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SAFELY DELIVERING THE DEPARTMENT OF ENERGY'S VISION  
FOR THE EAST TENNESSEE TECHNOLOGY PARK MISSION

UCOR-4213

**Technical Information for  
Delivery of Waste to the Environmental  
Management Waste Management Facility  
Oak Ridge, Tennessee**

This document is approved for public  
release per review by:

Peter Kortman

UCOR Classification & Information  
Control Office

5/7/15

Date

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Delivery of Waste to the Environmental  
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Oak Ridge, Tennessee**

Date Issued—June 2015

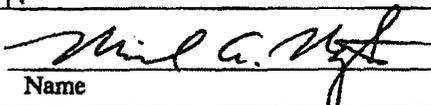
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Office of Environmental Management

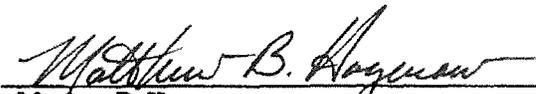
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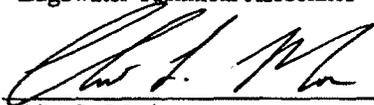
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## APPROVALS

<b>Technical Information for Delivery of Waste to the Environmental Management Waste Management Facility Oak Ridge, Tennessee</b>	<b>UCOR-4213</b>
	June 2015

<b>USQD Review Determination</b>	<input type="checkbox"/> USQD <input type="checkbox"/> UCD <input checked="" type="checkbox"/> CAT X <input type="checkbox"/> Exempt (Select Criteria 1-3 below.) USQD/UCD/CAT X No.: _____	
<b>Exemption Criteria</b>	<input type="checkbox"/> (1) Non-Intent Change <input type="checkbox"/> (2) DOE-Approved Document <input type="checkbox"/> (3) Chief Accounting Officer, Internal Audit, Labor Relations, General Counsel, Outreach & Public Affairs, or Project Controls Services OR <input checked="" type="checkbox"/> (4) Document identified in USQD-MS-CX-REPORTS-1074	
<b>USQD Preparer:</b>	 _____ Name	6/9/2015 _____ Date
<b>Exhibit L Mandatory Contractor Document</b>	<input checked="" type="checkbox"/> No (No PCCB Reviewer Signature Required) <input type="checkbox"/> Yes (Requires review by the Proforma Change Control Board.)	
<b>PCCB Reviewer:</b>	_____ Name	_____ Date

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## REVISION LOG

Revision Number	Description of Changes	Pages Affected
0	Initial issue of document. Replaces BJC/OR-3305, <i>Technical Information for Delivery of Waste to the Environmental Management Waste Management Facility, Bechtel Jacobs Company LLC, Oak Ridge, Tennessee</i>	All

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## ACRONYMS

ADP	Anomaly Detection Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
<i>CFR</i>	<i>Code of Federal Regulations</i>
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EMWMF	Environmental Management Waste Management Facility
ETTP	East Tennessee Technology Park
LDR	land disposal restriction
LA	Limited Area
LOI	Line of Inquiry
ORR	Oak Ridge Reservation
PSA	Pre-Shipment Assessment
PPA	Property Protection Area
PWAC	physical waste acceptance criteria
RCRA	Resource Conservation and Recovery Act of 1976
RFID	radio frequency identification
RFITS	Radio Frequency Identification Transport System
RTSC	Readiness to Ship Checklist (Form-2170)
SNM	special nuclear material
SPO	Security Police Officer
TID	tamper indicating device
WAC	waste acceptance criteria
WGS	Waste Generator Services
WLF	Waste Load Forecast
WTMS	Waste Transportation Management System
Y-12	Y-12 National Security Site
UCOR	URS   CH2M Oak Ridge LLC

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# 1. GENERAL

The Environmental Management Waste Management Facility (EMWMF) is a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) waste disposal facility located west of the Y-12 National Security Complex (Y-12) on Bear Creek Road. EMWMF is operated by URS | CH2M Oak Ridge LLC (UCOR) for the U.S. Department of Energy (DOE) Oak Ridge Office. To be considered eligible for disposal at EMWMF, the waste must be generated as a part of a CERCLA action on the DOE Oak Ridge Reservation (ORR) or at sites within the state of Tennessee where contamination can be directly related to ORR releases. The wastes must also meet the requirements set forth in the *Attainment Plan for Risk/Toxicity-Based Waste Acceptance Criteria at the Oak Ridge Reservation, Oak Ridge, Tennessee* (DOE/OR/01-1909&D3); *Waste Acceptance Criteria Attainment Team Project Execution Plan, Environmental Management Waste Management Facility Oak Ridge Reservation, Tennessee* (UCOR-4024); and this Technical Information document. Such wastes may be low-level radioactive wastes, land disposal restriction (LDR)-compliant Resource Conservation and Recovery Act of 1976 (RCRA) characteristic hazardous wastes, Toxic Substances Control Act of 1976 toxic wastes, asbestos-containing material (ACM), beryllium-containing material, and combinations thereof.

The previous version of this document, *Technical Information for Delivery of Waste to the Environmental Management Waste Management Facility, Bechtel Jacobs Company LLC, Oak Ridge, Tennessee* (BJC/OR-3305), is superseded by this document.

## 1.1 PURPOSE

The purpose of this document is to:

- Identify Waste Generator requirements for delivery of approved waste lots for disposal at EMWMF
- Present guidance resulting from experience and lessons learned related to the delivery and disposal of wastes at EMWMF

This document is not intended to provide guidance or direction related to approval of waste lots by the UCOR Waste Acceptance Criteria (WAC) Attainment Team or UCOR Nuclear Materials Control and Accountability. These UCOR organizations and their activities related to waste lot approval are discussed for the purpose of identifying prerequisite activities necessary to implement the requirements of this document. Additional guidance related to the overall process for obtaining approval to dispose of waste at EMWMF can be found in BJC/OR-3401, *Process to Obtain Approval to Dispose of Waste at the Environmental Waste Management Facility, Oak Ridge, Tennessee*.

Terms and definitions used in this document are presented in Appendix A. Appendix B contains a flowchart depicting the major steps towards obtaining approval to ship a waste lot to EMWMF.

## 1.2 SUBMITTALS

Documents and forms that must be prepared, submitted, and approved to obtain the designation as an approved waste lot are identified in Table 1.

**Table 1. Required submittals**

Form No.	Action owner	Form title	Description	Submittal to	Time frame
Form-1297 <sup>1</sup>	Waste Generator	EMWMF Material Screen Calculation Worksheet	Demonstrates compliance with EMWMF Administrative WAC for Nuclear Criticality Safety	EMWMF WGS Lead	Complete prior to submitting initial waste lot profile to WAT
Form-1015	Waste Generator	Request for Approval of Variance from Physical Waste Acceptance Criteria (PWAC) for the Environmental Management Waste Management Facility (EMWMF)	Provides generator justification for deviating from PWAC; provides EMWMF conditions for granting variance	EMWMF WGS Lead	Initial approved variance request to be included in final profile; submit requests 30 days prior to submitting waste lot profile to WAT. Variances requested after WAT approval of the waste lot profile must be approved by EMWMF prior to implementation of the variance.
Form-557	Waste Generator	Request for Authorization to Ship Nuclear Materials to URS   CH2M Oak Ridge LLC	Describes the waste lot material to gain NMC&A approval for shipment for disposal	ETTP Nuclear Materials Accounting Office	Five (5) working days are required for reviewing and processing the request after receipt of the completed documentation and final approval of the waste profile.
Form-2170	Waste Generator	EMWMF Readiness To Ship Checklist (RTSC)	Demonstrates all requirements have been met and Project is fully prepared to send compliant waste to EMWMF	EMWMF WGS Lead	Generator may submit partial RTSC to the EMWMF WGS Lead concurrent with submittal of final draft profile to WAT, but no later than two (2) weeks prior to initial delivery of an approved waste lot to EMWMF. See Chap. 3 of this document.
Form-933	EMWMF WGS Lead	Workplace Airborne Radioactivity Evaluation (WARE)	Used to set up daily RADCON parameters indicating the appropriate survey limits to use for each waste lot; also determines DAC values to use each day for air sampling.	EMWMF WGS Lead/EMWMF Lead Radiological Engineer	Radiological data provided for WARE completion following Waste Generator submittal of profile with the RTSC; WARE form will be completed prior to approval of RTSC.

<sup>1</sup>Wastes accepted for placement into EMWMF are limited, in terms of Nuclear Criticality Safety (NCS), to requirements contained in the Administrative WAC. Specifically, the quantity of fissile material in a waste package shall be limited, so that it remains subcritical during all phases of waste cell operations, including active waste disposal operations and inactive post-closure care, and that moderating materials such as beryllium and graphite are not present at unacceptable levels (> 0.1% wt.). Two options for Waste Generators to demonstrate compliance with the NCS requirements are (1) prepare an EMWMF Material Screen Calculation Worksheet (Form-1297), obtain approvals as indicated, and submit the completed form to the EMWMF WAC Attainment Team, along with the waste profile, or (2) prepare a specific NCS evaluation/determination. Approval of the Form-1297 or specific NCS evaluation/determination is a prerequisite for EMWMF WAC Attainment Team approval of a waste lot, and should be obtained prior to submitting the waste profile.

DAC = derived air concentration  
 ETTP = East Tennessee Technology Park  
 NMC&A = Nuclear Materials Control and Accountability  
 RADCON = radiological control  
 WAT = Waste Acceptance Technician  
 WGS = Waste Generator Services

## 2. GENERAL EMWMF INFORMATION

### 2.1 ADVANCE NOTIFICATION, COMMUNICATION, AND CHANGED INFORMATION

EMWMF Operations and the Waste Generators are encouraged to communicate throughout the waste disposal campaign. This communication is especially important during the early stages of the project to discuss waste lots, waste volumes, physical waste acceptance criteria (PWAC) variance requests, industrial hygiene, schedules and milestones, waste generation/delivery rates and schedule, waste packaging, data and information requirements, etc. Both EMWMF Operations and the Waste Generators may request meetings or discussions, and both are expected to participate in good faith and in timely fashion with the common goal of safe, compliant, and efficient disposal of waste. Contact information is discussed in Chap. 6.

If the Waste Generator determines that any data or information provided to the EMWMF WAC Attainment Team or to the EMWMF Waste Generator Services (WGS) Lead to obtain approval to dispose of waste in EMWMF has changed or were incorrect, the Waste Generator shall immediately provide notification to the EMWMF WGS Lead and the EMWMF WAC Attainment Team. If a change in the waste indicates the need for a PWAC variance, the Waste Generator shall not ship the waste in question until the EMWMF WGS Lead has made a determination of the need of a variance and the Waste Generator has obtained approval of any necessary PWAC variance. Management of changes to the Readiness to Ship Checklist (RTSC) is discussed in Chap. 3.

### 2.2 EMWMF INFORMATION

#### 2.2.1 Access

EMWMF includes two access areas: the Limited Area (LA) and Property Protection Area (PPA). The LA consists of the area within the security fence encompassing the disposal cells. Security fencing and Security Police Officers (SPOs) control access to the LA. The PPA includes the area outside the LA where various EMWMF Operations occur, including the administrative office trailers where visitors report (Building 9983-GV). For the purpose of this document, the term visitor includes non-EMWMF Operations personnel.

A need to know and a DOE photo badge issued by, or enrolled through the East Tennessee Technology Park (ETTP) Badge Office are required for access to the EMWMF LA. Un-cleared U.S. citizens may visit EMWMF provided the need for the visit is justified and they obtain a DOE visitor badge issued by the ETTP Badge Office prior to entering the EMWMF LA. Un-cleared visitors who do not have a DOE badge shall request a DOE visitor badge by sending an e-mail request to the EMWMF WGS Lead. Refer to Table 2 for specific access requirements for visitors.

Access by all visitors to the EMWMF LA requires EMWMF Site Access Orientation, Visitor Access Briefing, or Driver Orientation in accordance with PROC-EMWMF-SF-011, *EMWMF Site Access Control*. These briefings are provided by EMWMF Operations personnel and is intended to provide an overview of the potential hazards expected on-site and controls in place to mitigate those hazards.

