

December 5, 2007

Mr. Stephen Dembek
Office of International Programs
U.S. Nuclear Regulatory Commission
Mail Stop O4E21
11555 Rockville Pike
Rockville, MD 20852

Subject: Response to NRC request for additional information dated November 29, 2007

Dear Mr. Dembek:

In a letter dated November 29, 2007, the U.S. Nuclear Regulatory Commission (NRC) requested additional information regarding EnergySolutions' import/export license application dated September 14, 2007. The following letter provides the information requested.

NRC Question 1

Although the application for the import license indicates that "No hazardous wastes (as defined by USEPA in 40 CFR 261.3) or mixed wastes (hazardous and radioactive) are included in the request," it also indicates that generators could include "facilities equivalent to US Superfund sites." Please identify which of the sites listed are "equivalent to US Superfund sites" and how you will ensure that no hazardous or mixed wastes will be included.

EnergySolutions Response

The following sites may be comparable to Superfund sites:

- Saluggia fuel research facility
- Casaccia research facility
- Trisaia pilot fuel reprocessing facility

Before any of the material leaves the host country EnergySolutions would ensure that all of the imported waste will meet the processing and disposition requirements of its licensed facilities in Tennessee and Utah by subjecting the material to extensive waste characterization at the generator site. Our waste acceptance guidance documents have been provided to the customer to clearly communicate acceptable waste forms and activity levels. We have reviewed the extensive characterization data available and have taken the additional step to have sample analyses performed at a U.S. laboratory. EnergySolutions will have qualified personnel on-site working with the customer on characterization, packaging, and inspection at the generator site to ensure that all wastes

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imported to the United States meet the requirements of the import license and our licenses for the Bear Creek and Clive facilities. In addition, all material will be packaged and shipped in accordance with the IAEA and U.S. DOT shipping requirements and the NUREG/BR-0204 manifesting guidance.

NRC Question 2

The import application also states "Radioactive material content of each shipment will be subject to review and approval prior to shipment to our Tennessee facilities to ensure possession limits are not exceeded." According to the export application "To minimize the potential for return shipments, waste descriptions and data for all candidate wastes will be carefully reviewed by a multi-disciplinary team to ensure compliance with the applicable acceptance criteria of our Tennessee and Utah facilities. Each shipment will be subject to individual review and approval prior to EnergySolutions authorizing import to our facilities."

Will EnergySolutions employees from Tennessee be part of the multi-disciplinary team that will review and approve the radioactive material content of each shipment? What methods will be employed to review, approve and document the contents of each prospective shipment from Italy to the U.S.? The applicant should describe in detail the process by which the determinations required in 10 CFR 110.32 (c) (5) and (6) will be made prior to radioactive waste leaving Italy in order to ensure a very high probability that the waste can ultimately be disposed of in the U.S. Particular attention should be paid to the waste classification requirements in 10 CFR 61.55 because of uncertainties related to future disposal of Class B and C waste.

EnergySolutions Response

Yes, EnergySolutions employees from Tennessee and Utah will participate in characterizing the material in Italy and will ensure that all of the imported material will meet the license requirements at Bear Creek and Clive. Therefore, none of the imported material will have to be returned to Italy. Attachment 1 provides the procedures that will be followed during these activities.

NRC Question 3

Will most or all material from Italy be shipped directly to one of the Tennessee facilities for inspection, etc? Will any be shipped directly to the Utah facility, and if so, how much (volume and physical/chemical form and waste class)?

EnergySolutions Response

All material will be inspected in Italy before importation into the United States and will be transported to the Bear Creek facility in Tennessee. None of the material will be transported directly to the Clive, Utah facility nor will any of the material be dispositioned at the Barnwell facility.

NRC Question 4

“Wastes approved by EnergySolutions for processing will meet Class A requirements following completion of processing. In the unlikely event final waste forms exceed Class A limits and cannot be disposed domestically, they will be returned to the generator under the associated export license.” This statement seems to imply that EnergySolutions has the capacity to process most waste from reactor operations which often are classified as Class B and C waste to Class A. If this is the intent, please describe the processes and impacts on waste volume that will be employed for the operational waste (e.g. resins and filter cartridges) with a high probability of originally being classified as higher than Class A.

Although the export license application was filed for contingency purposes, do the foregoing statements mean that Class B and C and possibly Greater Than Class C wastes, which cannot be processed at one of the Tennessee sites to meet Class A requirements, will all be returned from Tennessee only to the generator or is it possible that any such material will be shipped from the Utah facility back to the generator? Is there a possibility that Class B, C and Greater Than Class C wastes will be processed at the Tennessee facilities and returned to Italy in “a more stable waste form?”

EnergySolutions Response

EnergySolutions cannot process “most waste from reactor operationsclassified as Class B or Class C waste”. Using routine process controls to limit final ash container dose rates, we can meter flowable Class B or C materials, such as carbon slurry, into the incinerator with the resultant ash being Class A material. EnergySolutions follows the NRC Branch Technical Position on Concentration Averaging for evaluation of final waste forms.

We will thoroughly inspect and characterize the waste in Italy to ensure that all wastes entering into the U.S. meet the requirements of the Bear Creek and Clive facility licenses. No Class B, Class C or GTCC materials will be shipped to Utah. Since all of the imported material will meet our licenses either at Bear Creek or Clive, none of the material will need to be returned to Italy.

NRC Question 5

“No shipments containing Highway Route Controlled quantities of radioactive material are anticipated.” Who and how will you ensure that there will be no such shipments and what will happen if there are?

EnergySolutions Response

Our on-site characterization in Italy will preclude such material from being imported and therefore there will be no shipments containing HRC quantities.

NRC Question 6

The statement “Appropriate notifications will be made and controls implemented for shipments that exceed the threshold for Appendix P Category 2 quantities”. This seems to imply that ES is anticipating such shipments. If so, please provide assurance that all applicable parties meet the requirements of 10 CFR 110.45 (c)(1).

EnergySolutions Response

The characterization work that will be performed in Italy should ensure that we do not receive any Category 2 shipments. However, in the very unlikely event that one is imported, we will follow established procedures and regulatory requirements.

NRC Question 7

“Following inspection and appropriate processing activities, waste materials meeting Clive disposal Waste Acceptance Criteria will be disposed at Clive, Utah as customer waste.” What is “customer waste?” Further, please indicate the disposition pathway of all waste that does not meet the Clive WAC.

EnergySolutions Response

Customer waste is attributable, for purposes of disposal tracking, to the original generator.

All material imported from Italy will either be recycled, incinerated or otherwise processed using U.S. technology at the Bear Creek, TN facility. Only a small fraction of the material imported will be disposed in the U.S. Approximately 33% (by weight) of the material will be recycled. This material is primarily metal that will be melted and formed into shield blocks which will be sold and used throughout the nuclear industry. Approximately 67% (by weight) will be processed at Bear Creek. Only about 8% (by

volume) of the total imported material is estimated to be disposed of at the Clive, Utah facility.

NRC Question 8

“You propose to import up to 20,000 tons or approximately 1,000,000 cubic feet (assuming a nominal density of 40 pounds per cubic foot) of material contaminated with varying quantities, types and combinations of source, special nuclear and byproduct materials.” Please estimate the maximum total mass and volume of material and the relevant physical and chemical characteristics of the radioactive contaminants that will be disposed of as customer waste.

