, culture slides, culture dishes, broken capillary tubes, broken rigid plastic, and exposed ends of dental wires. Sharps will require out of WAG approval prior to shipment.

4.3. Aqueous Liquids, Sludges, and Resins

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

See Note 1	Incineration	Liquid Evap System	Drum Oven
pH	5 to 9	>2 and <12.5	>2 and <12.5
Solids Content by Volume excluding settled sludge	<1.0%	<1.0%	<1.0%
Oil Content by Volume	<1.0%	<1.0%	<1.0%
Chelating Agent by Volume	<1.0%	<1.0%	<1.0%
Flash Point ^{0}F	>140	>200 (Note 2)	>200 (Note 2)
Oil (mg/L)	N/A	<100	N/A
Gross Beta-Gamma (µCi/ml)	N/A	<1.0E-3	N/A
Gross Alpha (µCi/ml)	N/A	<1.0E-6	N/A
Beryllium (mg/L)	N/A	<0.02	N/A
Note 1: Chemical agents present in the waste stream shall be identified.			
Note 2: Actual Flash Point result needed to determine proper processing plan.			

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

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

4.3.4. Packages shall not arrive bulging and under pressure. If any package arrives bulging or under pressure, additional pricing to handle the container may be required.

4.3.5. Resins with container contact dose rates in excess of 80 mR/hr require prior approval.

4.4. 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 wetted, double-bagged, and marked with the required asbestos warning labels (see Attachment 1 for additional details).

4.5. 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 for each filter. Data for each filter should also include weight, dose rate, and volume or dimensions.

4.6. Metals

4.6.1. *Bulk Metals*

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

b. Materials for mandatory recycling require special approval.

c. 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, Inconel, monel, nickel, and chromium (>15 lbs. per item). **Note that the weight limit is specific to the non-ferrous components rather than the weight of the item that contains the non-ferrous item.**	Lead/lead alloys
Molybdenum	Cadmium
Uranium metals	Chromium/chromium alloys (excluding stainless steel)
Tantalum	Metals that have residues of oils and solvents that can potentially combust during melting process
Zirconium	Titanium
Metals that have residues of oils and solvents that can potentially combust during melting process	Magnesium thorium
Titanium	Mercury-contaminated metal
Magnesium thorium	
Metals exceeding 20 mR/hr contact	
Metals coated with asbestos	
Lead	
Galvanized metal	
Stellite	
Tin	
Crushed metal items that contain nonmetallic materials	
Bulk metals containing >2% incinerable by weight (e.g. wire insulation, paint, other coatings)	
Metal items containing/coated with 50 ppm or greater levels of PCBs must have coating removed	

4.6.2. ***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 shall be packaged separately from non-lead materials and labeled as containing lead.

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 approval prior to shipment. Schematic diagrams shall be provided for all LEMS prior to shipping.

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

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

4.8. **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.

4.9. **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.

4.10. **Hazardous Waste**

Hazardous waste as identified in 40 CFR 261 (Reference 2.1.1) is acceptable if it meets criteria in Appendix A, Mixed Waste Acceptance Guidelines.

4.11. **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.

4.12. **Lead-Acid Batteries**

Sealed batteries that are not internally contaminated are accepted for decontamination and recycling. See Attachment 1 for packaging details.

Broken and/or leaking batteries are not eligible for recycle. However they may be eligible for mixed waste treatment under the criteria outlined in Appendix A, Mixed Waste Acceptance Guidelines.

4.13. **Oil**

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, (Reference 2.1.7) or is non-hazardous. Oil that does not meet the criteria for on-specification may meet the Mixed Waste criteria in Appendix A, Mixed Waste Acceptance Guidelines.

4.13.1. Oils for incineration will require submission of analytical data or process knowledge for approval.

4.13.2. On-Specification Used Oil Table

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

* This specification is for Total Metals (per above specifications), not TCLP.
**Total halogen concentrations 1,000 ppm but less than 5,000 ppm may be acceptable provided 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.
***Flashpoint ≥100 ° F and < 140 ° F require prior approval due to increased storage requirements.

4.13.3. 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

4.13.4. 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.

