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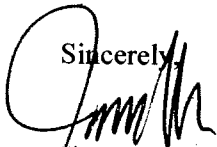
PRS-0074-06

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**Subject:**           **Contract No.: DE-AC30-06EW05001**  
                  **Deliverable No.: 029**  
                  **Deliverable Name: Waste Management Plan**

Attached is a contract deliverable item indicated above and provided as required by Section C.1.0.3 and as stated in Part III, Section J, Attachment 4.1.

Sincerely,



Jim Holm  
Transition Business Manager  
Paducah Remediation Services, LLC (PRS)

cc w/ attachments:

Loretta Parsons, PPPO/Lex – two (2) hard copies, e-mail copy  
David Kozlowski, PPPO/Lex – e-mail copy  
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PRS Internal Distribution  
PRS Project File

# WASTE MANAGEMENT PLAN for the Paducah Environmental Remediation Project Paducah, Kentucky

This document contains no classified or security sensitive information per review by:

SST

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C.J. Winkler

Name

CJ Winkler

3-24-06

Signature

Date

**WASTE MANAGEMENT PLAN  
for the Paducah Environmental Remediation Project  
Paducah, Kentucky**

**March 28, 2006**

**Prepared by  
Paducah Remediation Services, LLC  
Paducah, Kentucky  
Under Contract DE-AC30-06EW05001**

**Prepared for the  
U.S. Department of Energy  
Portsmouth/Paducah Project Office  
Lexington, Kentucky**

**APPROVALS**

**WASTE MANAGEMENT PLAN  
for the Paducah Environmental Remediation Project  
Paducah, Kentucky**

**(Document No. PRS-CDL-0029)**

**March 28, 2006**

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## ACRONYMS

ACM	asbestos containing material
ARAR	applicable, relevant, or appropriate requirements
BJC	Bechtel Jacobs Company, LLC
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIN	container identification number
DOE	Department of Energy
DQOs	data quality objectives
DSA	Documented Safety Analysis
EPA	Environmental Protection Agency
ER	environmental remediation
FFA	Federal Facilities Agreement
GSA	generator staging area
ICATS	Issues and Corrective Actions Tracking System
ISMS	Integrated Safety Management System
LLW	low-level waste
MLLW	mixed low-level waste
NDA	non-destructive assay
NOV	Notice of Violation
NTS	Nevada Test Site
PCB	polychlorinated biphenyl
PGDP	Paducah Gaseous Diffusion Plant
PK	process knowledge
PRS	Paducah Remediation Services LLC
P2/Wmin	pollution prevention/waste minimization
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFD	request for disposal
STP	site treatment plan
TRU	transuranic
TSCA	Toxic Substances Control Act
TSCAI	Toxic Substances Control Act Incinerator
TSDF	treatment, storage, and disposal facility
WAC	waste acceptance criteria
WGS	Waste Generator Services
WMP	waste management plan

## DEFINITIONS

### “Classified Material”

Any item or scrap which, due to its composition, structure, or function reveals restricted data or other classified information, either directly or through analysis, in accordance with DOE CG-SS-4, DOE CG-PGD-5, or other applicable classification guidance.

### “Commercial Grade Item”

This term is used to describe containers and packaging supplies that are industry standard with existing pedigrees

### “Data Quality Objectives”

A statement of the overall level of uncertainty that a decision maker is willing to accept in results derived from environmental data. This is qualitatively distinct from quality measurements such as precision, bias, and detection limit.

### “Data Validation”

The process of evaluating the available data against the project DQOs to make sure that the objectives are met. Data validation may be very rigorous, or cursory, depending on project DQOs. The available data reviewed will include analytical results, field QC data and lab QC data, and may also include field records.

### “Legacy Waste”

The backlog of stored waste remaining from former PGDP operations, about which a permanent disposal determination remains to be made. At the PGDP, this term applies to waste still in the waste storage facilities as of October 1, 2001.

### “Milk Runs”

This term is used to describe a common practice in the waste management business whereby a waste transportation truck will pickup waste at one or more locations and thereby reduce the total number of off-site shipments to the extent practical.

### “Orphan Waste”

Waste with no identified disposal path.



## 1.0 EXECUTIVE SUMMARY

In January 2006, Paducah Remediation Services, LLC (PRS) signed a contract (DE-AC30-06W05001) with the U.S. Department of Energy (DOE) for environmental remediation (ER) of the Paducah Gaseous Diffusion Plant (PGDP) site. Cleanup activities conducted under the contract are governed by various laws, regulations, compliance agreements, permits, and DOE orders. These documents set forth regulatory requirements for characterization and disposition of both existing legacy waste and newly generated waste.