EnergySolutions Response

Following is an estimated distribution of materials we expect to receive. All shipments will be conservatively manifested, packaged and shipped to ensure that only materials authorized under our Tennessee and Utah radioactive materials licenses will be imported and received at these facilities. We will conform to applicable IAEA and USDOT shipping requirements, and the NUREG/BR-0204 manifesting guidance. As stated earlier, all materials will be routed through our Bear Creek facility in Tennessee. Material forms are broadly described as metals, dry active waste (DAW) or liquids, as these are the principal physical considerations in packaging, handling, and processing. As these physical quantities are not routinely monitored or tracked, we do not intend these values to be restrictions on individual waste forms. In addition, the physical characteristics have no impact on worker or environmental health and safety. Total mass and radionuclide activity received will be closely monitored relative to authorized values to ensure authorized amounts are not exceeded.

Approximately 7,000 tons, or nominally one-third of the projected total mass to be imported, is expected to be metals. Although we intend to beneficially reuse most of the metals via our licensed shielding fabrication facility in Tennessee, we have included metal as a waste stream rather than importing it separately under the Part 110 General License provisions for the import of resource materials contaminated with incidental quantities of radioactive material (IRM). Radioactive contaminants are expected to be in form of solid metal oxides, principally byproduct material (fission and activation products) originating in light water and gas-cooled power reactor facilities undergoing decommissioning. This material is expected to contain nominally half of the byproduct materials projected in the license application, with only traces of source or special nuclear material (SNM). Structural steel, conduit, tanks, moderator metals, piping and valves are expected to comprise most of the metals. A small metals subset, not expected to exceed a few hundred tons, may originate from commercial fuel fabrication facilities undergoing decommissioning. These metals are expected to contain source material and/or low-enriched uranium and mixed oxide fuel contamination in the form of metal oxides or

contamination from fired ceramic material. These fuel facility metals are expected to account for a significant fraction of the source material and SNM activity requested in section 15 of the submitted USNRC Form 7, blocks 15a – 15c. Note that in no case will operable reactor components or fuel fabrication equipment be imported for use or transfer for use. The total volume of metals shipped from Italy is expected to be about 200,000 to 300,000 ft³.

DAW is expected to account for 5,000 tons of the requested 20,000 tons. This material will include cotton rags and personal protective clothing (PPE), ventilation filters, paper, plastic, wood, and ion exchange resins. This material is expected to account for up to one-half of the requested byproduct material activity, again with only low levels of source material and SNM. The total volume of DAW shipped from Italy is expected to be about 300,000 to 400,000 ft³. Approximately 20% of the DAW is expected to originate from fuels-related facilities, and will contain low levels of uranium and mixed oxide fuel contamination in the form of metal oxides (no nitrates or reactive forms are anticipated).

Aqueous liquids, including water/resin mixtures, and organic liquids (primarily non-hazardous electro-hydraulic control fluid [EHC oil] and lubricating oils meeting acceptance criteria) are expected to make up the remainder of the mass to be received and will be primarily contaminated with byproduct material, again with traces of source material and SNM. These are also expected to originate primarily from power reactor facilities undergoing active decommissioning.

We appreciate the opportunity to respond to these questions. If you have any further questions regarding this matter, please contact me at (801) 649-2114.

Sincerely,



Tye Rogers
Sr. Vice President, Regulatory Affairs

Attachment 1

cc: Brooke Smith and Carlotta Coates

ATTACHMENT 1



Waste Acceptance Guidelines Implementation

Revision 0

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Reviewed By:	<u>Signature on file</u> Erin Sims-Taylor, Director of Env. Affairs, TN Operations	<u>06/25/07</u> Date
Approved By:	<u>Signature on file</u> Brian Parsons, Director-Operations	<u>05/16/07</u> Date

- New
- Title Change
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- Rewrite

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Waste Acceptance Guidelines Implementation

1. PURPOSE AND SCOPE

Detailed criteria for the acceptance of waste at Duratek Bear Creek Operations and Gallaher Road Facility are established as a policy statement entitled Waste Acceptance Guidelines (WAG) (Reference 3.1.1) and International Radioactive Material Acceptance Guidelines (RMAG) (Reference 3.1.2). To administer and implement this policy, additional controls and requirements are established in this procedure. This includes assigning responsibility for WAG and RMAG maintenance, establishing mechanisms for approval of waste and radioactive material not meeting the acceptance guidelines, and required actions for guidelines violations.

2. COMMITMENTS

2.1. Duratek customer contracts

2.2. Duratek Radioactive Material License Conditions/Commitments

2.2.1. Storage time for materials on site – No radioactive materials possessed over 365 days in accordance with the Bear Creek and Gallaher Road Radioactive Material Permits.

2.2.2. Isotopes authorized on site – Maximum radioactivity and/or quantity of material that Duratek may possess at any one time days in accordance with the Bear Creek and Gallaher Road Radioactive Material Permits.

2.2.3. Possession limit for Special Nuclear Material (SNM) – Combined possession limit for SNM grams shall not exceed at any one time days in accordance with the Bear Creek and Gallaher Road Radioactive Material Permits.

2.2.4. Radiation Safety Guide – Review of “Out of WAG” material.

2.3. Other permits

2.3.1. RCRA Hazardous Waste Storage

2.3.2. TSCA-PCB Bulk Product Waste Authorization

2.3.3. Recycling Management Permit

3. REFERENCES AND FORMS

3.1. References

3.1.1. WAG-501, Waste Acceptance Guidelines

3.1.2. WAG-502, International Radioactive Material Acceptance Guidelines

3.1.3. DS-AD-PR-008, Non-Conformance and Corrective Action

Waste Acceptance Guidelines Implementation

3.2. Forms

3.2.1. CP-WM-PR-102-1.1, Nonstandard Material Approval

3.2.2. CP-WM-PR-102-1.2, Out of WAG Review Questions

4. GENERAL

4.1. Definitions

4.1.1. *Non-compliant material* — Nonstandard material/waste shipped to Duratek without prior approval and standard material shipped to Duratek without the proper advance notifications as described in References 3.1.1 and 3.1.2.

4.1.2. *Nonconforming material* — Any material/waste that is unacceptable by virtue of being disallowed by Duratek's various licenses and permits as conveyed in References 3.1.1 and 3.1.2. All nonconforming material or waste will be returned to the customer.

4.1.3. *Nonstandard material* (also known as out-of-WAG waste) — Any material/waste that does not meet the standard (either general or specific) acceptance guidelines as conveyed in References 3.1.1 and 3.1.2. Nonstandard material/waste requires special pre-approval prior to shipment to Duratek.

4.1.4. *Out of WAG Committee* — A group that meets to discuss and approve Nonstandard Material Approval requests. Members include all of the personnel listed below with the responsibility to review and approve/disapprove Nonstandard Material Approval requests and the Operations Projects Section Leader.