Any person who is not a U.S. citizen will not be allowed to visit the EMWMF (both the PPA and LA) without prior written approval from DOE. Requests shall be coordinated through UCOR Security.

All personnel and vehicles are subject to search. Unauthorized vehicles and articles are not allowed inside the EMWMF LA. Signs indicating prohibited articles (e.g., unauthorized cell phones, weapons, cameras) are posted.

**Table 2. Visitor requirements for visitor access**

	<u>Visitor access to administrative areas</u>	<u>Visitor access to the PPA beyond the administrative areas<sup>1</sup></u>	<u>Visitor access to the LA<sup>1</sup></u>
Register in the EMWMF Visitor Log each visit	X	X	X
Provide photo identification	X	X	X
Demonstrate a need to be on-site	X	X	X
Complete the EMWMF Visitor Access Briefing or Site Access Orientation		X	X
Have appropriate personal protective equipment (PPE) <sup>2</sup>		X	X
Possess a DOE Identification Badge enrolled through the ETPP Badge Office			X
Demonstrate a need to enter the LA.			X

<sup>1</sup>Persons who complete the EMWMF Site Access Orientation or Driver Orientation will be given an EMWMF Site Access Card. However, even with a Site Access Card, non-EMWMF Operations personnel will typically be escorted when in the PPA, and shall be escorted when in the LA for physical safety reasons.

<sup>2</sup>Appropriate PPE as determined by the EMWMF Site Safety and Health Representative typically includes the following minimum items

- Hardhat
- Safety glasses with side shields
- High visibility safety vest
- Sturdy work shoes or boots
- Work gloves (must be available on the person for use if needed)

**2.2.1.1 Driver Access to the LA**

Refer to Sect. 2.4 of this document.

**2.2.2 Hours of Operation**

The Waste Generator shall observe the established hours of operation, unless written approval of an exception is received from the EMWMF Operations Manager. The normal hours of waste receipt at EMWMF are posted internally at <http://intranet.ettp.gov/WasteGeneratorServices/index.html> or externally at <http://www.ucor.com/emwmf.html>. Requests for extending the normal work day or for weekend receipt shall be submitted to the EMWMF WGS Lead generally at least three working days in advance of the planned extended work day or weekend work. Emergency work day extensions will be reviewed on a case-by-case basis by the EMWMF Operations Manager.

EMWMF staff will provide notice regarding changes in EMWMF hours due to weather, holidays, construction activities, or other reasons.

**2.2.3 Scheduled Shipments**

It is the responsibility of the Waste Generator to ensure the Waste Load Forecast (WLF) is updated according to schedule changes or delays. Close communication with EMWMF Operations is encouraged as these situations arise. Trucks arriving that have not been loaded into the WLF may be held in order to verify waste is approved. Once verified, such shipments may be placed in the disposal queue or held and

unloaded as time allows. However, EMWMF Operations reserves the right to return the unplanned shipment to the Waste Generator or hold the truck overnight until the following work day for unloading. If a truck is held overnight, the Waste Generator shall arrange for pick-up of the driver and return of the driver the following work day.

Training of appropriately identified Waste Generator personnel on use of the WLF shall be requested from the UCOR Waste Performance Integration staff prior to utilizing the system.

#### **2.2.4 Shipping Records**

All waste delivery vehicles that utilize the Radio Frequency Identification Transport System (RFITS) shall be equipped with a Radio Frequency Identification (RFID) tag. The RFID tag identifies the vehicle and waste load as required to electronically transmit data into the Waste Transportation Management System (WTMS). Additionally, training of appropriately identified Waste Generator personnel for both RFITS and WTMS shall be requested from the UCOR Waste Performance Integration staff prior to utilizing the system.

Waste shipments utilizing paper (hardcopy) shipping documents shall be performed using shipping documentation prepared through WTMS.

UCOR waste shipments arriving via the Haul Road shall comply with UCOR-4391, *Transportation Safety Document for On-Site Transport on the East Tennessee Technology Park to Environmental Management Waste Management Facility Haul Road Within the Oak Ridge Reservation, Oak Ridge, Tennessee*. Non-UCOR waste shipments shall comply with other similar transportation authorization documentation, as determined by the applicable transportation authority having jurisdiction.

#### **2.2.5 Turn Time**

For waste delivery vehicles outfitted with an RFID tag, arrival and departure times will be recorded electronically when entering and exiting EMWMF via the Haul Road or EMWMF scale. The difference between arrival and departure times represents the “turn time” (i.e., total cycle time in which the truck has been on-site at EMWMF). For delivery vehicles entering EMWMF without an RFID tag, EMWMF Operations personnel will manually record the date and time of arrival and departure on the hardcopy shipping paper when the vehicle arrives at the designated dump ramp. This information will be manually entered into WTMS by EMWMF Staff.

#### **2.2.6 Incoming Radiological Survey**

Unless excepted by 10 *CFR* 835.405(e) (*Occupational Radiation Protection*, “Receipt of packages containing radioactive material”), deliveries of waste categorized as U.S. Department of Transportation (DOT) Class 7 Low Specific Activity (LSA), Surface Contaminated Object, White-I, Yellow-II, or Yellow-III through the EMWMF scales must stop at the incoming radiological survey station located just north of the EMWMF scale. EMWMF Radiological Control Technicians will perform incoming radiological surveys. If vehicle/package exceeds applicable limits for radiation levels, or if removable contamination is detectable, the Waste Generator will be notified by EMWMF staff so that appropriate corrective actions can be initiated. Waste deliveries to the EMWMF via the Haul Road or from Y-12 via the EMWMF access road off Bear Creek Road will proceed directly to the disposal cell. If radiological surveys are conducted for these vehicles, they will be performed within the LA of EMWMF.

All radioactive waste shipments to EMWMF must be in accordance with applicable DOT and DOE Radiological Protection requirements for protection of worker health and the environment. It is expected

that the exteriors of waste shipping containers (e.g., dump trucks, intermodals) will be free of removable contamination when they arrive at and depart from EMWMF.

Receipt of conveyances with removable contamination will result in impacts to operational efficiency, and subsequently, reductions in turn times. Current transportation equivalence of safety documentation allows for minimal incoming radiological surveys (approximately 1 in 20), which may be increased for new generators and generators that do not practice sound radiological control practices.

### **2.2.7 Decontamination**

EMWMF has limited capabilities and facilities for decontaminating waste delivery vehicles, shipping containers, and similar items; therefore, Waste Generators shall make every reasonable effort to ensure that wastes are packaged and delivered in a manner that minimizes the potential for contaminating these items during waste unloading. If equipment or facilities become contaminated, EMWMF will work with the Waste Generator to develop a solution to the problem(s). Should it be determined that decontamination of a waste delivery vehicle cannot occur within normal business hours and the vehicle is to remain at the EMWMF overnight, the Waste Generator shall arrange pickup of the driver at the EMWMF and drop off when the vehicle is released back to the generator. At this time, Waste Generators are not allowed to perform decontamination activities on the EMWMF footprint.

### **2.2.8 Weather**

EMWMF has consistently remained open to receive waste during available scheduled hours. However, it must be recognized that weather conditions may occasionally impact EMWMF waste receiving and placement operations. Waste receiving operations should not be expected during severe inclement weather (lightning, heavy precipitation, high winds, dense fog, or other weather-related events that limit or prevent the safe processing of waste vehicles). Freezing weather may also result in delays due to the need to spray water to control dust during waste dumping operations and the potential formation of ice on waste delivery vehicles and unloading ramp. Based on the duration of the weather-related waste placement suspension, trucks may be held for delayed unloading or be directed to return to the waste generating site.

In the event delays or suspension of waste receipt occur due to weather, electronic mail notifications will be sent to Waste Generator points-of-contact. Subsequent notifications will follow when delays or suspensions have been lifted. Note that EMWMF follows the direction of the ETP Park Shift Superintendent's Office when weather conditions require protective action.

## **2.3 REQUIREMENTS AND GUIDANCE FOR ADMINISTRATIVE AND PWAC**

The Waste Generator shall package and deliver waste such that it meets the Administrative WAC and PWAC, as presented in Table A.3 and Table A.4, respectively, of the WAC Attainment Plan (DOE/OR/01-1909&D3). This document presents additional operational requirements and guidance for delivery and disposal of wastes at EMWMF.

EMWMF reserves the right to periodically inspect the Waste Generator's management assessment surveillance reports and to inspect the Waste Generator's waste certification documents.

## **2.4 REQUIREMENTS FOR DRIVER TRAINING, TRUCK TARE WEIGHTS, AND VEHICLE/WASTE LOT IDENTIFICATION**

Only properly badged, trained, and equipped drivers may deliver waste to EMWMF. A new driver delivering waste to the EMWMF shall attend the EMWMF Driver Orientation Briefing (training is approximately 1 hour) prior to the delivery of that driver's first waste shipment. One week's advance notice should be provided to the EMWMF Site Safety and Health Representative to schedule a new driver's briefing. Waste Generators should send drivers to EMWMF in groups to the extent practicable.

All waste delivery personnel must, at a minimum, have the following items:

- DOE Identification Badge issued by or enrolled through the ETTP Badge Office
- EMWMF Site Access Card (provided at the conclusion of the EMWMF Driver Orientation Briefing)
- Hardhat
- Safety glasses with side shields
- High visibility safety vest
- Sturdy leather work boots
- Leather gloves

Prior to the initial waste shipment, the Waste Generator shall provide the UCOR RFITS Administrator with the tare weight for each transport vehicle. Vehicle tare weights may be recorded using the EMWMF scale after an initial waste shipment only after advance coordination with the EMWMF WGS Lead.

All transport vehicles carrying a specific waste lot shall be identified via RFID tag, unless otherwise approved by the UCOR WTMS Administrator, to facilitate the expeditious recording of the truck's total weight and the identification of the specific waste lot. Vehicle/waste lot identification shall be coordinated with the UCOR WTMS Administrator.

## **2.5 PACKAGING AND TRANSPORT REQUIREMENTS**

Waste shipments received at EMWMF, as well as waste transport vehicles leaving EMWMF and returning to the Waste Generator site, are subject to all applicable provisions of the Hazardous Materials Transportation Act, Federal Motor Carrier Safety Regulations, and DOE Order 460.1, *Packaging and Transportation Safety*. UCOR and UCOR Subcontractor waste shipments arriving via the Haul Road shall comply with UCOR Transportation procedures (PROC-TR-9500 series); UCOR Subcontractors shall also comply with the UCOR *Technical Specification for Transportation* (SPG-000000-0002). Non-UCOR waste shipments arriving via the Haul Road shall comply with transportation requirements outlined in a Memorandum of Understanding.

The Waste Generator shall not use the following types of transport vehicles:

- Bottom or side-dumping trucks/trailers
- Framed or frameless end dump trailers

## **2.6 REQUIREMENTS FOR CLASSIFIED WASTES AND SPECIAL NUCLEAR MATERIAL**

In addition to all other WAC, the Waste Generator shall comply with the following requirements for classified wastes and special nuclear material (SNM), dependent upon the Waste Generator's safeguards and security determination:

- The Waste Generator shall obtain review from the Waste Generator's derivative classifiers or the Site Classification and Information Control Office to determine if the proposed waste lot or any portion thereof is unclassified, visually classified, non-visually classified, or SNM. The Waste Generator shall promptly provide the determination to the EMWWMF Security Manager. Records of determinations that indicate the waste is visually classified, non-visually classified, and/or SNM shall be managed as Official Use Only.
- If the waste lot or any portion thereof is determined to be visually classified, non-visually classified, or SNM, the Waste Generator shall comply with the following requirements:
  - Specifically state the presence of the visually classified waste, non-visually classified waste, and/or SNM in the information submittal to the EMWWMF WAC Attainment Team.
  - Develop a project-specific security plan and obtain approval from the Waste Generator's Site Security organization for the transportation of visually classified waste, non-visually classified waste, and/or SNM to EMWWMF.
  - Unless a project-specific security plan contains more stringent requirements, visually classified wastes can be received at EMWWMF as follows:
    - Contained in a heavy-duty supersack that is contained in a dump truck or similar dump container. The load shall be tarped, and the Waste Generator's SPOs shall install tamper indicating devices (TIDs), which must be intact upon delivery to EMWWMF. TIDs will be examined by the SPO at EMWWMF prior to removal.
 