To support implementation of these requirements, PRS has created an integrated, site-wide Waste Generator Services (WGS) organization focused on safe, cost-efficient, and compliant final disposition of (ER) waste. Integration strategies achieve the following benefits:

<b>Benefit</b>	<b>Strategy</b>
Cost and Schedule Effectiveness	<p>Site-Wide Waste Generation Planning</p> <p>Use early characterization to identify problem wastes.</p> <p>Optimize use of process knowledge to reduce analytical cost.</p> <p>Perform bulk assay to the greatest extent practical.</p> <p>Develop/maintain broad profiles.</p> <p>Maximize the use of the C-746-U Landfill.</p> <p>Centralize pollution promotion/waste minimization (P2/WMin Program).</p>
Risk Mitigation	<p>Enhance control of waste materials by establishing a site-wide waste information management database to maintain inventory and characterization data.</p> <p>Verify process knowledge prior to shipment to eliminate shipping errors and disposal site Notice of Violations (NOV).</p> <p>Utilize facilities with appropriate Document Safety Analyses (DSA) and controls for characterization activities.</p> <p>Utilize WGS to provide waste and regulatory expertise to projects and eliminate disposal site NOVs.</p> <p>Centralize container management, including procurement and quality assurance (QA).</p>

This document establishes the framework to flow-down programmatic strategies for managing waste from initial generation through final disposition. These programmatic strategies will provide the basis for developing project-specific waste management plans. Project-specific waste management plans will

address (1) pollution prevention and waste minimization methods, (2) waste generation forecasts, (3) point of generation controls, (4) handling of classified waste, (5) staging and storage requirements, (6) transportation, (7) treatment/recycling/disposal requirements, (8) required training, and (9) waste with no disposal path conditions.

PRS shall characterize waste in accordance with the applicable regulations, DOE orders, profile and procedure requirements, and the applicable treatment, storage, and disposal facility (TSDF) waste acceptance criteria (WAC). Process knowledge shall be used to the extent practical to minimize additional sampling. Additional sampling and laboratory analysis or noninvasive characterization methods shall be performed as necessary when existing information is inadequate to make an accurate waste determination.

Sorting, segregation, and decontamination techniques shall be performed to the extent practical to minimize the amount of regulated waste (Resource Conservation and Recovery Act [RCRA] and Toxic Substances Control Act [TSCA]) requiring treatment and disposal. All wastes shall be evaluated for the best technical and cost effective disposition path with the following hierarchy:

1. Reuse/Recycle
2. C-746-U Landfill or on-site treatment
3. Commercial disposal low-level waste (LLW)
4. Nevada Test Site (NTS) (LLW)
5. Commercial TSDF for treatment/disposal (RCRA, TSCA, mixed low-level waste [MLLW], etc.)

PRS shall implement a program to track issues, corrective actions, and lessons learned. Issues and corrective actions shall be tracked in the Issues and Corrective Actions Tracking System (ICATS) database. Lessons learned shall be tracked in the LESSONS database (Lessons Learned System). Each project shall be responsible for developing lessons learned as applicable.

## 2.0 PURPOSE AND SCOPE

The purpose of this waste management plan (WMP) is to provide a systematic approach to the management of waste generated on the Paducah ER project that is designed to protect the health and safety of the worker, the public, and the environment. This document provides the required steps to implement DOE O 435.1, *Radioactive Waste Management*, and DOE M 435.1-1, *Radioactive Waste Management Manual*, which require PRS to systematically plan, document, execute, and evaluate the management of DOE radioactive waste and assist the government in planning, executing, and evaluating the management of DOE radioactive waste in accordance with the requirements of DOE O 435.1.

The scope of this document is to set forth the requirements for managing legacy and newly generated LLW, MLLW, TSCA LLW, and Transuranic (TRU) waste at the PGDP. The plan also addresses the management of nonradioactive waste for information purposes. The plan identifies the compliance drivers, organizational responsibilities, waste types, and specific elements that must be addressed during pre-planning, generation, management, and waste disposition. The approach outlined in this plan is intended to further supplement the waste management requirements in *FY 2004 Site Management Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, (DOE, 2004).