4.14. Paint Chips

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

4.15. Polychlorinated Biphenyls (PCBs)

All 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 (Reference 2.1.2) 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 (Reference 2.1.2), 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) (Reference 2.1.2) are accepted. Decontaminated items may require additional approval. All PCB shipments to Energy*Solutions* shall include a hazardous waste manifest.

4.16. **Bulk Waste Assay Program**

4.16.1. All BWAP processing requires a full isotopic distribution, including a 10 CFR 61 profile, for all waste and a TCLP analysis for each campaign of sludge, paint chips, and grit. Use the WAG-501-F2 form (Bulk Waste Assay Program Profile) 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 BCO Environmental Compliance.

4.16.2. Waste forms specifically excluded from BWAP processing include:

- Tires
- PCBs equal to or greater than 50 ppm Hazardous wastes identified per 40 CFR 261 (Reference 2.1.1) or Tennessee Rule 0400-10-.32 (Reference 2.1.75.

4.16.3. Liquids are accepted if shipped in bulk volumes of 5,000 gallons or greater. There is no minimum volume for absorbed liquids.

4.16.4. 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.

4.17. **Pyrophorics**

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

4.18. **Sealed Sources**

Sealed sources may be acceptable after evaluation and Out of WAG approval. The following information is required prior to processing approval:

- Isotopic information and corrected activity
- Physical description, e.g. plastic disc, metal cylinder, etc.
- Size and dimensions

4.19. **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/coatings identified

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

4.21. **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 for hazardous wastes that have been rendered non-hazardous by treatment shall include a completed Land Disposal Restriction (LDR) Form **OR** a Certification in accordance with 40 CFR 268.7 (Reference 2.1.3).

4.22. **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

NOTE: Glass is not acceptable for incineration except for glass liquid scintillation vials. Any glass thicker than a liquid scintillation vial is unacceptable for incineration without prior approval.

4.23. **Category 1 and 2 Quantity of Materials**

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 prior to shipment's departure to coordinate expected arrival time of the shipment in accordance with Reference 2.1.8.

Category 1 and 2 Quantity of Materials[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 Table is abbreviated based on site possession limits.

4.24. **Non-Conforming Material**

4.24.1. If Energy*Solutions* identifies any non-conforming material, the customer will be contacted for proper disposition. The waste will be put in dispute. Additional charges may apply based on the dispute resolution path.

5. RADIOLOGICAL GUIDANCE

General radiological criteria are defined in Table 1.

6. SPECIAL DISPOSAL-SITE REQUIREMENTS

6.1. 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.

6.2. 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.

6.3. 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.

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

6.5. Andrews, Texas

If the generator chooses not to utilize BCO's import agreement with Texas and contract with WCS, the generator must possess a generator certification issued by WCS, an import agreement with Texas if not already located in either Texas or Vermont, and a valid contract set up with WCS.

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	≤ 50 microR/hr	Not Applicable
Aqueous liquids, sludges, and resins	≤ 20	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	≤ 10 nCi/g
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

7. 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 Special Pricing Consideration

Ref. Section	Requirement
General	Non-radiological hazards 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
General	Waste material generated in the Northwest Compact
All	Waste that does not meet the Energy*Solutions* WAG or requires expedited processing
4.2.1	Sharps as defined in 49 CFR 173.134
4.3.6	Resins greater than 80 mR/hr
4.6	Metal pieces larger than 16 ft. × 8 ft. × 8 ft. per individual piece or combination of integral pieces
4.6	Metal pieces heavier than 20,000 lbs. per single piece
4.6.1	The following metals for recycling require special evaluation
	• Non-ferrous metals such as brass, bronze, aluminum, cadmium, copper, Inconel, monel, nickel, and chromium (>15 lbs. per item) • Molybdenum; uranium metals, tantalum, zirconium • Metals that have residues of oils and solvents that can combust during melting process • Titanium, metals coated with asbestos, lead, galvanized, • Metal items containing >2% incinerable by weight (e.g. wire insulation, paint, other coatings) • Magnesium thorium • Metals exceeding 20 mR/hr contact • 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) • Mercury-contaminated metal
4.6.1.c	LEMS
4.9	Compressed gases
4.10	Hazardous waste as identified in 40 CFR 261
4.11	Hot particle waste
4.12	Lead-acid batteries
4.13.2	Used Oil Flashpoint $\geq 100^0$F and $< 140^0$ F
4.14	Paint chips (requires TCLP and PCB analysis)
4.15	PCB and PCB-contaminated material
4.16.3	BWAP processing of specialty metals (e.g. brass or bronze), circuit boards, and batteries for recycle
4.18	Sealed sources
4.19	Tanks and other closed vessels
4.20	Trans-shipments for direct disposal
4.22	Glass for incineration that is thicker than liquid scintillation vials.
4.23	Category 1 and 2 Quantities of Material. Please note: manifests for exceeding these quantities must be submitted 5-days prior to the actual shipment arriving at the facility. arriving at the facility.

