


International Radioactive Metals Acceptance Guidelines

Revision 10

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1. RADIOACTIVE METALS MANAGEMENT

1.1. Purpose and Scope

This document provides Radioactive Metals Acceptance Guidelines (RMAG) for EnergySolutions, Services, Inc. (ES) Tennessee-based Commercial Waste Processing (CWP) facility at Bear Creek. The RMAG provides minimum requirements that international customers must meet to ship metal for recycle to this facility. Any metal to be shipped for purposes other than recycle shall follow the guidelines found in WAG-502, *International Radioactive Material Acceptance Guidelines*.

The minimum requirements are as follows:

- Radiological acceptance criteria as provided in Table 1.
- Metal for recycle requiring prior ES evaluation and approval before shipping as listed in Table 2 – Metal for Recycle Requiring Prior Approval and Possibly Special Pricing.
- Components and Materials with Special Restrictions per 10 CFR 110.8, Attachment 7.2, Table 3.
- Specific packaging guidelines defined in Attachment 7.1.
- Examples of metals for recycle can be found in Attachment 7.3, Table 4.

Radioactive metal that does not meet the RMAG may be accepted after evaluation of data **PRIOR** to the shipment of metal to the ES facilities. Any radioactive metal received at ES that does not meet the RMAG and has not been evaluated and approved by ES may be subject to additional processing surcharges and/or returned at the generator's expense.

All metal must be shipped in accordance with TS-R-1, International Atomic Energy Agency (IAEA): Regulations for the Safe Transport of Radioactive Material.

Each generator who ships radioactive metal to ES for processing must have a valid contract mechanism in place that includes a Return of Material clause as prescribed by ES' Tennessee Radioactive Materials licenses. Each generator must have authorization from their regulator to accept returned radioactive material, processed or unprocessed, prior to shipping to the ES facilities.

1.2. Approval for Metal receipt

ES evaluates the customer's description of the metal inventory following a formal procedure through its Out of Waste Acceptance Guidelines Committee (OOWAG). ES advises the customer promptly of OOWAG's evaluation and, where appropriate, confirms in writing that the inventory is acceptable for recycling. **This approval for recycling expires after one year and if the metal has not been shipped by then**

OOWAG will need to review inventory details as re-evaluated by the customer to consider a new approval.

Following Approval from OOWAG, the Customer is able to agree shipment arrangements with ES in the usual consignor/consignee manner in accordance with the appropriate contract mechanism in place.

1.3. ES Facility Information

<i>ES Facilities</i>	<i>Main Office</i>
EnergySolutions Services, Inc. Bear Creek Operations (BCO) 1560 Bear Creek Road Oak Ridge, TN 37830	Phone Number: +1 865-481-0222 Customer Service: +1 865-220-1230 Customer Service Fax: +1 865-220-1612
EnergySolutions Services, Inc. Gallaher Road Facility (GRF) 628 Gallaher Road Kingston, TN 37763	Phone Number: +1 865-481-0222 Customer Service: +1 865-220-1230 Customer Service Fax: +1 865-220-1612

2. REFERENCES AND FORMS

2.1. References

None

2.2. Forms (can be found at EnergySolutions.com Customer Portal)

2.2.1. WAG-502-F1, Shipment Summary Form-International

2.2.2. WAG-502-F3, Nonstandard Material Approval - International

3. SHIPPING, PACKAGING, AND DOCUMENTATION REQUIREMENTS

3.1. A completed Shipment Summary Form (WAG-502-F1) shall accompany all shipments unless ES acts as a broker on behalf of the generator.

3.2. A valid Category 2 Tennessee Radioactive Materials License-for-Delivery unless ES acts as a broker on behalf of the generator.

- 3.3. Special Nuclear Material (SNM) ≥ 0.5 grams and Source Material (SM) ≥ 0.5 kilograms, along with Safeguards and Foreign Obligation materials, must be documented and reported per IAEA guidelines. This documentation must be provided to EnergySolutions prior to shipment departure. Upon receipt of these materials, EnergySolutions will document and report transactions to NMMSS on DOE/NRC Form 741.
- 3.4. Test documentation and/or certification for any package requiring such paperwork as set forth in either IAEA (International Standards) or 49 CFR (American Standards) must accompany shipment including such packages (e.g., Type A Package).