### 3.0 COMPLIANCE DRIVERS

Waste generated on the project shall be managed in accordance with DOE orders, state and federal requirements, permits, and compliance agreements. The following does not constitute a complete list of compliance drivers but rather the primary requirements for planning:

- **DOE Order 435.1:** This order ensures that DOE radioactive waste is managed in a manner that is protective of work and public health and the environment. PRS program documents and implementing procedures are identified in the BJC-GM-1400PP, *Integrated Safety Management System Description*, (Bechtel Jacobs Company, LLC [BJC], 2004) and summarized in Appendix A, DOE Order Implementation Crosswalk.
- **Resource Conservation and Recovery Act:** Establishes the standards for hazardous and MLLW waste identification, treatment, storage, and disposal of solid and hazardous waste generated by the project.
- **Toxic Substances Control Act:** – Establishes requirements for identifying, storing, transporting, and treating TSCA and TSCA LLW waste.
- **Hazardous Waste Operating Permit No. KY88990008982:** Contains the regulatory provisions for hazardous and MLLW treatment, storage, and disposal activities of the project (Commonwealth of Kentucky Natural Resources and Environmental Protection Cabinet (Cabinet), 2004).
- **Solid Waste Permit Number 073-00045/073-00014/073-00015:** Contains the regulatory provisions for solid waste disposal activities of the project (Cabinet, 2006).
- **Federal Facilities Agreement:** The negotiated Federal Facility Agreement (FFA), as required by Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), is a tri-party agreement between DOE, U.S. Environmental Protection Agency (EPA), and Kentucky signed in 1998. The FFA coordinates Resource Conservation and Recovery Act (RCRA)/CERCLA corrective/remedial actions process at the site (EPA, 1998).
- **TSCA-Uranium Enrichment (UE)-FFCA:** This agreement was signed between the EPA and DOE in 1992 and requires develop and implementation of action plans for removal and disposal of polychlorinated biphenyl (PCB) material (EPA, 1992).
- **2003 Agreed Order:** The October 1, 2003 Agreed Order between DOE and the Kentucky Division of Waste Management sets forth requirements for characterization and closure of DOE material storage areas, characterization of certain legacy waste, and establishment of contained-in levels for listed environmental media and contaminated debris (Cabinet, 2003).
- **Site Treatment Plan Agreed Order and Site Treatment Plan:** The two-party agreement between Kentucky and DOE was signed in September 1997 and sets forth a series of treatment milestones for volumes of mixed waste that are documented in a site treatment plan (STP). The STP is revised annually (Cabinet, 1997).

## 4.0 ORGANIZATIONAL RESPONSIBILITIES

The PRS organization will implement the general requirements and responsibilities of DOE M. 435.1-1 through programs and procedures identified in BJC-GM-1400P, *Integrated Safety Management System Description*, (BJC, 2004) and summarized in Appendix A, *DOE Order Implementation Crosswalk*. Specific functional waste management activities shall be integrated across the following areas:

**Contracts/Procurement:** Establish purchase orders or contracts with analytical laboratories, subcontractors, waste transportation companies, and TSDFs. Procure empty hazardous materials containers, labels, placards, shipping forms, etc., and maintain an Approved Vendors List in accordance with the PRS QA program.

**Document Control:** Manage/retain records generated during waste generation, management, and treatment/disposal in accordance with DOE (1996) O 200.1, *Information Management Program*, and DOE (2005) O 414.1C, *Quality Assurance*.

**Environmental Monitoring:** Characterize materials and/or contents and provide isotopic information to determine the total activity and the contributing radionuclides, establish the fissile weights and enrichments, and determine whether other hazardous characteristics are also present. Monitoring will be performed in accordance with DOE 5400.1, *General Environmental Protection Program*, and DOE (1993) 5400.5, *Radiation Protection of the Public and Environment*. Maintain, input, create reports, and carry out all other activities necessary to manage sample analytical data provided by the projects. This includes management of the Oak Ridge Operations Office Environmental Information System and Project Environmental Management System databases.

**Project Waste Coordinators:** Develop WMPs outlining the waste disposition strategy for each project or work scope. Characterize the waste, select appropriate containers, and oversee the packaging of the waste. Work with transportation group to ship the waste to the appropriate TSDF.

**Quality Assurance:** Ensure that packaging supplies (containers, liners, absorbent, etc.) meet the requirements set forth by the project generating the waste. Ensure that work is performed in accordance with approved plans/procedures. Conduct routine surveillances of waste management activities. Activities will be performed in accordance with a QA program that meets the requirements of 10 Code of Federal Regulation (CFR) 830.120, *Quality Assurance Requirements*, and DOE (2005) O 414.1, *Quality Assurance*, as applicable.