4.2. Responsibilities

4.2.1. Logistics Director (or designee) —

- a. Attends Out of WAG Committee meetings;
- b. Reviews and approves/disapproves Nonstandard Material Approval requests;
- c. Approves the receipt of noncompliant waste or material;
- d. Coordinates WAG revisions/updates;
- e. Concurs on WAG changes;

4.2.2. Radiation Safety Officer or Radiation Protection Manager (or designee) —

- a. Attends Out of WAG Committee meetings;

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- b. Reviews and approves/disapproves Nonstandard Material Approval requests;
 - c. Concurs on WAG changes.
 - d. Evaluates changes in applicable regulations and Duratek licenses to identify necessary modifications to the WAG.
- 4.2.3. Environmental Affairs Director (or designee) —
- a. Attends Out of WAG Committee meetings;
 - b. Reviews and approves/disapproves Nonstandard Material Approval requests;
 - c. Concurs on WAG changes;
 - d. Evaluates changes in applicable regulations and Duratek permits to identify necessary modifications to the WAG.
- 4.2.4. Health & Safety Director (or designee) —
- a. Attends Out of WAG Committee meetings;
 - b. Reviews and approves/disapproves Nonstandard Material Approval requests;
 - c. Concurs on WAG changes;
 - d. Evaluates changes in applicable regulations to identify necessary modifications to the WAG.
- 4.2.5. Operations Director (or designee) —
- a. Attends Out of WAG Committee meetings;
 - b. Reviews and approves/disapproves Nonstandard Material Approval Requests;
 - c. Reviews and approves/disapproves changes to WAG;
 - d. Evaluates changes in processing capabilities to identify necessary modifications to the WAG.
- 4.2.6. Operations Projects Director (or designate) —
- a. Attends Out of WAG Committee meetings;
 - b. Ensures that the level of effort for project management is determined for each Nonstandard Material Approval Request;

Waste Acceptance Guidelines Implementation

- c. Collects copies of Nonstandard Material Approval Request forms and back up information for use in project management.

4.2.7. Business Development Personnel —

- a. Calls and facilitates Out of WAG Committee meetings
- b. Account Executives or Customer Service Managers (CSMs) initiate Nonstandard Material Approval Forms (CP-WM-PR-102-F1);
- c. Account Executives or CSMs conduct research, get prior reviews of customer's nonstandard desires, and present the requests at the Out of WAG Committee meetings;
- d. Account Executives or CSMs resolve issues with customers;
- e. Account Executives or CSMs are responsible for issuing and following up on Event Reports written against customers for shipment of nonconforming or noncompliant material to Duratek in accordance with Reference 3.1.3.
- f. Customer Service Managers controls the issuance of Nonstandard Material Approval forms (CP-WM-PR-102-F1) sequential document numbers and maintaining the file of approved forms.

4.2.8. Commercial Processing Personnel —

- a. Initiate Nonstandard Material Approval Forms (CP-WM-PR-102-F1).

4.3. Precautions and Limitations

None

4.4. Records

Customer Service Department maintains a signed copy of all Nonstandard Material Approval forms (CP-WM-PR-102-F1) in accordance with the Commercial Integration Records Flow Schedule.

Waste Acceptance Guidelines Implementation

5. PROCEDURE**5.1. Acceptance of Nonstandard Material/Waste**

- 5.1.1. Business Development or Commercial Processing personnel shall initiate a Nonstandard Material Approval Form (CP-WM-PR-102-F1) after receiving a request from a customer to ship material/waste to Duratek that does not meet general or specific waste acceptance guidelines.
- 5.1.2. Business Development or Commercial Processing personnel shall be responsible for obtaining information from the customer to complete CP-WM-PR-102-F1.
- 5.1.3. Customer Service Manager (or designate) will call and facilitate a meeting of the "Out of WAG Committee" when Nonstandard Material Approval Requests are ready to be presented.
- 5.1.4. During or after the Out of WAG Committee meeting, Business Development or Commercial Processing personnel shall be responsible for obtaining approval from all of the following individuals (or their designees) prior to permitting shipment of the material/waste to Duratek facilities.
 - Logistics Director
 - Environmental Director
 - Radiation Safety Officer or Radiation Protection Manager
 - Safety & Health Director
 - Operations Director
- 5.1.5. Out of WAG Committee members shall provide operations notes for AccuTrack in the space provided on CP-WM-PR-102-F1.
- 5.1.6. Out of WAG Committee members shall review the acceptability of the waste. CP-WM-PR-102-F2, Out of WAG Review Questions, provides guidelines for reference.
- 5.1.7. Out of WAG Committee members shall agree on the level of effort required for project planning and check the appropriate box on CP-WM-PR-102-F1.
- 5.1.8. Business Development or Commercial Processing personnel shall deliver a copy of CP-WM-PR-102-F1 and all back up information, including copies of technical commitments made in a Special Quote to the Operations Projects Section Leader if so indicated at the bottom of CP-WM-PR-102-F1.
- 5.1.9. Business Development personnel shall enter all processing instructions from CP-WM-PR-102-F1 into AccuTrack Operations Notes upon order entry.

5.2. Waste Acceptance Guidelines Noncompliance/Nonconformance

- 5.2.1. Any individual identifying noncompliant or nonconforming waste shall initiate a First Notification Report in accordance with Reference 3.1.3.
- 5.2.2. Waste arriving at Duratek that is categorically unacceptable per Duratek's licenses and permits shall be considered nonconforming waste.
- 5.2.3. All nonconforming waste shall be returned to the client unless an exemption is granted by the State.
- 5.2.4. Waste arriving at Duratek without prior approval of a Nonstandard Material Approval Form, CP-WM-PR-102-F1, does not comply with the WAG, but is acceptable per Duratek's licenses or permits shall be considered noncompliant waste.
- 5.2.5. All noncompliant waste shall be placed on Hold until completion of a Nonstandard Material Approval Form or until the waste is returned to the customer, whichever applies.

6. ATTACHMENTS

None

Waste Acceptance Guidelines

Revision 2

Authored By:	<u>Signature on File</u> David Wry, Account Executive	<u>04-10-06</u> Date
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Reviewed By:	<u>Signature on File</u> Bruce Stephenson, Logistics Team Leader	<u>04-10-06</u> Date
Approved By:	<u>Signature on File</u> Troy Eshleman, Division Leader	<u>04-17-06</u> Date

May 1, 2006
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Waste Acceptance Guidelines**1. RADIOACTIVE WASTE MANAGEMENT****1.1. Purpose and Scope**

This document provides Waste Acceptance Guidelines (WAG) for Duratek Services, Inc. Tennessee-based Commercial Waste Processing (CWP) facilities at Bear Creek, and Gallaher Road. The WAG provides minimum requirements that the generator must meet to ship waste to these facilities.

Material that does not meet the WAG may be accepted after evaluation of data **PRIOR** to shipment of waste. Material received at Duratek that does not meet the WAG and has not been evaluated and approved by Duratek 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 Duratek evaluation and approval before shipping are listed in Table 2.
- Specific waste packaging guidelines are defined in Attachment 1.

Duratek 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. Duratek Facility Information

<i>Bear Creek Facility</i>	<i>Gallaher Road Facility</i>	<i>Main Office</i>
Duratek Services, Inc. Bear Creek Operations 1560 Bear Creek Road Oak Ridge, TN 37830	Duratek Services, Inc. Gallaher Road Operations 628 Gallaher Road Kingston, TN 37763	Phone No.: 865-481-0222 Customer Service: 800-663-2966 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, Research and Special Programs Administration, Dept. of Transportation

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- 2.8. Tennessee Rule, Chapter 1200-1-11, Hazardous Waste Management
- 2.9. Tennessee Rule, Chapter 1200-2-5, 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

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. Shipment of waste to Duratek Tennessee-based processing facilities require—
 - Compliance with the WAG (including all requirements in Attachment 1).
 - Valid contract mechanism established with Duratek.
 - Shipment scheduling through an Account Executive, 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.