NOTE: Supersacks are not automatically approved for visually classified matter; it must be contained in a hard sided, hard topped container capable of being locked and a TID applied in accordance with the EMWWMF Security Plan. An addendum to the EMWWMF Security Plan must be submitted and approved by UCOR Security and DOE Security before supersacks would be allowed.
    - Contained in a heavy-duty supersack covered by a tarp and transported on a flatbed truck (two containers are required—the first container is the supersack, and the second container is the tarp.) TIDs shall be appropriately installed on the tarp by the Site Protective Force and the TIDs must be intact upon delivery to EMWWMF. TIDs shall be examined by the SPO at EMWWMF prior to removal.
    - Contained in rigid containers (e.g., B-25 boxes) that comply with the PWAC and requirements set forth in Appendix C or have an approved waste lot-specific PWAC variance. Light and medium duty supersacks are not acceptable for visually classified wastes, unless specially approved by the Waste Generator's Site Security Organization and concurred with by both UCOR and DOE Security (refer to the note above regarding use of supersacks).
  - Unless a project-specific security plan contains more stringent requirements, non-visually classified wastes can be received at EMWWMF as follows:
    - In bulk form in a dump truck bed or similar container. No additional container, such as a supersack or B-25 box, is required for non-visually classified waste. The truck bed/container shall be tarped. TIDs may or may not be required on non-visually classified shipments, but will be administered as specified in the project-specific security plans.
    - Rigid containers shall be completely filled whenever possible. Remaining void space must be determined and mitigated, according to Appendices D and E, to meet the Administrative WAC for containerized waste.
    - If soft-sided containers are used to dispose of items/empty containers (e.g., pipe 6–12 in. in diameter, drums, tanks), the contents must be crushed or shredded. Remaining void space

must be determined and mitigated according to Appendices D and E, and the soft-sided package must fit into an 18-in. lift.

- TIDs for wastes categorized as SNM shall be obtained from the appropriate Waste Generator organization as applicable. TIDs for wastes categorized as classified shall be obtained from the Site Protective Force.
- Only waste delivery vehicle operators and personnel in the waste delivery vehicles providing escort that have a need to access the EMWWMF LA, have an appropriate clearance, and have appropriate EMWWMF site training will be allowed access to the waste dump ramp in the EMWWMF LA during classified waste and SNM disposal operations. Uncleared waste delivery vehicle operators, who are escorted by the EMWWMF SPOs or EMWWMF Operations personnel, will be allowed to drive to and unload the vehicles at the waste dump ramp. Appropriately cleared escorts must ensure that the uncleared individuals do not observe the disposal operations.
- Disposal of classified wastes may occur at any time during normal waste receipt operations. However, coordination of classified waste receipts with the EMWWMF WGS Lead shall occur prior to shipment.
- Classified waste and SNM deliveries will be inspected by an EMWWMF SPO to check the TIDs on the containers/packages and to verify that the containers/packages were not breached during transport.
- Classified discussions shall not be conducted at EMWWMF.
- Classified information and documents shall not be transmitted, mailed, or delivered to EMWWMF.

## **2.7 REQUIREMENTS FOR RESPONSE TO ANOMALOUS WASTE**

If anomalous waste is identified at EMWWMF, the Waste Generator responsible for the waste will be promptly notified. Response to the anomalous waste will be implemented in accordance with Appendix F “EMWWMF Anomalous Waste Graded Response Approach” (referred to herein as the “Graded Response Approach”). The Graded Response Approach presents a series of responses by EMWWMF following the discovery of anomalous waste. This graded approach provides a process to ensure that the level of response by EMWWMF to anomalous waste is commensurate with the risk or impacts associated the anomalous condition.

Field implementation of response measures at EMWWMF will be performed by appropriately trained EMWWMF personnel in accordance with approved work control documents. The Waste Generator will be responsible for implementing appropriate corrective actions at the waste generation site to prevent recurrence of the anomalous condition.

## **2.8 REQUIREMENTS FOR RESPONSE TO WASTE LOAD PROBLEM**

When a waste load problem occurs (e.g., stuck load, vehicle problems), the EMWWMF Operations Manager or the EMWWMF WGS Lead will notify the Waste Generator of the problem(s) and any subsequent suspension of and/or restriction on further shipments to EMWWMF, pending resolution of the problem. The Waste Generator will be responsible for responding to waste load problems, if necessary, and the Waste Generator’s responsibilities include, but are not limited to:

- Responding to EMWWMF to investigate the problem
- Participating in the development and implementation of plan(s) to correct the issue

- Inspecting the waste transport vehicle and preparing any necessary transportation documentation before the vehicle departs EMWMF
- Supporting the preparation of all necessary documentation to conduct event investigations and/or prepare lessons learned documentation
- Providing funds for resolving the waste load problem, if necessary
- Preparing and implementing corrective action plans to prevent recurrence of additional deliveries of problem waste to EMWMF

## **2.9 REQUIREMENTS FOR LDR TREATMENT OF RCRA HAZARDOUS WASTE**

The Waste Generator is responsible for treating RCRA hazardous waste(s) to meet the applicable LDRs of RCRA (i.e., 40 *CFR* 268, *Land Disposal Restrictions*) such that only WAC compliant waste is received at EMWMF. For waste that is treated to meet LDRs, a copy of the treatment plan shall be provided to EMWMF Operations prior to initiating treatment, in order to provide information on the method(s) of accomplishment for rendering the waste LDR compliant. All shipments of LDR-treated waste shall be accompanied by a certification document signed by the Waste Generator compliance authority citing the appropriate certification language identified in 40 *CFR* 268.

### **3. READINESS TO SHIP REQUIREMENTS**

The Waste Generator shall prepare the RTSC (Form-2170), including all required data, information, plans, and documents, as specified in the instructions for completing the form. The Waste Generator shall submit either an electronic copy or hardcopy of the RTSC to the EMWMF WGS Lead. Generators may submit the RTSC concurrent with submittal of the final draft waste lot profile to the Waste Acceptance Technician, but no less than two weeks before planned shipments in order for review, comment resolution, and revision, as necessary. When the RTSC and supporting data and information are complete and acceptable, the EMWMF WGS Lead will provide Lines of Inquiry (LOIs) for the Pre-Shipment Assessment (PSA) to be performed by EMWMF Operations. Following successful completion of the PSA, the WGS Lead will issue to the Waste Generator a written authorization to ship the waste identified in the RTSC to EMWMF.

Waste Generators are strongly encouraged to plan appropriately for preparation and review of the RTSC and to avoid time-critical situations that may result in schedule delays and associated cost impacts if the checklist and supporting data and information are determined incomplete or inadequate, as the PSA may not be finalized until the RTSC is complete and approved.

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## 4. PHYSICAL WASTE ACCEPTANCE CRITERIA VARIANCES

### 4.1 VARIANCE REQUESTS

If the Waste Generator plans to request a variance from the PWAC for a waste lot or a portion of a waste lot, the Waste Generator should communicate with the EMWMF WGS Lead to discuss the proposed variance request, the potential impacts on EMWMF Operations and the Waste Generator, and measures to mitigate the impacts. In addition, the Waste Generator shall complete form Form-1015, *Request for Approval of Variance from Physical Waste Acceptance Criteria (PWAC) for the Environmental Management Waste Management Facility (EMWMF)*, and submit the form to the EMWMF WGS Lead, along with any additional information requested. The EMWMF WGS Lead will provide a written response to the variance request to the Waste Generator.

Approved blanket variances for certain PWAC are posted at:

- Internal website: <http://intranet.ettp.gov/WasteGeneratorServices/index.html>
- External website: <http://www.ucor.com/emwmf.html>

Known PWAC variance request approvals and approved blanket PWAC variances must be submitted by the Waste Generator to the EMWMF WAC Attainment Team with the waste lot profile to receive WAC Attainment Team approval to dispose of wastes in EMWMF.

If a Waste Generator needs to revise a previously approved variance request, the Waste Generator shall:

- Track changes on the original submittal of the variance request so that changes including strike-outs and newly added text are clearly identified
- Indicate the appropriate revision number
- Indicate the reason for the revision and that it supersedes the previously approved variance request
- Submit the revised variance request to the EMWMF WGS Lead for review and processing
- Notify the EMWMF WAC Attainment Team and make changes to the waste profile, as required

### 4.2 COST IMPLICATIONS

The Waste Generator or EMWMF Operations may incur additional costs for implementing a Waste Generator's requested variances or addressing wastes that do not comply with the WAC (special handling needs, special handling equipment, etc., for off-loading, placing, and managing the Waste Generator's waste at EMWMF). UCOR Management will address the distribution of cost burdens representing the best value and give coordinated direction to all project participants. The Waste Generator may be required to fund all or a portion of the costs.

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## 5. PRE-SHIPMENT ASSESSMENT

New waste lots, waste lots that have been suspended by the WAC Attainment Team or that have been dormant for an extended period of time (e.g., shipments not made within the previous six months), and waste lots that have a history of waste load problems or anomalous waste may be subjected to a PSA, with the WGS Lead (or designee) leading the assessment team. EMWMF Operations will develop LOIs for the PSA and provide them to the Waste Generator generally one week prior to the assessment. Timeframes for performance of the PSA can vary, but generally should be completed within two weeks of the first planned shipment. The PSA should be completed at least two working days prior to a Project's first planned shipment to allow time to resolve any outstanding issues. To facilitate timely completion of the PSA, the Waste Generator should develop an evidence file including, but not limited to, copies of work control documents, training related to waste acceptance at EMWMF, and other project documentation that address each LOI. The Waste Generator shall take appropriate action(s) to address any observations and/or findings and submit documentation to the WGS Lead to complete the PSA. When complete, the PSA will be signed off and submitted to the EMWMF Quality Assurance Manager. Copies of the PSA will be provided to the Waste Generator upon request.

Examples of potential LOIs include, but are not limited to, the following:

- Provide any self-assessments that have been performed pertaining to waste management and project readiness.
- Training for staff responsible for compliant implementation of waste lot profile and Anomaly Detection Plan (ADP) controls for Project staff have been performed.
- Process in place to identify, segregate, and control anomalies according to the ADP.
- Process in place to ensure that a signed ADP Certification Statement is sent with each shipment.
- The variances approved for WL XXX.XXX have been incorporated into work packages/operator aids to ensure conditions are met.
- Waste shipments have been scheduled in the WLF.
- Information to set up waste lot in WTMS/ RFITS has been provided.

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## 6. POINTS OF CONTACT

The points of contact for various subjects are presented at the EMWMF Operations website at the following web addresses:

- Internal website: <http://intranet.ettp.gov/WasteGeneratorServices/index.html>
- External website: <http://www.ucor.com/emwmf.html>

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## 7. REFERENCES

- 10 *CFR* 835. *Occupational Radiation Protection*, Section 405, "Receipt of packages containing radioactive material, Washington, D.C.
- 40 *CFR* 268. *Land Disposal Restrictions*, Washington, D.C.
- BJC/OR-3401. *Process to Obtain Approval to Dispose of Waste at the Environmental Waste Management Facility, Oak Ridge, Tennessee*, 2010, Bechtel Jacobs Company LLC, Oak Ridge, TN.
- DOE Order 460.1. *Packaging and Transportation Safety*, latest revision, U.S. Department of Energy, Washington, D.C.
- DOE/OR/01-1909&D3. *Attainment Plan for Risk/Toxicity-Based Waste Acceptance Criteria at the Oak Ridge Reservation, Oak Ridge, Tennessee*, 2004, U.S. Department of Energy, Oak Ridge, TN.
- PROC-EMWMF-SF-011. *EMWMF Site Access Control*, latest revision, URS | CH2M Oak Ridge LLC, Oak Ridge, TN.
- PROC-TR-9500 Series. *Transportation Procedures*, latest revisions.
- SPG-000000-0002. *Technical Specification for Transportation*, 2011, URS | CH2M Oak Ridge LLC, Oak Ridge, TN.
- UCOR-4024. *Waste Acceptance Criteria Attainment Team Project Execution Plan Environmental Management Waste Management Facility, Oak Ridge Reservation, Tennessee*, latest revision, URS | CH2M Oak Ridge LLC, Oak Ridge, TN.
- UCOR-4391. *Transportation Safety Document for On-Site Transport on the East Tennessee Technology Park to Environmental Management Waste Management Facility Haul Road Within the Oak Ridge Reservation, Oak Ridge, Tennessee*, latest revision.