4. RADIOACTIVE METALS ACCEPTANCE GUIDELINES

NOTE

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

4.1. Metal accepted for recycling.

4.1.1. Bulk Metals Recycling

- a. Bulk metals (pipe, pumps, valves, tools, file cabinets, etc.) may be melted for recycling. Carbon steel and stainless steel are the preferred alloys for recycling.
- b. Metal pieces larger than 4.88 meters x 2.44 meters x 2.44 meters (16 ft x 8 ft x 8 ft) require approval prior to shipping.
- c. Metal piece in excess of 9,080 kilograms (20,000 pounds) per single piece require approval prior to shipping.
- d. The following metals are specifically excluded from recycling by melt: (incidental quantities of the metals listed below may be accepted on a case-by-case basis and **MUST** be approved prior to shipment)

Not Candidates for Melting unless specifically approved by OOW committee
Non-ferrous metals such as brass, bronze, aluminum, cadmium, copper, Inconel, monel, nickel, and chromium
Molybdenum
Uranium metals
Tantalum
Zirconium
Titanium
Magnesium Thorium
Metals contaminated with asbestos
Metals contaminated with mercury
Lead
Galvanized metal with zinc weight percentage >1% of the galvanized metal weight
Stellite
Tin
Oil or solvent contaminated metals
Crushed metal items that contain nonmetallic materials
Alloys with melting points above 1649 degrees C
Bulk metals containing >2% incinerable by weight (e.g. wire insulation, paint, other coatings)
Metal items PCB concentrations 50 ppm or above in applied coatings
Components/materials that are not recyclable that are mixed with or associated with metal for recycle, to the extent that the mix is RCRA hazardous, i.e., leaded glass in a metal glove box.

4.1.2. Lead (Pb)

- a. Lead received at Bear Creek must be recyclable and have a determined product path designated for the lead. If there is no product demand or path to legitimately recycle, lead will not be accepted.
- b. Lead bricks, sheets, and shapes that have not been deformed, melted, or significantly gouged are accepted for recycling and beneficial reuse. All other lead shapes or items will be evaluated on a case-by-case basis. Lead shot, wool and blankets are not accepted for recycle.
- c. Lead shall be packaged separately from non-lead materials. The lead package must be labeled as Lead.

- d. Lead-encased metal shapes (LEMS) are accepted for removal of the encasing material and survey and recycling. All LEMS require approval prior to shipment.
- e. Where possible schematic diagrams should be provided for all LEMS prior to shipping. Each LEM shall be marked so it can be linked to the provided diagram(s).

4.1.3. Large Components for Recycling

ES will evaluate all large components >18,100 kgs (> 39,900 pounds) or which will not fit into a standard ISO freight container for receipt on a case-by-case basis for surface preparation and recycling. Specific examples of large components include heat exchangers, steam generators, low pressure turbines, tanks, closed vessels, and reactor pressure vessels.

4.2. **Stored or Residual Energy**

All potentially hazardous stored or residual energy present in any metal for processing, and especially equipment that has not been disassembled, must be identified. Systems, components, or equipment, including batteries which have residual energy must be relieved, drained, disconnected, restrained, and otherwise rendered deactivated and stable. Hazardous energy items shall be marked as “deactivated” or be marked “Danger - hazardous energy” if hazardous energy has not been addressed.

Potential stored energy would include electrical, mechanical, pneumatic (air), hydraulic, steam, gravity, etc. Examples include springs, static eliminators, capacitors, batteries, elevated movable machine parts, hydraulic systems, pressurized liquid/gas systems, cylinders, etc.

Information such as technical manuals, drawings, or manufacturer information related to equipment with stored or residual energy must be provided to ES OOW for evaluation prior to the shipment of metal or equipment with stored or potential energy. Any removal, disabling, or by-passing of a barrier or safety device intended to protect individuals from stored or residual energy shall be identified.

Any item where the potential or residual energy cannot be released by the customer is considered to be outside routine pricing arrangements and ES shall require the customer to accept a Special Quote with respect to this item before ES can agree to accept it.

4.3. Metals Expressly Prohibited from Import

Metals contaminated with mercury, or PCBs (i.e. oils, grease) and metals with Polychlorinated Biphenyls (PCB) coatings with concentrations 50 ppm or above in applied coatings are expressly prohibited from import.

4.4. Beryllium Contaminated Metal

4.4.1. Beryllium *contaminated metal may refer to:*

- Isotopic beryllium
- Elemental beryllium
- Beryllium compounds (beryllium oxide, beryllium fluoride, etc.)

4.4.2. Radioactive waste for processing will be considered as beryllium contaminated if either of the following criteria are excepted.

Descriptor	Criteria
Loose contamination	0.2 µg/100cm ² elemental, or 30,000 dpm/100cm ² radiological
Percent Contamination	0.1% by weight

4.4.3. Any shipment, package, or container that arrives with beryllium placarding, labelling, markings, etc., without prior approval will be placed on hold and investigated prior to processing.

5. RADIOLOGICAL GUIDANCE

Radiological acceptance criteria are defined in Table 1, Radiological Acceptance Criteria – SI Units. Levels of radiation and radionuclide concentrations exceeding those detailed in Table 1 may be accepted on a case-by-case basis, but **MUST** be approved prior to shipment.

Table 1. Radiological Acceptance Criteria – SI Units

A. RADIATION AND CONTAMINATION LEVEL OF METAL FOR RECYCLE		
Metal Type	Contact Dose Rate with Metal	Removable Contamination (Bq/cm²)¹
Metal for Recycling through Melting	≤ 200 μSv/hr	≤8 β-γ ≤1 α
Lead for Casting	≤ 50 μSv/hr	0.1 α for Uranium and daughters, 0.08 α for transuranics and Thorium, and less than 4 β-γ

¹Customer may apply a fixative such as a PCB-free paint where removable contamination exceeds these levels. Customer should limit the amount of fixative applied as much as practicable.