**Radiological Safety:** Review and approve methods of conducting transportation surveys for the receipt and off-site shipment of hazardous materials, radiological surveys of packaging to determine the appropriate labels and transport index, and ascertaining that appropriate surface contamination limits are not exceeded. The radiation safety technicians, under the RSO, will develop radiological work permits prior to beginning work and provide job coverage of waste packaging activities. These activities shall meet the requirements of 10 CFR Part 835, *Occupational Radiation Protection*, and DOE (1993) 5400.5, *Radiation Protection of the Public and the Environment*.

**Regulatory/Environmental Compliance:** Ensure that appropriate regulations pertaining to waste determinations, waste generation, storage, transportation, and disposal are followed. Verify that appropriate notifications are filed with regulatory agencies.

**Training:** Establish and maintain the training matrix and training files for PRS personnel and subcontractors engaged in waste management activities. A training and qualification program shall be implemented for radioactive waste management program personnel and shall meet the requirements of

DOE (2001) O 360.1, *Federal Employee Training*, and DOE (2001) 5480.20A, *Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities*.

**Transportation:** Provide guidance to the waste coordinators regarding the package selection, packaging, marking, and labeling of containers. Complete and certify shipping papers and/or manifests; call and schedule carriers; inspect, coordinate, and provide guidance on the loading and securing of packages aboard the conveyance; ensure that carrier is offered the appropriate placards; instruct carrier; and provide emergency instructions. Radioactive waste shall be packaged and transported in accordance with DOE (1997) O 460.1A, *Packaging and Transportation Safety*, and DOE (2004) O 460.2, *Departmental Materials Transportation and Packaging Management*.

**Waste Certification Group:** Certify and release waste for shipment. Verify that waste is prepared, packaged, and prepared for transport in accordance with the receiving facility's WAC.

## 5.0 WASTE GENERATION PLANNING

### 5.1 WASTE TYPES

Projects will generate and/or manage legacy and newly generated LLW, MLLW, TSCA LLW, TRU, RCRA, and TSCA waste. Projects include material disposition, environmental restoration, facilities disposition, and environmental monitoring. The characterization, processing, and disposition strategy for each project are identified in Appendix B, *Project-Specific Waste Management Strategy*.

### 5.2 WASTE GENERATOR SERVICES

WGS is an integrated, site-wide organization focused on safe, cost-effective, and compliant disposition of wastes from the Paducah Environmental Remediation Project. This integration strategy achieves the following benefits:

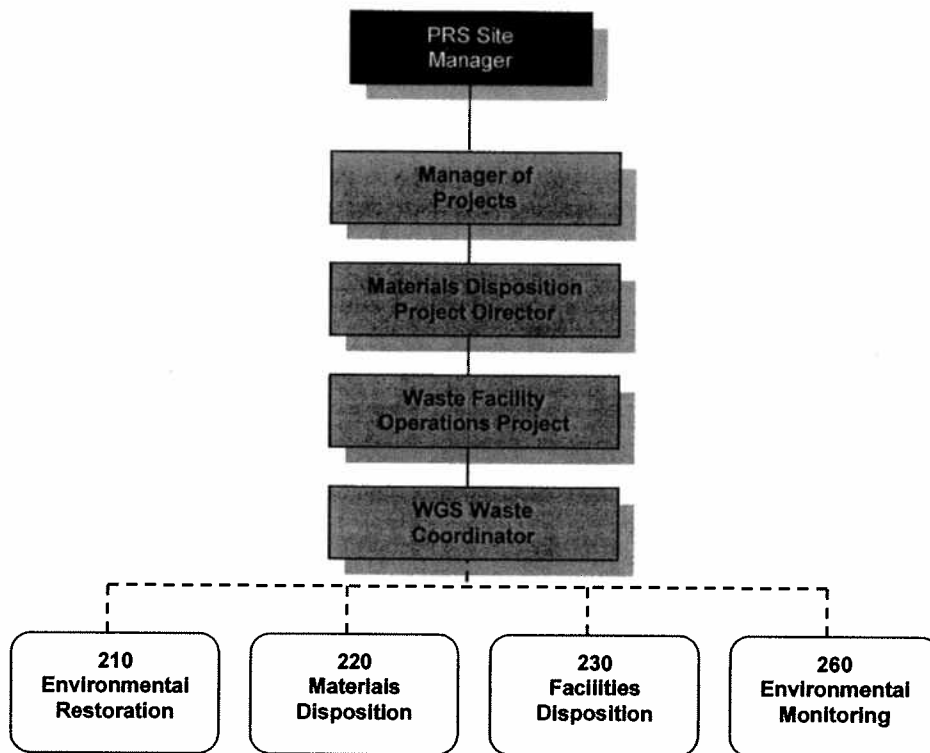
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<b>Benefit</b>	<b>Strategy</b>
Cost & Schedule Effectiveness	Site-Wide Waste Generation Planning
	Use early characterization to identify problem wastes.
	Optimize use of process knowledge to reduce analytical cost.
	Perform bulk assay to the greatest extent practical.
	Develop/maintain broad profiles.
Risk Mitigation	Maximize the use of the C-746-U Landfill.
	Centralize P2/WMin program.
	Enhance control of waste materials by establishing a site-wide waste information management database to maintain inventory and characterization data.
	Verify process knowledge prior to shipment to eliminate shipping errors and disposal site NOV's.
	Utilize facilities with appropriate DSAs and controls for characterization activities.
Utilize WGS to provide waste and regulatory expertise to projects and eliminate disposal site NOV's.	
Centralize container management, including procurement and QA.	