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**APPENDIX A.  
TERMS AND DEFINITIONS**

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## Terms/Definitions

- Administrative Waste Acceptance Criteria (WAC) – mandatory requirements for waste acceptance established in the Environmental Management Waste Management Facility (EMWMF) Record of Decision or other agreements with regulatory agencies.
- Analytical WAC – numerical concentration of a constituent in a given waste lot such that, if the waste form with this concentration occupied the entire disposal cell volume, risk or Hazard Index (HI) to a public receptor would be equal to specified criteria.
- Anomalous Waste – waste that does not meet any or all of the EMWMF WAC and/or is not included in the Approved Waste Lot. Potentially anomalous waste items are identified on the project-specific Anomaly Detection Checklist submitted as part of the approved waste profile.
- Approved Waste Lot – for a given waste lot to receive this designation and become eligible for disposal at the EMWMF, the Waste Generator must obtain the following:
  1. UCOR WAC Attainment Team approval (DOE/OR/01-1909&D3, *Attainment Plan for Risk/Toxicity-Based Waste Acceptance Criteria at the Oak Ridge Reservation, Oak Ridge, Tennessee*)
  2. UCOR Nuclear Material Control and Accountability approval (see Sect. 1.2)
  3. UCOR EMWMF Waste Generator Services (WGS) Lead authorization to ship (see Sect. 1.2)
- Asbestos - A family of naturally occurring mineral fibers uniquely suited for use in noncombustible, non-conducting, or chemically-resistant material. Common varieties of asbestos regulated by the Occupational Safety and Health Administration include chrysotile, amosite, and crocidolite. The following apply to various types of asbestos waste received at EMWMF:
  - Category I Non-friable asbestos-contaminated material (ACM) – asbestos-containing packing, gaskets, resilient floor covering, construction mastics, and asphalt roofing products containing more than one percent asbestos as determined using the method specified in 40 *CFR* 763, Appendix A.
  - Category II Non-friable ACM – any material, excluding Category I non-friable ACM, containing more than one percent asbestos as determined using the methods specified in 40 *CFR* 763, Appendix A, that when dry cannot be crumbled, pulverized, or reduced to powder by hand pressure.
  - Friable ACM – any material containing more than one percent asbestos as determined using the method specified in Appendix A, Subpart F, 40 *CFR* Part 763, Section 1, “Polarized Light Microscopy” that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.
- Auditable Safety Analysis (ASA) WAC – numerical concentration of a radioactive constituent in a given waste lot derived from the facility safety authorization basis such that, if the wastes remain below these concentrations, the categorization of the EMWMF as a Radiological Facility is preserved.
- Beryllium Waste – A waste material containing beryllium, if beryllium is present in the mixture in concentrations greater than 0.1 percent (1000 parts per million).
- Bulk Disposal – dumping of wastes from dump trucks or intermodal containers from an engineered dump ramp into an EMWMF disposal cell where the waste is typically pushed and compacted using heavy equipment.

- **Classified Waste** – includes matter that has been identified as being classified and requires enhanced safeguards and security. This designation could apply to items that include, but are not limited to, components, parts, tooling, gauges, liquids, powder, scrap, molds, packaging container inserts, other equipment, or any combination thereof that contain or reveal classified information.
- **Direct Placement** – picking up waste that is containerized, palletized, on dunnage, or oversized wastes from delivery vehicles (typically flatbeds) and placing them at their final disposal location in an EMWMF disposal cell with appropriate equipment (e.g., fork trucks or cranes). Little or no subsequent movement of material is required.
- **Direct Dumping** – directing the conveyance to dump its contents in an EMWMF disposal cell at the final resting place for the waste. Little or no subsequent movement of material is required.
- **Dispersible Wastes** – a waste lot that is either soil-like or contains material that could be made airborne by the wind or disposal operations (e.g., unloading, pushing, spreading, and compacting), or radiologically contaminated materials representing an inhalation hazard that can become airborne and are easily spread or dispersed during waste unloading, spreading, and disposal activities. These materials include, but are not limited to, powders, dust, concrete scabble, concrete dust, dry soil, and similar fine materials. Such wastes can be containerized or immobilized to render it non-dispersible. If properly containerized or immobilized, such waste is considered non-dispersible. Questions regarding dispersible waste should be directed to the EMWMF WGS Lead.
- **Physical Waste Acceptance Criteria** – physical limitations placed on waste forms. These limitations include grain size, dimensions, thickness, weight limitations, free liquid, compactability, double bagging of asbestos material, etc.
- **Pre-Shipment Assessment (PSA)** – an assessment performed by the EMWMF WGS Lead before waste shipments begin, but following submittal of the Readiness to Ship Checklist. This assessment is intended to evaluate the Waste Generator’s compliance with WAC requirements, and results in final approval to commence waste shipments to the EMWMF. EMWMF Operations will provide Lines of Inquiry (LOIs) to a Generator generally within five business days in advance of the assessment. Upon receipt of the PSA LOIs, the Waste Generator is encouraged to assemble relevant documentation to facilitate timely completion of the PSA and subsequent authorization to ship.
- **Radio Frequency Identification (RFID)** – a technology that uses small radio transponders called “tags” that are attached to waste transport vehicles that allow them to be identified and tracked by a remote system. Typically, an RFID tag includes an integrated circuit that stores data and interfaces to an antenna, allowing stored data to be retrieved by the remote system.
- **Radio Frequency Identification Transport System (RFITS)** – an electronic tracking system that facilitates the “paperless” transport of waste to the EMWMF. Information that describes each shipment is burned onto a RFID tag mounted on the vehicle. The tag is read at intervals along the shipping route and again when the vehicle enters and exits the EMWMF. This information uploads automatically into the Waste Transportation Management System (WTMS) to complete the consolidation of all UCOR waste shipment data in a central data repository.
- **Sharps** – hypodermic needles, syringes, pasteur pipettes, scalpel blades, razor knives, etc., requiring special handling and disposal.
- **Special Nuclear Material** – any material so designated in Section 51 of the Atomic Energy Act of 1954, as amended.
- **Sum of Fractions (SOF)** – sum of the ratios of the concentrations of site-related contaminants in a waste to their corresponding WAC concentration values. There are two separate SOFs for analytic WAC compliance—one for carcinogenic risk and one for toxicity HI. There are also separate SOF

applications for ASA-derived WAC compliance based on the facility safety authorization basis, and for administrative WAC compliance based on Tennessee Department of Environment and Conservation waste classification regulations.

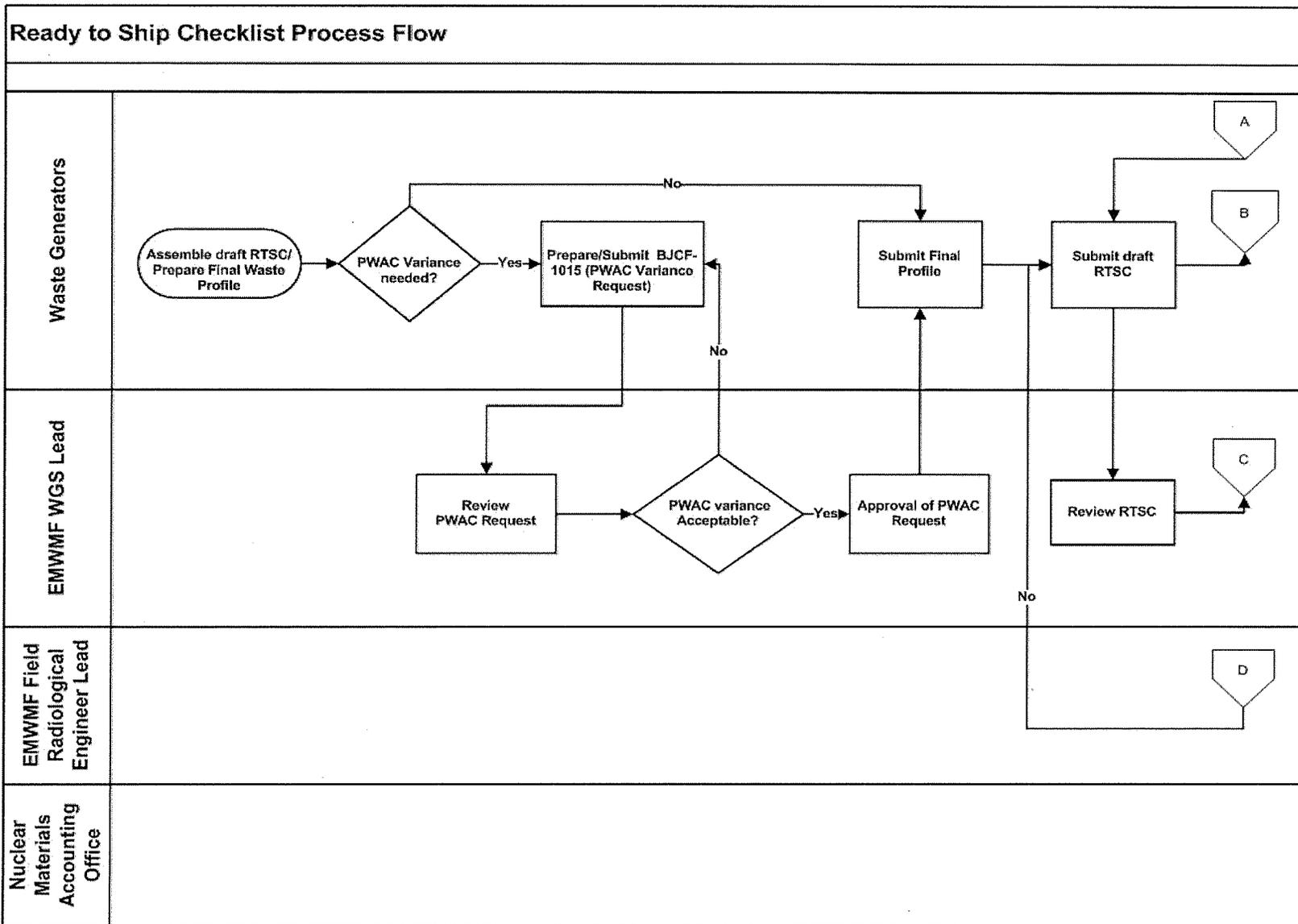
- Time of Arrival – the time an inbound waste transport truck is observed at an EMWMF RFITS antenna tower located on the Haul Road, east of the disposal cells or at the EMWMF scale.
- Time of Departure – the time an outbound waste transport truck is observed at an EMWMF RFITS antenna tower.
- Turn Time – the total time that a waste transport truck is on-site at EMWMF, as determined by the net time between time of arrival and time of departure as measured by EMWMF RFITS antenna towers.
- Waste Generator – the designated representative of an organization, project, subcontractor, or DOE prime contractor (or the waste generating organization itself) who desires to dispose of waste in EMWMF. In the context of this document, it is also synonymous with “Project.”
- Waste Load Forecast – a UCOR web-based tool that maintains the schedule, description, and vehicle requirements for waste loads shipped each day by waste-generating projects. A waste load is defined as waste transported in a single vehicle, in a single shipment, and governed by U.S. Department of Transportation or equivalent regulations. The information supports logistical planning for waste transportation, operations planning for on-site disposal facilities, and the assessment of liabilities associated with waste in transit.
- Waste Load Problem – issue associated with an otherwise compliant Approved Waste Lot, where during receipt, unloading, and/or management of the waste at EMWMF, creates or reveals problems/concerns such as, but not limited to, paperwork issues (e.g., incorrect shipping documentation), placarding/labeling issues, safety issues (e.g., wastes getting stuck in the truck during dumping), and contamination control issues (e.g., uncontrolled spread of radiological or chemical contaminants) at EMWMF.
- Waste Lot – primary unit of waste used to determine WAC compliance for disposal in EMWMF and to track waste as it moves through the waste management system. The waste lot can include all of the wastes generated by an remedial action (RA) project or one of several subsets of those wastes. Waste lots are determined by the RA project to suit the needs of the RA and, generally, correspond to discrete actions within a project schedule. Other criteria to use for subdividing a waste stream into one or more waste lots could be material type, similarity of contaminants, or any other logical grouping that enhances the ability of the RA project to characterize and manage its wastes.
- Waste Transportation Management System – a UCOR web-based tool that provides a central source for manually compiling and printing shipping documents required for the transport of waste and materials, and maintaining the associated data. In addition, the WTMS manages and reports data collected by the “paperless” RFITS and serves as the central database for EMWMF waste disposition records.