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- 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 Waste License-for-Delivery unless Duratek or another broker acts as a broker on behalf of the generator. Shipments of radioactive equipment that are not waste and empty containers do not require a Tennessee Radioactive Waste License-for-Delivery (Commitment 2.9).
- 4.6. Waste Shipment Record Form accompanying shipment of asbestos waste.
- 4.7. Uniform Low-Level Radioactive Waste Manifest (540/541 forms) accompanying shipment. Equipment, empty containers, analytical samples, and other non-waste materials do not require use of the NRC Uniform Low-Level Radioactive Waste Manifest (Commitment 2.9).
- 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 PCB shipments greater 50 ppm shall include a hazardous waste manifest (US EPA Form 8700-22).
- 4.11. Disposal site documentation (see Section 7).
- 4.12. For shipments involving multiple manifests (Broker Shipments) include a Consolidation Sheet 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 refrigerant equipment, a signed statement including the name and address of the person who recovered the refrigerant, and the date that the refrigerant was recovered, in accordance with Commitment 2.11.
- 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).

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5. WASTE ACCEPTANCE GUIDELINES

NOTE

See Table 2 for waste that requires advance approval from Duratek prior to shipment. Contact your account executive regarding advance approval and receipt schedules.

5.1. Animal/Biological and Infectious Waste

- 5.1.1. Animal/biological waste that is not infectious, or potentially infectious, is accepted for incineration only.
- 5.1.2. 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 accepted for direct incineration and must meet the following parameters:

pH range	5 to 9
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. Resins are accepted for processing but, as with sludge processing, require special handling.

Waste Acceptance Guidelines

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

5.4. Metals

5.4.1. Bulk Metals

a. Bulk metals may be processed through survey for release, decontamination, volume reduction for burial, or melted for recycling. See Table 1 for radiological acceptance criteria and Table 2 for size and prior approval requirements.

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

Not Candidates for Melting	Not Candidates for Volume Reduction	Not Candidates for Bestway Metal Processing
<ul style="list-style-type: none"> • Non ferrous metals such as brass, bronze, cadmium, copper, and chromium • Molybdenum • Uranium metals • Tantalum • Tungsten • Zirconium • Oil or solvent contaminated metals • Titanium • Metals exceeding 20 mrem/hr 	<ul style="list-style-type: none"> • Lead/lead alloys • Cadmium • Chromium/chromium alloys (excluding stainless steel) • Metals contaminated with oils or solvents • Titanium 	<ul style="list-style-type: none"> • All items not candidate for melting • All items not candidates for volume reduction • All light gauge metals such as duct work • Non GIC/SafeCheck Users

5.4.2. Lead (Pb)

a. Lead bricks, sheets, blankets, wool, shot or shapes that have not been deformed, melted, or significantly gouged are accepted for recycling using decontamination, survey for release or casting, as appropriate. Sheets/shapes that have been rolled, folded, crumpled, or crushed may only be accepted for casting.

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.

Waste Acceptance Guidelines

5.5. Bulk Dry Active Waste (DAW)

Waste consisting of paper, plastic, cloth, rubber, wood, and metal are acceptable. Polyvinyl chloride and metal are not candidates for incineration. See Table 1 for radiological criteria and Best Way DAW processing.

5.6. 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 in 49 CFR (Commitment 2.7).

5.7. Compressed Gases

Compressed gases may be candidates for processing after evaluation. Aerosol cans and compressed gas containers that are empty, punctured, and at atmospheric pressure are acceptable for processing.

5.8. Glass

Confirmed nonhazardous (through TCLP analysis) glass is acceptable. Leaded glass is acceptable for processing after evaluation.

5.9. Hazardous Waste

Hazardous waste as identified in 40 CFR 261 (Commitment 2.2) or Tennessee Rule 1200-1-11 (Commitment 2.8) cannot be accepted without specific regulatory exemption.

5.10. Hot Particle Waste

Hot particle waste is accepted for compaction only. 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.

5.11. Lead-Acid Batteries

Sealed batteries that are free from internal contamination are accepted for decontamination and recycling.

Waste Acceptance Guidelines

5.12. Oil

Oil is accepted for incineration and/or energy recovery. Oil for energy recovery may exceed certain hazardous waste limits, provided it meets the criteria for on-specification used oil provided in 40 CFR 279.11 (Commitment 2.3). Oils for energy recovery will require submission of analytical data for approval.

5.12.1. Direct Processing - Oils such as diesel, #4, #6, etc. and lubricating oils meeting the following specifications are accepted for direct processing.

Heating value	≥18,500 BTU/lb
Viscosity	≤40 weight (≤100 ssu)*
Solids content	≤10% by volume
Aqueous liquid content	≤10% by volume

*The above guidance on oil viscosity indicates a grade of 40 or less.

5.12.2. Blended Processing - Oils that do not meet the above specifications will require enhancement with diesel oil, kerosene or other additives to allow them support combustion, therefore these oils will require blending before processing.

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.

5.13. Paint Chips

Confirmed nonhazardous (through TCLP analysis) paint chips are accepted for processing.

5.14. Polychlorinated Biphenyls (PCBs)

All PCB shipments to Duratek require out-of-WAG approval. Metallic items (except lead) coated with PCB-containing paint and defined as PCB bulk product waste per 40 CFR 761 (Commitment 2.4) are accepted for processing. The PCBs must have been added to the paint during the manufacturing process. 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, PCBs meeting an applicable decontamination standard of 40 CFR 761.79(b) (Commitment 2.6) are accepted. All PCB shipments to Duratek above 50 ppm shall include a hazardous waste manifest.

5.15. Potentially Clean Waste (PCW)

5.15.1. PCW for Green Is Clean (GIC) and GIC-Safecheck processing requires a full isotopic description, including a 10 CFR 61 profile, for all waste. Confirmed non-hazardous (through TCLP analysis) sludge is acceptable for GIC processing.

Waste Acceptance Guidelines

5.15.2. Waste forms specifically excluded from GIC processing include:

- Tires
- Mercury-containing devices
- Any other hazardous materials described in Section 5.9

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, etc.) are accepted with prior approval, provided they are properly identified and segregated from other waste.

5.16. **Pyrophorics**

Pyrophoric materials are not accepted for processing. Examples include elemental magnesium, titanium, phosphorus, zirconium, lithium, sodium, hafnium, strontium, and calcium.

5.17. **Sealed Sources**

Sealed sources are acceptable after evaluation.

5.18. **Sharps**

Sharp metal pieces, including hypodermic needles, are accepted for incineration and compaction. Hypodermic needles are the only sharps that can be accepted for incineration. Sharps that are also infectious or potentially infectious waste (see Section 5.1) are not acceptable for processing.

5.19. **Soil**

Soil that is free of animals, insects, or other such beings is accepted. The soil's state and county of origin must be identified prior to receipt.