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WGS is integrated into projects by assigning trained waste coordinators directly to each project (see Figure 1). These waste coordinators specialize in waste planning and minimization, characterization,

disposition path planning, profile development, and transportation. The WGS process starts with developing pre-disposition plans for waste stream identification, emphasizing waste minimization and elimination. End-point disposition paths are identified prior to generation, with priority placed on source reduction, reuse, recycling, and low-cost on-site disposal. By incorporating careful planning into waste management activities, waste shall be characterized and packaged in accordance with the acceptance requirements for disposition, and the need for long-term storage shall be greatly reduced.



**Figure 1. Waste Generator Services personnel matrixed into projects.**

A detailed process flow diagram for Waste Generator Services is presented in Appendix C.

### 5.3 PROJECT-SPECIFIC PLANNING

Work shall be planned, authorized, and accomplished under controlled conditions, using work plans, instructions, or procedures commensurate with the complexity and risk of the work. Processes important to waste disposition activities (e.g., characterization, radiological surveys, etc.) shall have controls or verification steps identified as part of operating procedures. Controls shall be established to ensure the traceability of the waste from the point of generation through final disposition. Each project shall develop a project-specific WMP detailing the processes, procedures, and methods that will be used during project implementation to ensure safe and compliant management of all project-related waste (including secondary waste). The project-specific WMP shall include the following elements:

- Pollution prevention and waste minimization methods



- Waste avoidance
- Material substitution
- Recycling and reuse
- Volume reduction
- Waste generation forecast (by waste stream)
  - Waste category (e.g. LLW, MLLW, TSCA LLW, TRU, RCRA, TSCA, asbestos-containing material, universal, etc.)
  - Waste stream description (e.g. product, personal protective equipment/trash, soil, debris, etc.)
  - Waste codes or special identification
  - Special handling requirements (e.g., PCBs, asbestos, classified, etc.)
  - Estimated quantity
  - Planned disposition facility
  - Type and number of containers to be used to package and transport the waste
  - Type of absorbents and/or liners to be used to package the waste.
- Point of generation controls
  - Inventory controls beginning with receipt of empty containers through disposition of the waste that ensure traceability of each container of waste from the point of generation through disposition
  - Methods that will be used to identify, segregate, characterize, and package each waste stream
  - Methods that will be used to identify and manage waste anomalies and prohibited items
  - Methods for precluding prohibited items (free liquids, compressed gases, reactives, etc.)
  - Physical waste form modification to ensure TSDF WAC compliance and minimize disposal costs
  - Quality control (QC)
  - Nevada Test Site (NTS) Compliance (if applicable).
- Handling of classified waste
  - If classified waste is to be generated, the WMP shall address it only as classified LLW, classified MLLW, classified industrial waste, or classified hazardous waste. Contact your security specialist for further instructions on preparing and handling documentation for classified waste generation.
- Characterization requirements
  - Chemical characterization strategy (process knowledge [PK], sampling, field screening).
  - Radiological characterization strategy (PK, sampling, field screening).
- Staging and storage requirements
  - Proper labeling, marking, and posting
  - Secondary containment, cover, emergency response equipment, etc.
  - Inspection requirements and frequency
  - Administrative time limits for waste storage/staging to ensure compliance with DOE (2001) O 435.1, Kentucky Administrative Regulations, and applicable enforceable documents
  - Nuclear criticality safety.
- Transportation
  - Type of conveyance (e.g., dump truck, flatbed, gondola)
  - Approved vendors/subcontractors
  - Federal, state, local, and site requirements to maintain certification requirements
  - Mode of transportation (e.g., truck, rail, intermodal).
- Treatment/recycling/disposal requirements
- Required training for personnel involved in waste generation processes.