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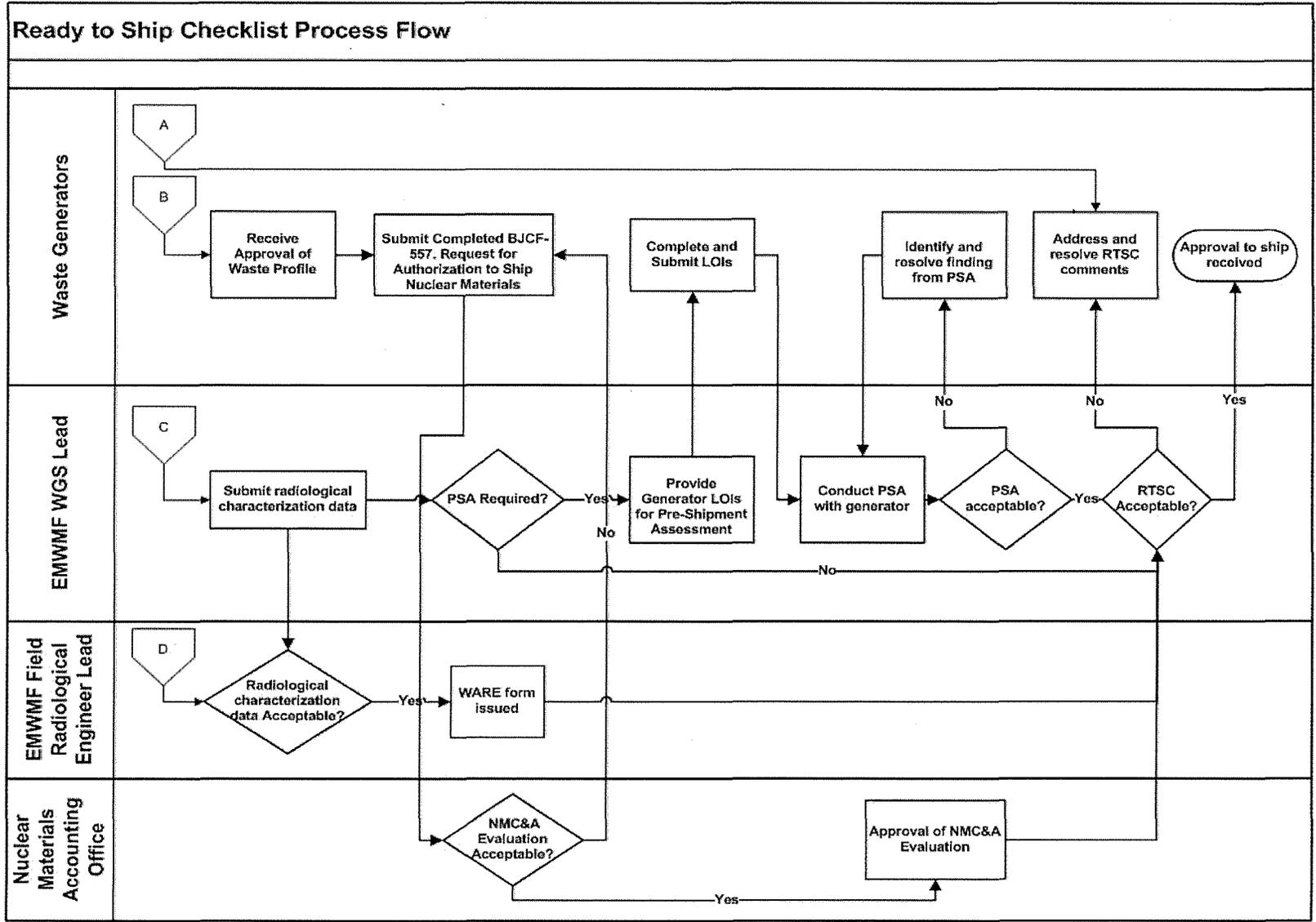
**APPENDIX B.  
FLOWCHART**

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# FLOWCHART



FLOWCHART (cont.)



**APPENDIX C.  
EMWMF PHYSICAL WASTE ACCEPTANCE CRITERIA,  
OPERATIONAL REQUIREMENTS, AND GUIDANCE**

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## C.1 GENERAL

The following requirements and guidance are based on operating experience and lessons learned at the Environmental Management Waste Management Facility (EMWMF) related to the physical waste acceptance criteria (PWAC) (see the table below). The purpose of these requirements and guidance is to: (1) provide for safe work conditions at EMWMF, (2) ensure EMWMF safety basis requirements are met, (3) ensure EMWMF design requirements are met, and (4) maximize productivity at EMWMF. Waste Generators must comply with the requirements and should implement the guidance. Waste Generators may request approval of variances from PWAC requirements in accordance with the process discussed in Chap. 5 of the main document. Approved blanket variances for certain PWAC are published at the following addresses: internally at <http://intranet.ettp.gov/WasteGeneratorServices/index.html> and externally at <http://www.ucor.com/emwmf.html>

Bulk delivery and dumping of waste off a dump ramp is the most efficient and preferred method for disposal of waste at EMWMF. Waste that is unsuitable for dumping because of its physical, radiological, and/or chemical composition should be delivered in containers or as individual items that can be directly placed into the disposal cell using heavy equipment or other special placement procedures. Shipments that contain waste requiring direct placement take additional time and care, resulting in longer turn times for those shipments and/or use of equipment not readily available at EMWMF.

It is important to minimize void space within the EMWMF to (1) comply with regulatory requirements; (2) provide a firm stable foundation for the EMWMF final cover system, which is required to maintain its integrity for 1000 years; (3) prevent differential settlement of the EMWMF final cover system, which otherwise might allow the infiltration of water into the buried waste with the resulting release of emplaced contaminants; and (4) conserve valuable airspace to maximize the amount of waste that can be disposed.

**Table C.1. Physical waste acceptance criteria**

	PWAC description
1	55-gal to 85-gal drums must be $\leq 1000$ lb.
2	Boxes up to $96 \text{ ft}^3$ must be $\leq 10,000$ lb.
3	Soft-sided waste containers up to $10 \text{ yd}^3$ must be $\leq 24,000$ lb.
4	Single debris items must have dimensions $\leq 4 \text{ ft} \times 4 \text{ ft} \times 6 \text{ ft}$ and weights $\leq 24,000$ lb.
5	Concrete debris can either be reduced to rubble to a maximum dimension of approximately 1 ft (and preferably mixed with soils), or shipped in large blocks (with rebar cut as flush as practical) capable of direct placement in the cell.
6	Steel plate dimensions should have a maximum dimension less than the inside dimension of the haulage container to aid direct dumping in the cell. It shall not be bent or forced into the container, shall be shipped separately from soils, and shall not extend above the top of the container. Cribbing may be necessary to avoid binding of the material during unloading.
7	Pipes shall be segregated from other wastes and shall be placed in haulage containers to avoid bridging or otherwise wedging during unloading. Pipe and tubing less than 6-in. diameter is accepted without further restrictions. Pipes between 6-in. and 12-in. diameter shall be crushed, shredded, or filled to minimize void spaces. Pipes 12-in diameter and greater shall be split longitudinally.
8	Asbestos-containing materials and beryllium dust-containing wastes shall be wetted, double-bagged, and shipped separately or with adequate volumes of soil to facilitate safe transport and burial. Bags shall be limited to a maximum weight of 40 lb.

**Table C.1. Physical waste acceptance criteria (cont.)**

9	Miscellaneous metals, building debris, structural steel, or conduit shall not be bent over or folded in the container and shall be easily dumped and segregated from soils. General building rubble shall be sufficiently sized or compacted to be gradable into an 18-in. layer by a D-7 Caterpillar dozer or a CAT 825 compactor, or be able to be buried in the working face if it meets the dimension criteria above.
10	Containerized compactable waste shall either have all voids filled with non-compressible materials such as soil or grout, or be capable of being crushed by a D-7 dozer. Soft waste shall be containerized so that it can be crushed and spread.
11	Rebar shall be cut to a maximum of 4-ft length and shall be in rolls or bundles that can be placed and graded in an 18-in. lift.
12	Non-crushable containers (B-25 boxes, etc.) shall be evenly loaded, and any remaining voids should be filled with non-compressible materials or grout.
13	Container liners shall be installed prior to waste loading and shall be folded and secured over the waste after loading.
14	Waste shall have dose rates no greater than 200 mrem/hr on contact, and no greater than 10 mrem/hr at 2 m from any surface of the wastes.

Source: DOE/OR/01-1909&D3. *Attainment Plan for Risk/Toxicity-Based Waste Acceptance Criteria at the Oak Ridge Reservation, Oak Ridge, Tennessee*, Bechtel Jacobs Company LLC, Oak Ridge, TN, Table A.4

## **C.2 GENERAL REQUIREMENTS AND GUIDANCE BASED ON OPERATING EXPERIENCE**

- Bulk soil or soil-like waste shall be delivered in delivery vehicles that can be quickly dumped (e.g., dump trucks or roll-off/intermodal containers).
- Container-type items (e.g., gas cylinders, aerosol cans, pressurized containers/cylinders, previously pressurized containers/cylinders, sealed/closed drums, containers with lids [e.g., intact sample jars, intact chemical containers, intact glass vials, intact containers], air conditioning units, refrigerant compressors, etc.) are not allowed in bulk (dumped) waste shipments unless they have been sheared/breached/punctured, emptied of contents, and painted with a bright color (e.g., RustOleum® high-visibility fluorescent green spray paint). Painting the item(s) as indicated communicates to EMWMF personnel that all issues with the item(s) have been addressed and the item(s) has been rendered acceptable for disposal.
- Container-type items that have been emptied, but have not been sheared/punctured/breached, shall be packaged in a rigid container (e.g., 55-gal drum or B-25 box) and filled per Appendices B and C. Advance notice must be provided to EMWMF Waste Generator Services (WGS) Lead prior to shipment of this waste.
- Sealed drums containing wastes that should not be opened, crushed, or compacted shall be filled per Appendices B and C and delivered on and secured to pallets.
- Rigid containers shall be evenly loaded, and any remaining voids filled with mitigated per Appendix E.
- In accordance with the Administrative Waste Acceptance Criteria (WAC), no free liquids (<1%) are allowed in the waste. Any free liquid present must be moisture incidental to dust control during waste generating activities.

- Lightweight materials (e.g., paper, plastic sheeting, packaging foam peanuts) that are dispersible by wind shall be containerized or otherwise immobilized to prevent these materials from being blown outside the EMWMF radiological boundary during waste dumping and spreading operations.
- Intermodal containers, dump truck beds, and other conveyances intended for dumping wastes at EMWMF shall not contain any interior hooks or appurtenances that may catch or snag the plastic liners, supersacks, bagged/wrapped waste, etc. during dumping operations at EMWMF.
- Sharps shall be placed in puncture-proof containers that are labeled “non-infectious sharps” to minimize potential hazards to operations and maintenance personnel at EMWMF. Void space in the container(s) shall be filled in accordance with Appendices D and E. Cardboard boxes, garbage bags, and plastic beverage containers are not acceptable containers. Advance notice shall be provided to the EMWMF WGS Lead prior to shipment. In addition, the shipping documentation shall state that the waste shipment contains sharps. Any alternate management of sharps must be authorized in writing by the EMWMF WGS Lead.

Note: The Administrative WAC prohibits disposal of infectious waste in EMWMF. Sharps may be disposed at EMWMF as described above, provided they are determined to not contain infectious waste.