5.20. **Tanks and Other Closed Vessels**

Tanks and other closed vessels are accepted for processing after evaluation and provided that they are completely empty.

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

Dry active waste that meets all low-level radioactive waste package and waste form disposal requirements is accepted, after evaluation, for trans-shipment from Duratek directly to a licensed low-level radioactive disposal site. Each package will be opened and inspected by Duratek to determine whether the package and waste form meets all shipping and disposal requirements.

5.22. 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 may be acceptable, after evaluation. If Duratek approves the material for processing, the shipment paperwork shall provide a completed Land Disposal Restriction (LDR) Form **OR** a Certification in accordance with 40 CFR 268.7 (Commitment 2.12).

RCRA-exempt materials that require special handling due to additional hazards (e.g. flammability) are acceptable on a case-by-case basis. Approval must be obtained for these materials prior to shipment. Examples include uranium metal and alloys, and thorium metal and alloys. In certain cases, Duratek may require stabilization of this material prior to shipment.

5.23. 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

5.24. Refrigerant Equipment

Chlorofluorocarbon compounds and other ozone-depleting substances must be removed from refrigerant equipment prior to shipment.

5.25. 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, Duratek shall be provided with the expected arrival date and time of the shipment.

RADIOACTIVE MATERIAL QUANTITIES OF CONCERN

Radionuclide ¹	TBq ²	Curies ²
Am-241	0.6	16
AM-241/Be	0.6	16
Cf-252	0.2	5.4 ³
Cm-244	0.5	14 ³
Co-60	0.3	8.1
Cs-137	1	27
Gd-153	10	270
Ir-192	0.8	22
Pm-147	400	11,000 ³
Pu-238	0.6	16
Pu-239/Be	0.6	16 ³
Se-75	2	54
Sr-90 (Y-90)	10	270
Tm-170	200	5,400 ³
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 These quantities of concern exceed Duratek's possession limits and are, therefore, self-limiting.

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) to be disposed of at the Envirocare of Utah disposal facility in Clive, generators must ensure that all radionuclides in the LLRW shipment are within Class A limits.

Envirocare requires approval from the low-level radioactive waste compact of origin (including the Northwest Compact), 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, Envirocare requires for Duratek to provide documentation that the waste has been approved for export.

Waste Acceptance Guidelines

7.2. Barnwell, South Carolina

For LLRW designated for disposal at the Chem-Nuclear Systems facility in Barnwell, generators and/or brokers 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. Generators in the SouthWest Compact, Rocky Mountain Compact, and Central Interstates Compact are required to have export permits.

Waste Acceptance Guidelines

Table 1. General Radiological Criteria

A. RADIATION LEVEL OF WASTE		
Waste Type	mrem/hr @ Contact With Waste	Contamination, Fixed or Removable (dpm/100cm ²)
Best Way DAW OR Best Way Metals NOTE: Best Way processing customers shall allow Duratek to use incineration, compaction, metal melting, decontamination, GIC-Safecheck and Envirocare disposal.	≤ 20	≤50,000 β-γ, ≤5,000 α
DAW (other than Best Way)	≤ 200	Not Applicable
Metal (other than Best Way)	≤ 200	See Table 1 B. below
Metal for Melt Only	≤ 20	≤50,000 β-γ ≤5,000 α
GIC/Safecheck	≤ 0.1	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 <i>except</i> 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 <i>except</i> 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. Duratek does not assume or expect that generators conduct external contamination swipes on waste.

C. RADIONUCLIDE CONCENTRATION	
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 <i>except</i> H-3 and C-14	≤ 0.3 μCi/cm ³
Total, H-3 and C-14	≤ 0.03 μCi/cm ³
Other mixed fission and activation products, Z < 84	≤ 25 mCi/ft ³
Be (for acute health hazards refer to www.osha-slc.gov/SLTC/beryllium)	Special approval required
Th-232	≤ 5 mCi/ft ³ or 100 lb Th/ft ³ waste
U-238 as metal or oxide	≤ 15 mCi/ft ³ or 100 lb U/ft ³ waste
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

8. WASTES REQUIRING PRIOR APPROVAL

The items listed in Table 2, on the following page, require advance approval from Duratek 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 Duratek without prior approval from Duratek, it will be subject to waste processing surcharges or returned at the generator's expense.

9. ATTACHMENTS

Attachment 1, Specific Waste Packaging and Shipping Guidelines

Waste Acceptance Guidelines

Table 2. Waste Requiring Prior Approval and Possibly Special Pricing

Ref. Section	Requirement
General	Nonradiological hazards to our employees shall be identified
2	Scheduling of any shipment for processing at Duratek
All	Any waste that does not meet the Duratek WAG
5.2	Resins for incineration
5.4	Metal pieces larger than 16 ft × 8 ft × 8 ft per individual piece or combination of integral pieces
5.4	Metal pieces heavier than 20,000 lb per single piece
5.4	Metal melting for the following requires special evaluation:
	<ul style="list-style-type: none"> • 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)
5.4.2.e	LEMS
5.7	Compressed gases
5.8	Leaded glass (requires TCLP analysis)
5.9	Hazardous waste as identified in 40 CFR 261
5.11	Lead-acid batteries
5.13	Paint chips (requires TCLP analysis)
5.14	PCB-contaminated material
5.15	GIC processing of specialty metals (e.g. brass or bronze), circuit boards, and lead-acid batteries
5.15	GIC processing of sludges and paint chips (requires TCLP analysis)
5.17	Sealed sources
5.20	Tanks and other closed vessels
5.21	Trans-shipments for direct disposal
5.22	Treated Formerly Characteristic Hazardous Waste and RCRA Exempt Materials
5.25	Radioactive Material Quantities of Concern
Table 1 - B	When contamination levels in Table 1-B, may be exceeded
Table 1 - B	TRU for processing in concentrations of > 0.1 nCi/g
Table 1 - B	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 (includes U-233, U-235, or uranium enriched in U-233, U-235)
General	Due to the non-routine nature of the types of wastes generated during decommissioning projects, Duratek reserves the right to review for approval radioactive wastes that originate from decommissioning projects
General	All cask shipments (minimum of 3 days prior to arrival of shipment)
General	Wooden or fiber outer containers and poly-wrapped flatbed loads
General	All international shipments

Waste Acceptance Guidelines

ATTACHMENT 1, Specific Waste Packaging and Shipping Guidelines

All wastes shipped to Duratek, shall be delivered in qualified containers, at a minimum they shall be Strong Tight, IP1, IP2 or Type A. Wooden containers are generally not acceptable. Any deviations shall require prior written approval from Duratek. Strong Tight must comply with 49 CFR 173.24, 49 CFR 173.24a (non-bulk) or 49 CFR 173.24b (bulk).

Unless prior written approval is provided, all double-stacked containers on shipments must be palletized.

Waste Types

The guidance provided in this attachment applies to packaging for the following waste types. See Duratek 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 Green Is Clean
- Sealed Sources for Encapsulation
- PCB Bulk Product Metal for Best Way Metals Processing
- Cask Shipments of High Radioactivity Waste
- Non-RCRA Liquid Scintillation Vials Shipments

DAW for Direct Compaction

1. Duratek requires certification specifying that the 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 Duratek-provided inner-pack (IP) boxes.