- Waste with no disposal path (this type of waste will be included in annual updates to the site treatment plan).

Note: Waste streams with no disposal path shall be generated only in accordance with approved conditions, which, at a minimum, shall address the following:

- Programmatic need to generate the waste
- Characteristics and issues preventing the disposal of the waste
- Safe storage of the waste until disposal can be achieved
- Activities and plans for achieving final disposal of the waste.

WMPs shall be developed by waste coordinators assigned to each project. Projects may choose to develop and implement a separate WMP or address the WMP elements in other work control documentation, such as work plans or work packages. Through this planning process, PRS shall ensure that operations are conducted in compliance with applicable federal, state, and local requirements pertaining to waste determinations, transportation, and treatment/disposal.

PRS shall evaluate existing WMPs for projects that are underway and will be in progress at the beginning of contract execution (April 24, 2006). PRS shall either adopt the plans (through the approved “bluesheet” process) or modify them for implementation. A list of these existing documents is included in Appendix D.

#### 5.4 SUBCONTRACTORS

In accordance with the PRS integrated safety management system description and Section I.129 of contract No. DE-AC30-06W05001, requirements for waste management planning shall be incorporated into the contracts of all subcontractors that are involved in the generation of waste. A waste coordinator shall be assigned to each subcontractor to assist in work planning and the development of a specific WMP for the work being performed.

#### 5.5 POLLUTION PREVENTION/WASTE MINIMIZATION

PRS shall plan every activity to meet the obligations and responsibilities under Executive Order 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*, and Executive Order 13101, *Greening the Government through Waste Prevention, Recycling, and Federal Acquisition*, and *The Pollution Prevention Act of 1990*. PRS shall minimize the generation of waste per the following EPA hierarchy:

- Reduce
- Reuse
- Recycle
- Dispose.

**Reduce.** During project planning, every effort shall be made to minimize the amount of waste generated by the following means:

- Use the least hazardous chemicals/products possible.
- Purchase only the amount of materials required.
- Limit the materials taken into contamination areas.

- Perform as many tasks outside a contamination area as possible.
- Decontaminate items to the greatest extent practical.
- Aggressively sort and segregate materials.

**Reuse/Recycle.** PRS shall develop and implement a program for excess chemicals, products, etc. These items shall be made available to the following: PRS projects, PGDP contractors, and other governmental agencies. This will help reduce the number of products purchased as well as reduce the amount requiring waste disposal.

Universal wastes (batteries, thermostats, and lamps) shall also be packaged and staged to optimize off-site shipments. Recycling contracts shall be put in place for these items.

PRS shall recycle office wastes, including paper, plastic, aluminum cans, printer cartridges, etc. These items shall be placed in designated locations/containers located throughout the plant site. When sufficient quantities have been collected, they will be transported to a local recycling agency.

**Dispose.** PRS shall maintain treatment/disposal contracts for all waste types generated. In all cases, PRS shall seek the most cost-effective, compliant alternative.

## 5.6 WASTE MANAGEMENT PLAN REVIEW AND APPROVAL PROCESS

WMPs shall be reviewed and approved by appropriate project personnel and subject matter experts in accordance with the Integrated Safety Management System (ISMS) work control process. At a minimum, the following personnel shall review and approve the project-specific plans/procedures:

- Project manager (or designee)
- Environmental compliance manager (or designee)
- Health physics supervisor or radcon supervisor
- Site safety officer or industrial hygiene representative
- Transportation manager (or designee)
- Waste facility operations project manager (or designee)
- Regulatory agencies (if required).

Once approved, the project shall proceed with implementation of the WMP. The responsibility for implementing requirements in the WMP shall reside with the waste coordinator assigned to the project. The waste coordinator shall notify the project manager if a discrepancy is found or if the plan requires modification and/or additional reviews.

## 5.7 PACKAGING AND TRANSPORTATION

Waste shall be packaged in a manner that provides containment and protection for the duration of the anticipated storage period. Selection and use of containers must be appropriate for the waste being packaged. Characterization of the waste must be performed prior to final container selection in order to ensure the following:

- Physical characteristics of the waste are appropriate for the container type (bulk containers for bulk waste, liquid-rated containers for liquids, vents for pressurized or potentially flammable gas mixtures, etc.).