- Whole tires shall be shredded, chipped, chopped, sliced, or cut into pieces (i.e., quartered) prior to shipment to EMWMF to facilitate waste compaction and to prevent whole tires from “floating” to the surface. Foam-filled tires are acceptable for receipt intact.
- Cold Weather Guidance
  - The onset of cold weather (temperatures below freezing) results in a variety of issues that have the potential to impact waste receipt and worker safety at EMWMF. Through implementation of the following precautionary measures, these impacts can be minimized.
    - Spray truck and intermodal gaskets with a lubricant such as vegetable-based, non-stick cooking spray (e.g., PAM) to prevent the gaskets from sticking to intermodal doors and dump truck tail gates.
    - Reduce (but do not eliminate) the amount of water used for dust suppression on the waste piles. Asbestos waste must still be dust free when dumping at the cell.
    - Do not pre-load wet waste when freezing temperatures are expected. This will reduce the potential for waste to freeze to the beds of dump trucks and intermodal containers.
    - Daytime temperatures below freezing may result in longer turnaround times on the Haul Road, as reduced dust suppression will require lower speed limits to maintain safe lines-of-sight.
- The URS | CH2M Oak Ridge LLC EMWMF Operations Manager reserves the right to limit the maximum moisture content in soil and soil-like waste based on the requirement that EMWMF must properly compact the waste. Factors include weather conditions, moisture content in the previously placed waste, size of the active workface, amount of solid rubble and debris in the waste, and logistics of the disposal cell operations. Waste that falls outside of these parameters may be rejected until waste moisture conditions improve or amendments are added.

**C.3 SPECIFIC REQUIREMENTS AND GUIDANCE BASED ON TABLE C.1**

**Table C.2. Operational requirements and guidance**

PWAC requirement	Disposal method	Operational requirement	Operational guidance
1	Direct place Direct dump	<p>Void space in drums shall be mitigated per Appendices B and C.</p> <p>Drums delivered for direct placement (i.e., from a flatbed, trailer, or other transport vehicle requiring the drum to be removed by heavy equipment) shall be securely strapped to pallets with the drums not extending beyond the edge of the pallets.</p> <p>Drums delivered for direct dumping must be in a condition to be compacted (e.g., the lids or bungs must be loosened or removed for safety considerations). (Note: EMWMF Operations personnel will not loosen the lids or remove the bungs.)</p>	
2, 12	Direct place	Void space in rigid containers shall be mitigated in Appendices B and C	<p>Rigid containers are considered any metal structures (e.g., B-12 boxes, B-25 boxes, ST-90 boxes, SeaLand containers, large metal pipe or pipe valve, metal equipment structure) within which material is placed or contained (i.e., attached to or securely held in the container) such that the container and its contents can be placed into the disposal cell as waste. Rigid containers must resist crushing by a Cat D-7 dozer or similar equipment.</p> <p>Use of rigid containers should be minimized due to difficulty in ensuring the containers meet the void space requirement under the Administrative WAC.</p>

**Table C.2. operational requirements and guidance (cont.)**

<b>PWAC requirement</b>	<b>Disposal method</b>	<b>Operational requirement</b>	<b>Operational guidance</b>
3, 10	Direct dump	<p>When a soft-sided container contains one or more items that contain voids, the voids in each of the items must be filled with acceptable void filler per Appendix E.</p> <p>Alternatively, the package and the contents must be crushable by a D-8 dozer.</p>	<p>The Waste Generator shall be responsible for all additional associated costs for handling overweight items at EMWMF (e.g., higher capacity off-loading equipment, additional trained operating personnel, approved plans [e.g., hoisting and rigging plans], and approved safety documentation [e.g., activity hazard assessment] for off-loading and placing the waste.)</p>
4	<p>Direct place</p> <p>Direct dump</p>	<p>Separate concrete or concreted items and/or large metal items or plates for direct placement shall not be connected by metal or wire that could bend as the item is being lifted by forklift or pushed by heavy equipment.</p> <p>Single debris items shall not be shipped with other debris/waste. However, multiple single debris items may be shipped on designated loads.</p> <p>Waste Generator shall provide a minimum of two work days advance notice to the EMWMF WGS Lead prior to delivery of single debris items to allow sufficient time for scheduling manpower and equipment for direct placement operations and for making delivery arrangements for any special fill materials (e.g., gravel, controlled low-strength material [CLSM]).</p>	<p>A single debris item is an item of waste that meets the indicated PWAC, but is still too large to fit into an 18-in.-thick lift.</p> <p>Waste Generator may size-reduce or crush the single debris item to eliminate the voids and/or single debris item designation.</p> <p>Single debris items are subject to special handling requirements (e.g., moving with a forklift and backfilling with gravel or CLSM, or positioning in a particular manner). Waste Generator will be responsible for the costs for the special fill materials.</p>

**Table C.2. operational requirements and guidance (cont.)**

PWAC requirement	Disposal method	Operational requirement	Operational guidance
5, 6, 9	Direct place Direct dump	<p>The Waste Generator shall use appropriate dust control measures (e.g., water [without creating a free liquids problem] or a fixative) when loading waste into transport vehicles to minimize dust generation and dispersion of airborne contaminants upon dumping and unloading wastes at EMWMF.</p> <p>Miscellaneous metals that are included with debris to be direct dumped for bulk placement must be cut or folded/compacted to be no larger than approximately 4 ft × 8 ft or to smaller dimensions determined by the Waste Generator to prevent the material from becoming lodged in the transport container.</p> <p>To reduce the potential for waste becoming lodged or jammed in containers during dumping, the dump containers shall not be overfilled. This is especially important for intermodal-type containers.</p>	<p>Miscellaneous metals that are included with debris to be direct dumped for direct placement (except for rebar, which is addressed in a following section) should be size-reduced to a maximum length of approximately 8 ft.</p> <p>Metal plates and structural steel mixed with miscellaneous debris should not be larger than approximately 4 ft × 8 ft.</p> <p>Structural steel should not be bent to reduce the length to less than 8 ft. If structural steel items are bent as a result of demolition, the overall length should not exceed 8 ft, and the distance from the short leg to the long leg should be less than 3 ft or less than one half the width or height (whichever is less) of the shipping container.</p> <p>Metal plates and large heavy objects should be placed atop other waste material to facilitate the plates/object sliding out of the dump containers during dumping.</p> <p>Long waste items should be strategically placed in the waste container to facilitate the items sliding out of the dump containers without lodging/jamming during dumping.</p> <p>Multiple items should be securely bundled together such that (1) the bundled materials do not separate or shift when the transportation chains, belts, or securing apparatus are removed and (2) the bundled material can be removed from the delivery truck with heavy equipment.</p> <p>Metal plates, structural members, oversized materials, and bundled materials should be strapped to pallets or placed on 4-in. × 4-in. (or larger) dunnage for forklift access.</p>

Table C.2. operational requirements and guidance (cont.)

PWAC requirement	Disposal method	Operational requirement	Operational guidance
7	Direct place Direct dump	<p>Pipe that are collected and managed separately from demolition debris shall be placed/arranged in dumping containers (e.g., dump beds, roll-off containers) so as to avoid bridging or otherwise wedging when dumped.</p> <p>Pipe shall not exceed 8 ft when placed in a dumping container.</p> <p>The maximum length of the pipe, tubing, and conduit is 12 ft.</p>	<p>References to pipe diameter is to internal diameter.</p> <p>Light-duty pipe and similar miscellaneous metals should be managed under the requirements given above for miscellaneous metals.</p> <p>These requirements apply to standard piping, heavy-duty piping, tubing, heavy ductwork, heavy conduit, and similar items that cannot readily be crushed/compacted by a Caterpillar D-8 dozer.</p> <p>Bent pipe, tubing, and conduit should not have an overall length exceeding 8 ft from the bend to the end of the longest leg. The legs of the pipe, tubing, or conduit should not be spread more than approximately 3 ft apart at the end of the shortest leg. The bent pipe, tubing, or conduit should be placed in the dumping container such that the opening of the bend is pointed to the back of the container.</p> <p>Pipe may be hauled on flatbed trucks or trailers for unloading by forklift or similar equipment. If so, the materials should be bundled, strapped together, and strapped to pallets or placed on 4-in. x 4-in. (or larger) dunnage.</p>
11	Direct place Direct dump		<p>Rebar should be bundled to a diameter of approximately 18 in., and the length shall not exceed 4 ft for direct dumping or direct placement.</p> <p>Alternate handling approaches are allowed under blanket PWAC variance EMWMF-BV-11-01.</p> <p>Longer lengths of rebar can be considered under PWAC variance requests as follows:</p> <ul style="list-style-type: none"> <li>• Straight or bent sections of rebar bundled with a diameter of &lt; 18 in. and a maximum length of 10 ft for direct dumping or direct placement.</li> </ul>

Table C.2. operational requirements and guidance (cont.)

PWAC requirement	Disposal method	Operational requirement	Operational guidance
8	Direct place Direct dump	<p>Use of rigid containers for direct placement of asbestos-containing material (ACM) is to be minimized. Rigid containers used for bagged friable and non-friable ACM, bagged beryllium-containing materials and asbestos or beryllium contaminated bulk waste (e.g., soil, building debris) shall be completely filled when possible. Remaining voids to be addressed according to Appendices D and E.</p> <p>Beryllium-containing wastes and asbestos-containing wastes shall not be shipped with other types of wastes (e.g., metal, building demolition debris, concrete, etc.) unless specifically approved for mixed shipment under a blanket PWAC variance or a waste lot specific PWAC variance.</p>	<p>Beryllium-containing wastes and asbestos-containing wastes may be shipped together in the same load.</p> <p>The Waste Generator may use approved blanket PWAC variances for ACM and may request PWAC variances for:</p> <ul style="list-style-type: none"> <li>• Bulk placement of beryllium-containing waste containerized in sealed bladder bags and sealed double-lined supersacks that are specifically designed for asbestos containment.</li> <li>• Bulk placement of bagged beryllium-containing wastes weighing more than 40 pounds.</li> </ul>
13	Direct place Direct dump	Liners must overlap the waste from both directions.	<p>Liners should be capable of maintaining integrity during the unloading process such that no waste touches the interior surfaces of the dump bed or intermodal roll-off container.</p> <p>Liners should have a minimum thickness of 6 mils.</p>

**APPENDIX D.**  
**METHODS FOR DETERMINING IF RIGID CONTAINERS MEET VOID**  
**SPACE REQUIREMENTS**

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## D.1 GENERAL

The use of rigid containers (e.g., B-12 boxes, B-25 boxes, ST-90 boxes, SeaLand containers, drums that cannot be crushed or compacted due to the waste contents) should be minimized due to:

- The difficulty in filling and verifying the void spaces in the containers meet the minimum 90% full requirement under the Administrative Waste Acceptance Criteria (WAC)—an important requirement for protecting the integrity of the Environmental Management Waste Management Facility (EMWMF) final cover system.
- The consumption of valuable landfill airspace by packaging and void filler material.

The Waste Generator is responsible for ensuring that each container is filled as completely as possible and mitigating remaining voids. Through an approved variance, arrangements may be made for voids to be mitigated at EMWMF.

The Administrative WAC requirement ( $\geq 90\%$  full) applies to the entire container, including waste and void filler. Voids within a container include voids surrounding the waste, as well as voids internal to the waste (e.g., voids internal to a piece of machinery), and is applicable to the container upon delivery to EMWMF.

Acceptable void filler materials are described in Appendix E.

If the Waste Generator decides to use rigid containers for disposal of wastes in EMWMF, the Waste Generator shall demonstrate that each container is filled to more than at least 90% full (at the time and point of disposal) by one of the methods in the following sections.

The calculations shall be performed, checked, and documented in accordance with URS | CH2M Oak Ridge LLC Procedure DE-0704, *Project Calculations*, or equivalent.