NOTE

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

Waste Acceptance Guidelines

ATTACHMENT I, Specific Waste Packaging and Shipping Guidelines

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 material** received in packages other than 55-gal drums or Duratek inner-pack boxes must be size reduced prior to receipt to less than 30"Wx38"Lx44"H. Asbestos shall be double bagged 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 B-25-type containers shall be capable of being off-loaded through the end. Also note that large cargo containers of DAW accepted at Duratek 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 Duratek 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., B-25 boxes, cargo containers) as wastes that require other processing methods (i.e., metals processing, GIC) 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.
5. **Sharp metal pieces** shall be bagged and marked SHARPS. Hypodermic needles shall be packaged in a leak-proof and puncture resistant "sharps container."

ATTACHMENT 1, Specific Waste Packaging and Shipping Guidelines

DAW in Non-Bulk Containers for Direct Incineration

1. Duratek requires certification specifying that the 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, glass). 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 200 lb gross weight per package. Use of other packaging configurations requires special approval from Duratek.

3. Clearly mark each package with the generator's name, address, contact name, and phone number, 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.

NOTE

Duratek can provide double-containment shipping boxes, if requested. These containers are generally of two types:

- Duratek "six-pack" LSA box loaded with six internal 79-gal drum over-packs. The generator's 55-gal drums are then placed inside the 79-gal drums, with absorbent added around the outside of the 79-gal drums. The oil-carrying capacity of a six-pack box is approximately 330 gallons (six 55-gal drums in each box); and
 - Duratek's Oil Express container, consisting of two tanks inside a sealed, welded cargo container. The oil-carrying capacity of this container is approximately 2,500 gal.
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 in sealands when shipped with DAW.

ATTACHMENT 1, Specific Waste Packaging and Shipping Guidelines

Aqueous Liquids for Incineration

1. Put the primary containers in outer-packs to provide double containment in the event of leakage or spillage from the primary container.

NOTE

Duratek can provide the "six-pack" double-containment boxes described above, if requested.

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 in sealands when shipped with DAW.
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 50 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 Duratek.

Waste Acceptance Guidelines

ATTACHMENT 1, Specific Waste Packaging and Shipping Guidelines

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. Duratek 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 B-12 type).

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

Potentially Clean Waste for Green Is Clean

1. General PCW Packaging Guidelines

- PCW may be packaged in 55-gal drums. Duratek 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. "Mixed" PCW and Radioactive Waste Packaging Requirements

- Notify an Account Executive prior to a "mixed" 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.

ATTACHMENT 1, Specific Waste Packaging and Shipping Guidelines

NOTE

Radioactive waste shipped with PCW and destined for other processing methods is also subject to various other specific packaging criteria.

3. “Special” PCW Packaging Requirements**3.1. *Low-Density Trash PCW***

- Package PCW trash in plastic bags (or equivalent) weighing less than approx. 50 lb each.

3.2. *Asbestos PCW*

- Package PCW asbestos in sealed plastic bags (or equivalent). The asbestos must be double-bagged, with the bags free of any tears or punctures on receipt. (For asbestos waste containing sharp objects that might tear a bag, Duratek 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 GIC bulk assay.
- No yellow “rad” bags.

3.3. *Sludges (i.e., Waste Water, Oil, and Treated Sewage) 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.
- Absorbent material should be placed in the container to avoid freestanding liquid from occurring during waste shipping.

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 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.
- Absorbent material should be placed in the container to avoid freestanding liquid from occurring during waste shipping.

Waste Acceptance Guidelines

ATTACHMENT 1, Specific Waste Packaging and Shipping Guidelines

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).

Sealed Sources

Packaging instructions will be provided on a case-by-case basis after evaluation.

PCB Bulk Product Waste Metal for Best Way Metals Processing

1. **Bulk Container Packaging:** Use specially lined strong tight bulk containers for PCB-contaminated metallic items. Clearly mark the liner and package 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 concentrations in applied paint:** If PCB concentration is not identified through chemical analysis, PCB-contaminated metallic items will be assumed to have PCB concentrations in excess of 100,000 ppm.
3. PCB wastes shall be packaged separately and not intermingled with non-PCB contaminated wastes.

Cask Shipments of High Radioactivity Waste

1. All cask shipments require prior written approval from Duratek.
2. Notification shall be made if the cask model is not on list shown below. The customer may be asked to provide the operating instructions and special equipment if these are not available within Duratek. Failure to notify Duratek of the cask type will result in additional charges for delays in unloading.
 - CNS1-8
 - CNS1-13C
 - CNS1-13G
 - CNS3-55
 - CNS6-75
 - CNS6-80-2
 - CNS8-120A
 - CNS8-120B
 - CNS10-160B
 - CNS14-170 II
 - CNS14-170 III
 - CNS14-190H
 - CNS14-195H
 - CNS14-215H
 - CNS21-300
3. Customers using an NRC-licensed cask not owned by Duratek (or CNS, Inc.) shall ensure that Duratek is a "Registered User" of the licensed cask prior to shipment to a Duratek facility. This applies to all shipments requiring licensed packages.

ATTACHMENT 1, Specific Waste Packaging and Shipping Guidelines

4. Third-party cask documents (C of C, SAR, and handling and maintenance procedures and drawings) shall be made available to Duratek as the NRC Registered User of the cask prior to shipment of the cask to a Duratek facility.
5. 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).
 - Failure to observe appropriate requirements shall result in the submission of noncompliance information to the appropriate regulatory agency.
 - Liners containing "grapple bails" are to be identified on the Waste Manifest Form.

NOTE

Liners containing non-Duratek 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.

NOTE

Drums with dose rates greater than 1 R/hr shall be shipped in a cask on pallets.

- 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.

Cask Shipments (continued)

- For shipments consisting of high-integrity drums, the pallets on which the drums are placed are considered sacrificial since the pallets are used for proper placement in the concrete vaults.
- 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.

NOTE

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

ATTACHMENT 1, Specific Waste Packaging and Shipping Guidelines

Non-RCRA Liquid Scintillation Vials 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 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 50-lbs./container gross weight.

Poly or Fiber drums —

- If packaged in open head drum, shall be double-bagged, containing enough incinerable absorbent to absorb the amount of liquid contained in the package.
- Must not exceed 110-lbs./container gross weight.
- Note that Poly drums are the preferred packaging for glass vials.

Metal drums —

- Vials must be double bagged in bags of 25-lb. increments with enough incinerable absorbent to absorb amount of liquid in the bag.

Waste Acceptance Guidelines

Revision 3

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- Title Change
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Waste Acceptance Guidelines

1. RADIOACTIVE WASTE MANAGEMENT

1.1. Purpose and Scope

This document provides Waste Acceptance Guidelines (WAG) for Duratek Services, Inc. Tennessee-based Commercial Waste Processing (CWP) facilities at Bear Creek, and Gallaher Road. The WAG provides minimum requirements that the domestic generator must meet to ship waste to these facilities.

Material that does not meet the WAG may be accepted after evaluation of data **PRIOR** to shipment of waste. Material received at Duratek that does not meet the WAG and has not been evaluated and approved by Duratek 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 Duratek evaluation and approval before shipping are listed in Table 2.
- Specific waste packaging guidelines are defined in Attachment 1.