- The container is compatible with the chemical characteristics of the waste (corrosives, reactives, etc. may require appropriate liners).
- Radiological properties and quantities are appropriate for the container (IP-1, IP-2, Type A, etc. requirements).
- Security requirements are satisfied.
- Treatment, storage, and disposal requirements are met.

On-site and off-site transportation of waste shall be coordinated through the PRS transportation team. On-site shipments are performed in accordance with BJC/PAD-661, *Transportation Safety Document for On-Site Transportation within the Paducah Gaseous Diffusion Plant, Paducah, KY*. Off-site shipments are performed in accordance with PA-3028, *Paducah Transportation Program*. Only designated and trained shippers shall be authorized to complete shipping papers (e.g., uniform low-level radioactive waste manifests, uniform hazardous waste manifests, bills of lading, etc.) and review waste shipments for compliance with 49 CFR. Waste shipping personnel shall be trained in accordance with 49 CFR subpart H.

Waste containers shall be staged and consolidated to the extent practical to minimize the volume and number of on-site and off-site shipments. PRS shall establish “milk runs” to on-site small-quantity generators to optimize the off-site shipments.

For waste shipments involving regulated U.S. Department of Transportation materials, PRS shall use motor carriers that are approved for use under the DOE Motor Carrier Evaluation Program. Self-assessments of transportation and packaging operations shall be performed at least every 3 years to ensure compliance with applicable regulations, DOE orders, etc.

## **6.0 CHARACTERIZATION STRATEGY**

### **6.1 GENERAL**

Waste characterization shall be conducted in accordance with the applicable regulations, compliance agreements, DOE orders, waste profile requirements, and the applicable TSDF WAC. When process knowledge is insufficient to ensure accurate characterization, additional sampling and laboratory analysis or noninvasive characterization methods shall be performed. Sample collection and analysis shall be performed in accordance with EPA-approved and/or industry standard practices (e.g., EPA SW-846, *Test Methods for Evaluating Solid Wastes*, EPA Series 900 methods). The technical basis for sampling and analysis shall be documented in an approved characterization plan that includes strategy for sampling and analysis, a review of the data quality objectives (DQO) process, analytical methods, and standard operating procedures that will be employed for waste characterization. The characterization plan shall describe the sampling techniques that will be used and the QA and quality control (QC) measures that will be employed to ensure data accuracy and representativeness in accordance with EPA SW-846 and EPA-900 methods. These measures include, but are not limited to collection of trip blanks, field replicate samples, material blanks, blind duplicates, blind performance evaluation samples, matrix spikes/matrix spike duplicates, laboratory control samples, chemical tracer recoveries, laboratory and method blanks, and other performance evaluation samples as required by specific methods. The characterization plan also defines how data will be verified and/or validated prior to use.

Samples collected for waste characterization shall be submitted to DOE-approved laboratories which also meet the appropriate QA requirements as described in the applicable WAC of the receiving facility. Waste characterization information must be traceable to the exact waste package into which the waste was placed.

### **6.2 LEGACY WASTE**

PRS shall maximize the use of PK and existing sample analysis to meet the DQOs. PRS shall conduct a thorough review of any historical PK and existing sample analysis data to develop waste stream campaigns. Early identification and examination of MLLW orphans and gap analysis shall be performed to determine additional processing/disposition needs. As campaigns are identified, PRS shall open, visually inspect, decant, add absorbent to, and remove prohibited articles from the legacy containers as necessary to meet the WAC at the appropriate TSDF. Additional sampling and laboratory analysis or noninvasive characterization methods shall be performed as necessary when existing information is inadequate to make an accurate waste determination.

### **6.3 NEWLY GENERATED WASTE**

PRS shall plan and execute all work to manage waste at the point of generation. Waste coordinators shall develop project-specific WMPs to identify each waste stream and define how it will be characterized. A combination of PK and existing sample analysis data shall be utilized to meet the DQOs. Additional sampling and laboratory analysis or noninvasive characterization methods shall be performed as necessary when existing information is inadequate to make an accurate waste determination.

It is the strategy of PRS to sort, segregate, size reduce (when necessary), package, and ship waste from the point of generation to the extent practical, thus minimizing the need for on-site storage. In the event that newly generated waste needs to be added to the on-site storage facilities, the waste coordinator shall ensure that a disposition path has been identified and that the waste is packaged in compliance with 49 CFR and the designated TSDF WAC. The waste coordinator shall also develop a request for disposal

(RFD) in accordance with BJC/PAD-11, *Waste Acceptance Criteria for the Department of Energy Treatment, Storage, and Disposal Units at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, to ensure that the on-site WAC requirements are met.