B. RADIONUCLIDE CONCENTRATION	
Radionuclide concentration per package shall not exceed the following limits without prior evaluation and approval.	
Metals for Recycle	Limiting Values
All Nuclides	≤ 5000 Bq/gm
Co-60	≤ 40 Bq/gm
Cs-137	≤ 5000 Bq/gm
Ni-63	≤ 5000 Bq/gm
C-14	≤ 1000 Bq/gm
H-3	≤ 1000 Bq/gm
Sr-90	≤ 35 Bq/gm
Pu-241	≤ 800 Bq/gm
Total Transuranics (sum of Am-241, Pu-238, Pu-239, Cm-243, Cm-244)	≤ 20 Bq/gm
Special Nuclear Material	≤ 0.49 grams
Source Material	≤ 0.49 kgs

6. METALS REQUIRING PRIOR APPROVAL

The items listed in Table 2 require advance approval from ES prior to shipment. Additionally, these items shall be specifically identified on the Shipment Summary Form (WAG-502-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 ES without prior approval, it will be subject to waste processing surcharges or returned at the generator’s expense.

Table 2 – Metal for Recycle Requiring Prior Approval and Possibly Special Pricing Consideration

Ref.	Requirement
General	Non-radiological hazards shall be identified
General	Due to the non-routine nature of the types of wastes generated during decommissioning projects, ES reserves the right to review for approval radioactive metals for recycle that originate from decommissioning projects
General	All cask shipments (minimum of 3 days prior to release of shipment)
General	Wooden or fiber outer containers and poly-wrapped flatbed loads
General	Shipments requiring specialty container or dunnage returns
All	Metal that does not meet the ES WAG or requires expedited processing
4.1.1.b	Metal pieces larger than 16 ft. □ 8 ft. □ 8 ft.(4.88 meters x 2.44 meters x 2.44 meters) per individual piece or combination of integral pieces
4.1.1.c	Metal pieces heavier than 20,000 lbs. (9,080 kilograms) per single piece
4.1.1.d	Bulk Metals that require special evaluation
4.1.2	Lead, LEMS
4.1.3	Large Components
4.2	Stored of Residual Energy
4.4	Beryllium Contaminated Metal
Table 1	When levels in Table 1 are exceeded

7. ATTACHMENTS

- 7.1. **Attachment 7.1 Specific Metal Packaging and Shipping Guidelines**
- 7.2. **Table 3 — Components and Materials with Special Restrictions per 10 CFR 110.8,**
- 7.3. **Table 4 — Examples of Metal Melt Material**

7.1. Attachment 7.1, Specific Metal Packaging and Shipping Guidelines

All metals shipped to ES shall be delivered in qualified containers per IAEA standards and 49 CFR standards. As a minimum, containers shall meet IP-1 standards. Deviations shall require prior written approval from ES.

Any equipment not shipped in its original or intended configuration should be noted on manifest additional notes page or form WAG-502-F3, Nonstandard Material Approval - International. An example would be a compactor or baler that was normally operated in a vertical configuration and now being shipped in a horizontal configuration possibly creating additional pressure applied to certain components.

When metals are imported for recycling, specific care must be taken to minimize non-recyclable material used for shoring or contamination control.

**7.2. Attachment 7.2, Table 3. Components and Materials with Special
Restrictions per 10 CFR 110.8, List of Nuclear Facilities and Equipment
under NRC Export Licensing Authority**

App.	Description
A	Nuclear Reactor Equipment
B	Gas Centrifuge Enrichment Plant Components
C	Gaseous Diffusion Enrichment Plant Assemblies and Components
D	Aerodynamic Enrichment Plant Equipment and Components
E	Chemical Exchange or Ion Exchange Enrichment Plant Equipment and Components
F	Laser-Based Enrichment Plant Equipment and Components
G	Plasma Separation Enrichment Plant Equipment and Components
H	Electromagnetic Enrichment Plant Equipment and Components
I	Reprocessing Plant Components
J	Uranium Conversion Plant Equipment and Plutonium Conversion Plant Equipment
K	Equipment and Components for the Production of Heavy Water, deuterium, and Deuterium Compounds
M	Categorization of Nuclear Material
N	Lithium Isotope Separation Facilities, Plants, and Equipment
O	Fuel Element Fabrication Plant Equipment and Components

NOTE: See 10 CFR 110 for details

7.3. Attachment 7.3, Table 4. Examples of Metals for Recycle

Tanks and Components
Piping
Valves
Empty Waste Drums
Light gauge Metals
Welding rods
Metal cans
Metal mop buckets
Heavy Gauge Tools
Tools

NOTE: Call your ES Technical Representative for questions regarding metals not listed on this table