Duratek 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. Duratek Facility Information

<i>Bear Creek Facility</i>	<i>Gallaher Road Facility</i>	<i>Main Office</i>
Duratek Services, Inc. Bear Creek Operations 1560 Bear Creek Road Oak Ridge, TN 37830	Duratek Services, Inc. Gallaher Road Operations 628 Gallaher Road Kingston, TN 37763	Phone No.: 865-481-0222 Customer Service: 800-663-2966 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

Waste Acceptance Guidelines

- 2.8. Tennessee Rule, Chapter 1200-1-11, Hazardous Waste Management
- 2.9. Tennessee Rule, Chapter 1200-2-5, 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. 29CFR 1910.1030 Blood Borne Pathogens

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, Green is Clean (GIC) Non-Detect Program Profile

4. SHIPPING, PACKAGING, AND DOCUMENTATION REQUIREMENTS

- 4.1. Shipment of waste to Duratek Tennessee-based processing facilities require—
 - Compliance with the WAG (including all requirements in Attachment 1).
 - Valid contract mechanism established with Duratek.
 - Shipment scheduling through an Account Executive, 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.

Waste Acceptance Guidelines

- 4.3. A completed Shipment Summary Form (WAG-501-F1) shall accompany all shipments.
- 4.4. A completed Green is Clean (GIC) Non-Detect 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 Duratek 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 PCB shipments greater 50 ppm 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 refrigerant equipment, a signed statement including the name and address of the person who recovered the refrigerant or declared the equipment empty, and the date that the refrigerant was recovered, in accordance with Commitment 2.11.
- 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).

5. WASTE ACCEPTANCE GUIDELINES

NOTE

See Table 2 for waste that requires advance approval from Duratek prior to shipment. Contact your account executive regarding advance approval and receipt schedules.

5.1. **Animal/Biological and Infectious Waste**

5.1.1. Animal/biological waste that is not infectious, potentially infectious, or regulated waste as defined by commitment 2.13 is acceptable.

5.1.2. 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	5 to 9
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.

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

Waste Acceptance Guidelines

5.4. Dewatered Liquid Cartridge Filters

Dewatered liquid filters may be 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 survey for release, decontamination, volume reduction for burial, or melted for recycling. See Table 2 for size 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
<ul style="list-style-type: none"> • Non ferrous metals such as brass, bronze, aluminum, cadmium, copper, and chromium • Molybdenum • Uranium metals • Tantalum • Tungsten • Zirconium • Oil or solvent contaminated metals • Titanium • Metals exceeding 20 mrem/hr • Magnesium thorium 	<ul style="list-style-type: none"> • Lead/lead alloys • Cadmium • Chromium/chromium alloys (excluding stainless steel) • Metals contaminated with oils or solvents • Titanium • Magnesium thorium

Waste Acceptance Guidelines

5.5.2. **Lead (Pb)**

- a. Lead bricks, sheets, or shapes are accepted for recycling through casting.
- 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 in 49 CFR (Commitment 2.7).

5.8. **Compressed Gases**

Containerized compressed gases may be candidates for processing following special review and approval. Aerosol cans and compressed gas containers 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) cannot be accepted.

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 free from internal contamination are accepted for decontamination and recycling.

Waste Acceptance Guidelines

5.12. Oil

Oil is accepted for incineration and/or energy recovery. Oil for energy recovery may exceed certain hazardous waste limits, provided it meets the criteria for on-specification used oil provided in 40 CFR 279.11 (Commitment 2.3). Oils for energy recovery will require submission of analytical data for approval.

5.12.1. Direct Processing - Oils such as diesel, #4, #6, etc. and lubricating oils meeting the following specifications are accepted for direct processing.

Heating value	≥18,500 BTU/lb
Viscosity	≤40 weight (≤100 ssu)*
Solids content	≤10% by volume
Aqueous liquid content	≤10% by volume

*The above guidance on oil viscosity indicates a grade of 40 or less.

5.12.2. 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.

5.13. Paint Chips

Confirmed nonhazardous (through TCLP analysis) paint chips are accepted for processing.

5.14. Polychlorinated Biphenyls (PCBs)

All PCB shipments to Duratek require out-of-WAG approval. Out-of-WAG approvals need to be submitted a minimum of 120 days prior to 1 year after the out-of service date. Metallic items (except lead) coated with PCB-containing paint and defined as PCB bulk product waste per 40 CFR 761 (Commitment 2.4) are accepted for processing. The PCBs must have been added to the paint during the manufacturing process. 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, PCBs meeting an applicable decontamination standard of 40 CFR 761.79(b) (Commitment 2.6) are accepted. All PCB shipments to Duratek above 50 ppm shall include a hazardous waste manifest.

5.15. GIC (Non-Detect)

5.15.1. GIC non-detect processing requires a full isotopic description, including a 10 CFR 61 profile, for all waste. Use the WAG-501-F2 form to communicate waste matrices to the account executive.

5.15.2. Waste forms specifically excluded from GIC processing include:

- Tires
- Liquids

- Hazardous materials described in Section 5.9

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 with prior approval, provided they are properly identified and segregated from other waste.

5.15.4. Waste requiring special regulatory approvals (e.g., soils and sludges) require 30 days notification following submittal of WAG-501-F2 form.

5.16. **Pyrophorics**

Pyrophoric materials are not accepted for processing. Examples include elemental magnesium, titanium, phosphorus, zirconium, lithium, sodium, hafnium, strontium, and calcium.

5.17. **Sealed Sources**

Sealed sources are acceptable after evaluation and Out of WAG approval.

5.18. **Tanks and Other Closed Vessels**

Tanks and other closed vessels are accepted for processing after evaluation and provided that they are completely empty.

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

Waste that meets all low-level radioactive waste package and waste form disposal requirements is accepted, after evaluation, for trans-shipment from Duratek directly to a licensed low-level radioactive disposal site. Each package will be opened and inspected by Duratek to determine whether the package and waste form meets all shipping and disposal requirements.

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 may be acceptable, after evaluation. If Duratek approves the material for processing, the shipment paperwork shall provide a completed Land Disposal Restriction (LDR) Form **OR** a Certification in accordance with 40 CFR 268.7 (Commitment 2.12).

RCRA-exempt materials that require special handling due to additional hazards are acceptable on a case-by-case basis. Special approval must be obtained for these materials prior to shipment. Examples include uranium metal and alloys, and thorium metal and alloys. In certain cases, Duratek may require stabilization of this material prior to shipment.

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, Duratek shall be provided with the expected arrival date and time of the shipment.

RADIOACTIVE MATERIAL QUANTITIES OF CONCERN

Radionuclide ¹	TBq ²	Curies ²
Am-241	0.6	16
Am-241/Be	0.6	16
Cf-252	0.2	5.4 ³
Cm-244	0.5	14 ³
Co-60	0.3	8.1
Cs-137	1	27
Gd-153	10	270
Ir-192	0.8	22
Pm-147	400	11,000 ³
Pu-238	0.6	16
Pu-239/Be	0.6	16 ³
Se-75	2	54
Sr-90 (Y-90)	10	270
Tm-170	200	5,400 ³
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 These quantities of concern exceed Duratek's possession limits and are, therefore, self-limiting.

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) to be disposed of at EnergySolutions' disposal facility in Clive, generators must ensure that all radionuclides in the LLRW shipment are within Class A limits.