## D.2 DENSITY METHOD FOR DETERMINING CONTAINER VOID CONTENT

Use of the density method to determine void content shall be based on (1) the measured internal volume of the container, (2) measured weight of each waste material in the container converted to volume based on density values from published references or laboratory measurements, and (3) weight of acceptable void filler in the container converted to volume. The calculated Filled Volume Percentage shall be calculated using the following equation:

$$\text{Filled Volume (\%)} = \frac{\left(\frac{\text{Waste}_1 \text{ weight}}{\text{Waste}_1 \text{ density}}\right) + \left(\frac{\text{Waste}_2 \text{ weight}}{\text{Waste}_2 \text{ density}}\right) + \dots + \left(\frac{\text{Waste}_n \text{ weight}}{\text{Waste}_n \text{ density}}\right) + \left(\frac{\text{Fill weight}}{\text{Fill density}}\right)}{\text{Container volume}}$$

where:

- **Waste<sub>1</sub> weight** = Weight (typically in pounds) of the 1<sup>st</sup> type of waste material in the container. Likewise, **Waste<sub>2</sub>** represents the 2<sup>nd</sup> type of waste material, and **Waste<sub>n</sub>** represents the n<sup>th</sup> type of waste material in the container. Weights are as measured with calibrated scales.

- **Waste<sub>1</sub> density** = Density (typically in pounds per cubic foot) of the 1<sup>st</sup> type of waste material in the container. Likewise, **Waste<sub>2</sub>** represents the 2<sup>nd</sup> type of waste material, and **Waste<sub>n</sub>** represents the n<sup>th</sup> type of waste material in the container. Densities are for the material in a solid, non-compressed form/state (e.g., density of solid steel, not steel wool; density of solid asbestos, not shredded for fluffed asbestos) based on published reference literature or analytical laboratory data.
- **Fill weight** = Weight (typically in pounds) of the fill material in the container. Weights are as measured with calibrated scales
- **Fill density** = Density (typically in pounds per cubic foot) of the fill material in the container. Densities are for the material in a solid, non-compressed form/state based on published reference literature or analytical laboratory data.
- **Container volume** = Volume (typically in cubic feet) of the container interior. Volume is as calculated based on physical measurements or as provided by the container manufacturer.

For porous and water sorbent wastes and fill material, the density of the waste and fill material shall be based on the actual moisture content of the material in the waste container.

The Waste Generator shall provide the following documentation to the EMWMF Waste Generator Services (WGS) Lead for each container (if different) or for a series of similarly packaged containers:

- Copy of the calculation
- Measured weights of all the individual wastes
- Measured weight of the fill material
- Measured moisture content of the individual wastes and fill material in the container, as applicable
- Published reference literature and/or analytical laboratory data presenting the densities of all the individual wastes and fill material
- Densities of the individual wastes and fill material at the measured moisture content of the wastes and fill in the container, as applicable
- Internal dimensions and calculated volume of the container or the interior volume as provided by the container manufacturer
- Tare, net, and gross weights of the container
- Verification that the design weight capacity of the container is not exceeded

### D.3 VOLUME METHOD FOR DETERMINING CONTAINER VOID CONTENT

The Volume Method can only be used for non-compressible waste materials (e.g., metal, concrete), and it cannot be used for compressible waste materials (e.g., bagged asbestos, bagged personnel protective equipment). Compliance with the requirement to fill a container as close to 100% as possible shall be based on (1) the internal volume of the container, (2) volume of each non-compressible waste material in the container, and (3) volume of the acceptable void filler placed in the container. The measured Filled Volume Percentage shall be calculated using the following equation:

$$\text{Filled Volume (\%)} = \frac{[\text{Waste}_1 \text{ volume} + \text{Waste}_2 \text{ volume} + \text{Waste}_n \text{ volume} + \dots + \text{Fill volume}]}{\text{Container volume}}$$

where:

- **Waste<sub>1</sub> volume** = Volume (typically in cubic feet) of the 1<sup>st</sup> type of waste material in the container. Likewise, **Waste<sub>2</sub>** represents the 2<sup>nd</sup> type of waste material, and **Waste<sub>n</sub>** represents the n<sup>th</sup> type of waste material in the container. Volumes are as calculated based on measurements of physical dimensions. Volumes exclude the volume of any voids intrinsic to the waste.
- **Fill volume** = Volume (typically in cubic feet) of the approved fill material in the container. Volumes are as calculated based on measurements of physical dimensions.
- **Container volume** = Volume (typically in cubic feet) of the container interior. Volume is as calculated based on physical measurements or as provided by the container manufacturer.

The Waste Generator shall provide the following documentation for each container to the EMWMF WGS Lead for each container (if different) or for a series of similarly packaged containers:

- Copy of the calculation
- Measurements and calculated volumes of all the individual wastes
- Measured volume of the fill material
- Internal dimensions and calculated volume of the container or the interior volume as provided by the container manufacturer
- Tare, net, and gross weights of the container
- Verification that the design weight capacity of the container is not exceeded

#### D.4 COMPACTION METHOD FOR DETERMINING CONTAINER VOID CONTENT

With the Compaction Method, compactable wastes (e.g., personnel protective equipment, bagged asbestos-containing materials, plastic, loose drywall, light gauge metal items) is placed in a container and compacted in layers (maximum loose lift thickness of nominally 18 in.) with compaction equipment exerting a pressure greater than 2110 lb/ft<sup>2</sup>, which is equivalent to the ground pressure created by a Caterpillar D-8 bulldozer. Non-compactable wastes (e.g., heavy gauge metal items, concrete) shall be excluded from the container. Any remaining voids in the container shall be filled with acceptable fill material so that the container is filled as close to 100% as possible upon delivery to EMWMF. The Filled Volume Percentage shall be calculated using the following equation:

$$\text{Filled Volume (\%)} = 1 - \frac{\text{Measured freeboard volume}}{\text{Container volume}} \times 100\%$$

where:

- **Measured freeboard volume** = Volume (typically in cubic feet) of the freeboard of the container after it has been filled with waste and approved fill material. Volumes are as calculated based on measurements of physical dimensions.
- **Container volume** = Volume (typically in cubic feet) of the container interior. Volume is as calculated based on physical measurements or as provided by the container manufacturer.

The Waste Generator shall provide the following documentation for each container to the EMWMF WGS Lead for each container (if different) or for a series of similarly packaged containers:

- Copy of the calculation
- Measurements and calculated volume of the freeboard
- Internal dimensions and calculated volume of the container or the interior volume as provided by the container manufacturer
- Tare, net, and gross weights of the container
- Verification that the design weight capacity of the container is not exceeded

#### **D.5 FILLING TO REFUSAL METHOD TO DEMONSTRATE VOID CONTENT**

The Filling to Refusal Method can only be used for non-compactable waste materials (e.g., heavy-gauge metal, concrete), and it must not be used for compressible waste materials (e.g., bagged asbestos, bagged personnel protective equipment). Containers should be filled as close to 100% as possible with waste, then filled to refusal with void filler (see Appendix E) to demonstrate compliance. Remaining voids inside the containers, including voids intrinsic to the waste must be open, with the openings oriented and connected to allow the void filler to flow into essentially all interior voids. There shall be no obstructions to restrict the flow of void filler in, around, and under the objects in the container/waste item. The container and waste contents shall be totally filled with acceptable void filler (see Appendix E) until the container is at the verge of overflowing.

In the context of this section, “containers” may include selected waste items into which acceptable void filler is placed in order to satisfy the minimum void requirement.

Calculations are not required for this method; however, the Waste Generator shall provide the following documentation to the EMWMF WGS Lead for each container (if different) or for a series of similarly packaged containers:

- Descriptions of the container and waste
- Description indicating all voids in the container were filled to refusal
- Description of void filler material (See Appendix E)
- Gross weight of the filled container
- Verification that the design weight capacity of the container is not exceeded

#### **D.6 OTHER METHODS FOR DETERMINING CONTAINER VOID CONTENT**

The previously described density and volume methods (see Sects. D.2 and D.3) can be combined to determine that containers are 90% full.

In addition, the Waste Generator may develop an equally rigorous method for demonstrating compliance with the 90% full requirement and submit a written request describing the proposed method to the EMWMF WGS Lead for review and possible approval.

**APPENDIX E.  
VOID FILLING MATERIALS**

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## **E.1 ACCEPTABLE VOID FILLING MATERIALS**

The following materials are acceptable for filling voids in rigid containers (e.g., B-12 boxes, B-25 boxes, ST-90 boxes, SeaLand containers, drums that cannot be crushed or compacted due to the waste contents) for disposal in the Environmental Management Waste Management Facility (EMWMF). In addition, these materials may be used for filling voids in equipment and other items that contain voids. If voids are to be mitigated at EMWMF under an approved variance request, the voids must be open and readily accessible for filling with the selected void filler. If voids are mitigated at the Waste Generator's Site, appropriate confinement measures over the openings of the equipment/items to prevent spillage/loss of the void filler during handling (e.g., transport, unloading, dumping, and placement) at EMWMF must be provided. This is especially important when using sand, gravel, and similar material.

### **E.1.1 SAND**

Bagged dry sand is acceptable. Sand shall be visibly dry so that it flows freely when poured and does not clump or bulk. Sand that does not pour evenly shall be screened, dried, or otherwise processed to increase flowability. Sand may be of any gradation, but for applications requiring maximum flowability (e.g., pouring through orifices/fill ports, flowing through openings between waste items), a rounded uniformly graded (all same size particles) sand (e.g., Ottawa sand) is recommended. Vibration of the sand or the container may be used to promote flowability of the sand. Acceptable methods may include concrete vibrators, form vibrators, vibratory tables, striking containers with hammers, rocking of containers, operating a heavy vibratory compactor adjacent to the item, or other such methods. The dry sand must be stored in a dry location and maintained in a dry condition. Bulk quarry deliveries are not recommended due to the typical dampness and moisture present in bulk quarry deliveries. In any case, the sand must be flowable at the time of application.

### **E.1.2 GRAVEL OR CRUSHED STONE**

Gravel or crushed stone meeting the gradation of AASHTO M43, *Standard Specification for Sizes for Aggregate for Road and Bridge Construction*, size no. 57 or 67 is acceptable.

### **E.1.3 CONTROLLED LOW-STRENGTH MATERIAL**

Controlled low-strength material (CLSM) meeting the requirements of *Specification for Controlled Low-Strength Materials (Flowable Fill)* (SPG-0000DE-A013) or *Technical Specification for General Purpose Controlled Low Strength Material at EMWMF* (SPG-EMWMF-A111) is acceptable. Testing of CLSM shall be performed in accordance with ASTM D4832, *Standard Test Method for Preparation and Testing of CLSM Test Cylinders* and ASTM D6103, *Standard Test Method for Flow Consistency of Controlled Low Strength Material*

Use of CLSM, which was previously determined to meet the specified requirements for compressive strength and flowability, is acceptable without additional testing, provided that the Waste Generator performs the following:

- Provide documentation (including copies of the previous test results, the associated CLSM mix design, and name of the CLSM supplier) on previously tested and accepted CLSM

- Review the CLSM delivery ticket(s) prior to placement to verify the delivered material is consistent with the ordered material (e.g., CLSM mix design from the identified supplier)
- Observe the placement of CLSM to confirm that it is highly flowable and without excessive water
- Document the review of the delivery ticket(s) and visual observation of the flowability

NOTE: If voids are being mitigated at EMWMF, EMWMF staff will perform the actions identified in the bullets above.

## **E.2 UNACCEPTABLE VOID FILLING MATERIALS**

Unacceptable void fillers include, but are not limited to, sawdust; wood chips; bubble wrap; foam packaging peanuts; vermiculite; damp/moist/wet sand; sand that does not flow freely; and other degradable, clumpy, non-free-flowing, and/or compressible materials.

## **E.3 RESTRICTIONS ON VOID FILLING MATERIALS**

The following restrictions are placed on void filler materials used for any K-25 and K-27 Building fissile item/component/system or fissile container bound for EMWMF burial.

- Sand or grout shall not be used as void filler material, except of Size 1, 2, 3, or 4 converters with no more than 350 g uranium (U)-235 (including  $2\sigma$  measurement uncertainty).
- Alumina or aluminum shall not be used as void filler material, except of trap material still in traps.