Ref. Section	Requirement
Table 1	When contamination levels in Table 1 are exceeded
Appendix A	Mixed Waste

8. **ATTACHMENTS**

Attachment 1, Specific Waste Packaging and Shipping Guidelines

9. **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 using six mil polybags, and marked with the required asbestos warning labels. In addition, a Waste Shipment Record per 40 CFR 61.150(d) 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. **High Dose Rate Waste >200 mRem/hr** received in packages such as bags, boxes or other discrete items shall be clearly marked and visible upon opening and unloading of bulk waste containers. The use of colored tape, paint or other clearly marked identifier may be used.
5. **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 either segregated by use of partitions or placed in separate containers within the bulk package and must be 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.

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.
4. Glass is not acceptable for incineration except for glass liquid scintillation vials. Any glass thicker than a liquid scintillation vial is unacceptable for incineration without prior approval.

Oil for Direct Incineration

1. Synthetic fluids, including electrohydraulic (EHC) fluids and synthetic hydrocarbon (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 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.

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**. Note: DO NOT mark containers as BIOHAZARDOUS. Biohazardous means the same as infectious at BCO.

   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 or intermodals. Maximum container weight is approximately 43,000 lb gross weight.

2. **"Co-mingled" PCW and Radioactive Waste Packaging Requirements**

- Notify an Account Executive 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 clear plastic bags (no radiation markings and/or labeling) weighing less than approx. 50 lbs. each.

3.2. ***Asbestos PCW***

- Asbestos shall be double bagged using six mil polybags, and marked with the required asbestos warning labels. In addition, a Waste Shipment Record per 40 CFR 61.150(d) must accompany the shipment. (For asbestos waste containing sharp objects that might tear a bag, Energy*Solutions* recommends that asbestos bags be packaged in super sacks.)
- Each bag 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 Safety Data Sheet (SDS) 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, or equivalent.
- No freestanding liquid.

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

- Package high-density waste in metal drums, boxes, super sacks, sealands, intermodals, or equivalent.
- 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 lbs. gross weight.

3.7 Lead-Acid Batteries

Sealed batteries that are not internally contaminated are accepted for decontamination and recycling.

Batteries containing electrolyte acid or alkaline corrosive battery fluid (wet batteries) must be packaged to prevent a dangerous evolution of heat and short circuiting. Each battery shall be fully enclosed in inner packaging made of non- conductive materials and separated in a manner to prevent contact with other batteries, devices or conductive materials in the packaging. Exposed terminals shall be protected with non-conductive caps, non -conductive tape or by other appropriate means. Batteries shall also be packaged to prevent shifting which could loosen the terminal caps.

Broken and/or leaking batteries are not eligible for recycle. However they may be eligible for mixed waste treatment under the criteria outlined in Appendix A, Mixed Waste Acceptance Guidelines.

Sealed Sources

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-bulk product waste (contaminated metallic items with PCB levels 50 ppm of greater). Clearly mark the package and the PCB item with the PCB "M_L" sticker as required by 40 CFR 761.45 (Reference 2.1.2) 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 an 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, and shoring requirements).

- Liners containing "grapple bails" are to be identified on the Waste Manifest Form. If the liners have non-Energy*Solutions* supplied bails, the customer must provide the proper grapple lifting device and instructions or procedure for its use. These are to be provided prior to or at the time the liner is offered for shipment. The customer-provided grapple lifting device may need to be made available at later times to move the liner within the facility.

  NOTE

  Liners containing non-Energy*Solutions* grapple bails must have appropriate lifting cables attached if the above criteria cannot be met.

  CAUTION

  Customer-provide grapple lifting devices may have to be shipped separate from the liner if liner requires overweight permit.

- 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.