EnergySolutions requires approval from the low-level radioactive waste compact of origin (including the Northwest Compact), 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, EnergySolutions requires documentation that the waste has been approved for export.

7.2. Barnwell, South Carolina

For LLRW designated for disposal at the Chem-Nuclear Systems facility in Barnwell, generators and/or brokers 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

7.4. Generators in the SouthWest Compact, Rocky Mountain Compact, and Central Interstates 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 Table 1 B. below
Metal for Melt Only	≤ 20	≤ 50,000 β-γ
Bulk Waste Assay/GIC non-detect	≤ 30 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 <i>except</i> 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 <i>except</i> 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. Duratek does not assume or expect that generators conduct external contamination swipes on waste.

C. RADIONUCLIDE CONCENTRATION	
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 <i>except</i> H-3 and C-14	≤ 0.3 μCi/cm ³
Total, H-3 and C-14	≤ 0.03 μCi/cm ³
Other mixed fission and activation products, Z < 84	≤ 25 mCi/ft ³
Be (for acute health hazards refer to www.osha-slc.gov/SLTC/beryllium)	Special approval required
Th-232	≤ 5 mCi/ft ³ or 100 lb Th/ft ³ waste
U-238 as metal or oxide	≤ 15 mCi/ft ³ or 100 lb U/ft ³ waste
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

8. WASTES REQUIRING PRIOR APPROVAL

The items listed in Table 2, on the following page, require advance approval from Duratek 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 Duratek without prior approval, it will be subject to waste processing surcharges or returned at the generator's expense.

Waste Acceptance Guidelines

Table 2. Waste Requiring Prior Approval and Possibly Special Pricing

Ref. Section	Requirement
General	Nonradiological hazards to our employees shall be identified
General	Due to the non-routine nature of the types of wastes generated during decommissioning projects, Duratek reserves the right to review for approval radioactive wastes that originate from decommissioning projects
General	All cask 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 or Bamwell, SC.
General	Shipments requiring specialty container or dunnage returns
All	Any waste that does not meet the Duratek WAG or requires expedited processing
5.2	Resins
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:
	<ul style="list-style-type: none"> • 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.c	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 analysis)
5.14	PCB-contaminated material
5.15	GIC processing of specialty metals (e.g. brass or bronze), circuit boards, and lead-acid batteries
5.15	GIC processing of sludges, soils and paint chips (requires TCLP analysis)
5.17	Sealed sources
5.18	Tanks and other closed vessels
5.19	Trans-shipments for direct disposal
5.20	Treated Formerly Characteristic Hazardous Waste and RCRA Exempt Materials
5.22	Radioactive Material Quantities of Concern
Table 1 - B	When contamination levels in Table 1-B, may be exceeded
Table 1 - B	TRU for processing in concentrations of > 0.1 nCi/g
Table 1 - B	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 (includes U-233, U-235, or uranium enriched in U-233, U-235)

9. ATTACHMENTS

Attachment 1, Specific Waste Packaging and Shipping Guidelines

Waste Acceptance Guidelines

ATTACHMENT 1, Specific Waste Packaging and Shipping Guidelines

All wastes shipped to EnergySolutions, 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 double-stacked containers on shipments must be palletized.

Waste Types

The guidance provided in this attachment applies to packaging for the following waste types. See Duratek 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 Green Is Clean
- Sealed Sources for Encapsulation
- PCB Bulk Product Metal
- Cask Shipments
- Non-RCRA Liquid Scintillation Vials Shipments

DAW for Direct Compaction

1. Duratek requires certification specifying that the 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 Duratek-provided inner-pack (IP) boxes.

NOTE

Duratek 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.

Waste Acceptance Guidelines

4. **Asbestos (friable and non-friable) material** received for compaction in packages other than 55-gal drums or Duratek 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 ft³ containers shall be capable of being off-loaded through the end. Also note that large cargo containers of DAW accepted at Duratek 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 Duratek 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, GIC) 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.
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. Duratek requires certification specifying that the 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, glass). 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. Use of other packaging configurations requires special approval from Duratek.

Waste Acceptance Guidelines

3. Clearly mark each package with the generator's name, address, contact name, and phone number, 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.

NOTE

Duratek can provide double-containment shipping boxes, if requested. These containers are generally of two types:

- Duratek "six-pack" LSA box loaded with six internal 79-gal drum over-packs. The generator's 55-gal drums are then placed inside the 79-gal drums, with absorbent added around the outside of the 79-gal drums. The oil-carrying capacity of a six-pack box is approximately 330 gallons (six 55-gal drums in each box); and
 - Duratek's Oil Express container, consisting of two tanks inside a sealed, welded cargo container. The oil-carrying capacity of this container is approximately 2,500 gal.
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 in sealands when shipped with DAW.

Aqueous Liquids for Incineration

1. Put the primary containers in outer-packs to provide double containment in the event of leakage or spillage from the primary container.

NOTE

Duratek can provide the "six-pack" double-containment boxes described above, if requested.

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 in sealands when shipped with DAW.

Waste Acceptance Guidelines

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 50 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 Duratek.

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. Duratek 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 ft³ type).

Waste Acceptance Guidelines

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

Potentially Clean Waste (PCW) for Green Is Clean

1. General PCW Packaging Guidelines

- PCW may be packaged in 55-gal drums. Duratek 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 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.

NOTE

Radioactive waste shipped with PCW and destined for other processing methods is also subject to various other specific packaging criteria.

3. “Special” PCW Packaging Requirements

3.1. *Low-Density Trash PCW*

- Package PCW trash in plastic bags (or equivalent) weighing less than approx. 50 lb each.

3.2. *Asbestos PCW*

- Package PCW asbestos in sealed plastic bags (or equivalent). The asbestos must be double-bagged, with the bags free of any tears or punctures on receipt. (For asbestos waste containing sharp objects that might tear a bag, Duratek 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 GIC bulk assay.
- No yellow “rad” bags.
- Asbestos Waste Shipment Record must accompany shipment.

Waste Acceptance Guidelines

3.3. ***Sludges (i.e., Waste Water, Oil, and Treated Sewage) 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.
- Absorbent material should be placed in the container to avoid freestanding liquid from occurring during waste shipping.

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.
- Absorbent material should be placed in the container to avoid freestanding liquid from occurring during waste shipping.

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).

Sealed Sources

Packaging instructions will be provided on a case-by-case basis after evaluation.

PCB Bulk Product Waste for Metals Processing

1. **Bulk Container Packaging:** Use plastic lined DOT specification bulk containers for PCB-contaminated metallic items. Clearly mark the liner and package 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 intermingled with non-PCB contaminated wastes.

Waste Acceptance Guidelines

Cask Shipments of High Radioactivity Waste

1. All cask shipments require prior approval from Duratek.
2. Customers using an NRC-licensed or other cask not owned by EnergySolutions or subsidiaries shall ensure that Duratek is a "Registered User" of the licensed cask prior to shipment to a Duratek facility.
3. Third-party cask documents (C of C, SAR, and handling and maintenance procedures and drawings) shall be made available to Duratek as the NRC Registered User of the cask prior to shipment of the cask to a Duratek 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. supersak, 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-Duratek 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.

- 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 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.

NOTE

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

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 50-lbs./container gross weight.

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 50-lbs. need to be palletized.

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