## **E.4 OTHER VOID FILLING MATERIALS**

EMWMF staff will evaluate other void fill materials on a case-by-case basis. If other void fill materials are identified and a Project would like those materials to be evaluated for use, a Project representative should send an e-mail request to the EMWMF Waste Generator Services Lead. The request should include:

- Material name
- Specifications and/or Material Safety Data Sheet
- Description of proposed use
- Anticipated volume of proposed fill material to be used
- Additional information, as requested

**APPENDIX F.**  
**EMWMF ANOMALOUS WASTE GRADED RESPONSE APPROACH**

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## **INTRODUCTION**

In the past, anomalous waste identified at the Environmental Management Waste Management Facility (EMWMF) elicited a similar response regardless of the severity of the condition or the relative impact on personnel, the environment, or the facility.

Anomalous waste is defined in this Technical Information Document as “waste that does not meet any or all of the EMWMF waste acceptance criteria and/or is not included in the Approved Waste Lot.” For the purpose of this paper, anomalous waste includes the anomalous item, as well as related conditions.

EMWMF personnel are trained to look for various anomalous waste items and conditions. When identified, the anomalous waste or condition will be evaluated using the above graded response approach. Each anomalous waste event generally must be investigated by an EMWMF Operations worker dressing out in appropriate personal protective equipment and entering the disposal cell; thus, it is time consuming and may impact waste shipment cycle times. Further, recognizing that elimination of the receipt of anomalous waste is in the best interest to EMWMF Operations, it is recognized that some anomalies may get through even the best implemented Anomaly Detection Plan (ADP). Therefore, based on the anomalous waste item or condition, the appropriate Tier Response will be implemented as described above. This anomalous waste graded approach offers flexibility in responding to such issues with varying degrees of impacts to the Waste Generator, while maintaining appropriate safety to EMWMF Operations personnel. Additionally, this graded approach allows for protecting the physical structures associated with EMWMF and ensuring regulatory compliance, both in the short-term and long-term.

Finally, under this graded approach, it is recognized that anomaly detection is not 100 percent effective in eliminating all anomalies, particularly given the fact that the potential for anomalies by waste lot varies greatly. As such, a trend analysis will be performed as a means to ensure the necessary rigor required by Waste Generators in implementing their ADP. Following an increasing trend observed over the established measurement period (e.g., 4 consecutive weeks), the tier response may be elevated for additional action. However, pending a demonstration that additional actions taken on the part of the Waste Generator have shown to be effective (i.e., by a marked reduction in incidence of anomalies), the response may return to the previous tier, as appropriate.

## **PURPOSE**

This appendix presents a graded approach to the response by EMWMF Operations personnel following the discovery of anomalous waste. Overall, this graded approach provides a process to ensure that the level of response by EMWMF Operations personnel is commensurate with the risk or potential impacts associated with the anomalous waste. Additionally, application of this approach will minimize the resulting cost/schedule impacts for all involved organizations, including the Waste Generators.

No actions outlined in this document supersede or are in conflict with URS | CH2M Oak Ridge LLC's Emergency Management Program prescribed by DOE Order 151.1C, *Comprehensive Emergency Management System*.

## **WASTE ACCEPTANCE CRITERIA**

Approval of waste for disposal in EMWMF is predicated on meeting requirements specified in the *Attainment Plan for Risk/Toxicity-Based Waste Acceptance Criteria at the Oak Ridge Reservation, Oak Ridge, Tennessee* (DOE/OR/01-1909).

## WAC ANOMALY TIER ASSIGNMENT

The graded response to anomalous waste items and conditions involves the assignment of the various waste acceptance criteria (WAC) to a Tier Level based on the severity of the anomaly. Below is an explanation of the three Tiers.

### **Tier 1: Minor Anomalies**

- Physical parameters of waste being outside those that can be readily handled at EMWMF (e.g., item exceeds the lifting capacity of EMWMF equipment).
- Inappropriate liner use or excessive dust generation during dumping.
- Compactable containers being non-amenable to compaction.
- Closed containers, such as common empty drink containers with lids (e.g., empty water bottle with cap), known container type deemed to be benign by EMWMF Operations personnel (e.g., can of latex paint), or known container type deemed to be non-hazardous by the Waste Generator (e.g., can of lubricant unique to the Waste Generator).

### **Tier 2: Moderate Anomalies**

- Receipt of containers under pressure, including aerosol cans.
- Receipt of containers that contain unknown liquids, but have not ruptured.
- Various administrative WAC in which violations may necessitate removal of the item from the disposal cell or require special dispensation from regulators after the fact of disposal.
- Physical WAC violations that could result in long-term impacts to the performance of the facility if not remedied.

### **Tier 3: Major Anomalies**

- Violations of the WAC that may result in injury due to fire, explosion, gaseous release, or other reaction.
- Violations of the WAC that may result in exposure of personnel to dangerous fumes/vapors, particulates, or fibers (e.g., un-containerized friable asbestos-contaminated material).
- Shipment of waste to EMWMF that was not generated under the Comprehensive Environmental Response, Liability, and Compensation Act.

NOTE: Given the redundancy of protection related to supersacks containing encapsulated or plastic-wrapped beryllium waste items, failure of the supersack during waste placement and disposal does not represent an unsafe condition and is not a non-conformance. The EMWMF response, as a best management practice, will be to promptly cover the waste. A Condition Adverse to Quality need not be generated.

Table F.1 presents the three Tiers and the associated WAC assigned to each Tier.

**Table F.1. WAC anomaly tier level assignment**

Tier level	Administrative WAC <sup>1</sup>	Physical WAC <sup>1, 2, 3, 4</sup>
1	<p>Must not be capable of detonation or explosive decomposition or reaction at normal pressures and temperatures or of explosive reaction with water (specifically related to release of hydrogen fluoride that either ends quickly or dissipates rapidly, resulting in only “sheltering in place”)</p>	<p>Drums ≤ 1000 lb            Boxes ≤ 96 ft<sup>3</sup> and ≤ 10,000 lb            Soft-sided containers ≤ 10 yd<sup>3</sup> and ≤ 24,000 lb            Single debris item ≤ 4 ft × 4 ft × 6 ft and ≤ 24,000 lb            Concrete debris and general rubble reduced to 1 ft            Steel plate sized to transport container and ≤ 4 ft × 8 ft            Miscellaneous debris gradable into 18-in. lift            Container liners installed in container and folded and secured over the waste after loading (Tier 1 response applies to excessive dust generation from an inadequate container liner)            Containerized compactable waste must have voids filled or be crushed (Tier 1 response applies to common empty drink containers with lids or known container types deemed to be benign by the Waste Generator with such information having been communicated to EMWMF Operations).</p>
2	<p>No reactive waste (Tier 2 response applies to cylinders or potentially pressurized vessels that are not releasing contents, not painted with bright paint to indicate it passed the Waste Generator’s inspection, and/or not breached.)            Meet RCRA and TSCA land disposal restrictions            No infectious waste (Tier 2 response applies if the liquid is in non-leaking medical-type containers)            Must have structural stability either by processing the waste or by placing the waste in container or structure that provides stability after disposal            Void space within the waste and between the waste and its package must be reduced to extent practicable            Containers must be at least 90% full            Average uranium concentrations must be less than 1030 ppm or 714 pCi/g            Waste shall not exceed Class C</p>	<p>Pipe 6-in. to 12-in. diameter crushed or shredded            Pipe &gt; 12 in. diameter split longitudinally            Containerized compactable waste must have voids filled or be crushed            Rebar ≤ 4 ft and bundled for grading into 18-in. lift            Rigid containers must have voids filled to ≥ 90%            Dose &lt; 200 mrem/hr at contact and &lt; 10 mrem/hr at 2 m</p>

**Table F.1. WAC anomaly tier level assignment (cont.)**

Tier level	Administrative WAC <sup>1</sup>	Physical WAC <sup>1, 2, 3, 4</sup>
3	CERLCA action generated waste No transuranic or high-level, spent nuclear fuel, or 11e(2) byproduct waste No reactive waste (Tier 3 response applies to cylinders or potentially pressurized vessels that have released contents at EMWMF) No bulk or containerized liquid hazardous waste or waste containing free liquids >1% (moisture must be incidental to dust control) No infectious waste (Tier 3 response applies if liquid is leaking from a medical-type container) No pyrophoric waste Must not be capable of detonation or explosive decomposition or reaction at normal pressures and temperatures or of explosive reaction with water Must not contain or be capable of generating quantities of toxic gases, vapor, or fumes, including release of hydrogen fluoride that continues or does not dissipate rapidly resulting in evacuation of the disposal cell. Waste to remain subcritical	ACM/Be shall be containerized

<sup>1</sup>Stated criteria are abbreviated to fit within the table. For the full text criteria, refer to Appendix C of this document or the *Attainment Plan for Risk/Toxicity-Based Waste Acceptance Criteria at the Oak Ridge Reservation, Oak Ridge, Tennessee* (DOE/OR/01-1909&D3).

<sup>2</sup>Exact values associated with the Physical WAC may be adjusted by EMWMF Operations to remain consistent with requirements established by EMWMF Operations.

<sup>3</sup>Variances to specific Physical WAC criteria may be granted by EMWMF Operations on a case-by-case basis in accordance with established protocol.

<sup>4</sup>For the purpose of this table, the Physical WAC includes requirements based on operating experience.

ACM = asbestos-contaminated material

Be = beryllium

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

RCRA = Resource Conservation and Recovery Act

TSCA = Toxic Substances Control Act

## GRADED TIER RESPONSE

With the individual WAC requirements assigned to a specific Anomaly Tier, each Tier is given a graded response that is matched with the actual or perceived severity of the anomaly. Table F.2 presents the graded response actions associated with each Tier. The intent is that the series of response actions associated with each Tier Level would be implemented following an incident in which a specific categorized WAC is violated. If recurrence of anomalies occurs, the Tier response may be elevated to the next Tier as a means to effect sufficient changes in anomaly detection by the Waste Generator.

**Table F.2. Graded tier response actions**

Tier level	Response action
1	<ul style="list-style-type: none"> <li>• Upon first incident, verbal or e-mail notification from EMWMF Operations to Waste Generator</li> <li>• EMWMF Operations log the event on the Anomalous Waste Log</li> <li>• Waste Generator to communicate the issue to field staff and return documentation (e.g., e-mail) to EMWMF Operations within one working day indicating such action</li> <li>• Waste shipments may continue during implementation of actions</li> <li>• Additional Tier 1 infractions trended with an increasing trend as measured over four consecutive weeks may lead to an elevation of response action to Tier 2 or 3, as appropriate</li> </ul>
2	<ul style="list-style-type: none"> <li>• Written notification made by EMWMF Operations to Waste Generator via e-mail</li> <li>• EMWMF Operations log the event on the Anomalous Waste Log</li> <li>• Waste Generator to communicate the issue to field staff and return documentation (e.g., e-mail) to EMWMF Operations within one working day indicating such action</li> <li>• CAQ issued by EMWMF Operations to UCOR Issues Management or by e-mail to non-UCOR Waste Generating Organizations</li> <li>• Waste Generator to take appropriate actions to close CAQ within five working days with notification provided to EMWMF Operations when NCR is closed</li> <li>• Waste shipments may continue during implementation of actions</li> <li>• Additional Tier 2 Response infractions trended with an increasing trend as measured over four consecutive weeks may lead to an elevation of response action to Tier 3, as appropriate</li> </ul>
3	<ul style="list-style-type: none"> <li>• Written notification by EMWMF Operations to Waste Generator</li> <li>• Waste shipments suspended</li> <li>• EMWMF Operations log the event on the Anomalous Waste Log</li> <li>• CAQ issued by EMWMF Operations to UCOR Issues Management or by e-mail to non-UCOR Waste Generating Organizations</li> <li>• Waste Generator to submit a Corrective Action Plan (CAP)</li> <li>• EMWMF Operations to review and approve CAP (corrective actions include up to removal of anomalous item)</li> <li>• Waste Generator to take appropriate actions to close CAQ prior to restart of shipments</li> <li>• EMWMF Operations to issue notice of restart of shipments</li> <li>• Additional Tier 3 Response infractions trended with a positive trend as measured over four consecutive weeks may lead to an indefinite suspension of shipments pending a formal Readiness Assessment to restart waste shipments</li> </ul>

CAQ = Condition Adverse to Quality  
 NCR = Nonconformance Report  
 UCOR = URS | CH2M Oak Ridge LLC

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