#### **6.4 COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT WASTE**

Site investigation activities and implementation of response actions conducted under the FFA will generate various types of waste, including contaminated media and debris. As required by CERCLA, waste generated under the FFA will be managed in accordance applicable, relevant, or appropriate requirements (ARAR) and EPA guidance/policies. Consistent with these requirements, characterization strategies for CERCLA waste will be tailored to the nature of the materials generated. For example, EPA policy (57 FR 990) provides for characterizing construction debris based on a representative sample of the average properties of the debris as a whole and does not establish an expectation or requirement that all potentially hazardous items be segregated and managed separately. Any sorting and segregating of such items will be considered on a case-by-case basis and conducted to the extent reasonable and practical. As part of the characterization process for waste determinations of environmental media and debris, PRS will use EPA's Contained-In Policy, which allows the establishment of health-based levels for determining when environmental media and debris contain a listed hazardous waste. Contained-in determinations will be conducted consistent with Appendix D of the Agreed Order (2003).

#### **6.5 NONDESTRUCTIVE ASSAY**

Where applicable, PRS shall use a multi-detector nondestructive assay (NDA) system to obtain the radiological characterization for waste streams. Each waste stream shall be evaluated to determine if NDA can be effectively utilized for waste characterization to meet the requirements of the C-746-U Landfill (BJC/PAD-11, *Waste Acceptance Criteria for the Department of Energy Treatment, Storage, and Disposal Units at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, and BJC/PAD-491, *Authorized Limits Request for Solid Waste Disposal at Landfill C-746-U at the Paducah Gaseous Diffusion Plant*), and/or off-site TSDF WAC.

#### **6.6 PROFILE DEVELOPMENT**

PRS shall develop broad profiles for site-wide application to the greatest extent practical. These profiles will be based on waste generation and physical, chemical, and radiological characteristics. Each project will develop waste stream-specific RFDs that will be reviewed, approved, and verified into these broad profiles. Narrow, waste-stream specific profiles shall be developed on a case-by-case basis for waste that is generated by a single project or cannot easily fit into a broad profile.

#### **6.7 WASTE PACKAGE CERTIFICATION**

PRS shall certify waste as meeting waste acceptance requirements at the applicable TSDF prior to being transferred to the facility receiving the waste. This certification shall be performed in accordance with PA-3011, *Certification of Paducah LLW for Disposal at the Nevada Test Site*, and/or PA-3013, *Offsite Shipment Management Review*.

## **7.0 CONTAINER MANAGEMENT, STAGING, AND STORAGE**

### **7.1 CONTAINER MANAGEMENT AND TRACKING**

PRS shall develop and implement a centralized container management function. Each project/generator shall forecast container needs so that blanket purchase agreements can be put in place with container manufacturers for commercial grade containers. Specialty containers, if required, shall be purchased on a case-by-case basis. All container purchases shall be coordinated through this centralized function for economies of scale.

PRS shall assign a unique container identification number (CIN) to each container used at the PGDP. This number shall be placed on the container by the manufacturer or at the time of receipt. Containers shall be tracked by each project from the time of receipt through final disposition. At the time of receipt, these containers shall be tracked by the project using the following information:

- CIN
- Container type, size, volume, tare weight
- Date received
- Project/owner
- Location stored/being filled (as applicable).

As the status and/or location of these containers changes or if specific requirements of a project-specific WMP dictate certain requirements, updates to the container tracking must be made accordingly. Once filled, additional information must be tracked, including the following:

- Date packaged
- Waste type (LLW, MLLW, TSCA LLW, RCRA, TSCA, etc.)
- Waste weight, gross weight
- Waste codes (as applicable)
- Waste description (including physical form)
- Waste location
- Radionuclides.

Shipment information shall be tracked, including shipment number, date, and destination. Currently, each project uses its own tracking system (Microsoft Access, Excel, Waste Information Tracking System, etc.). Ultimately, PRS intends to use one site database for container tracking. To do so, each existing project shall be evaluated to determine the value added for inclusion in a single database. Short-term projects most likely will not be changed. Long-term projects will gradually be converted over to a single database. In all cases, container-tracking information shall be maintained for inclusion in the DOE Waste Information Management System database as directed by DOE.

### **7.2 ACCUMULATION, STAGING, AND STORAGE AREAS**

#### **7.2.1 Satellite Accumulation Areas**

Projects/generators may accumulate up to 55 gallons of hazardous waste or mixed waste (or 1 quart of acutely hazardous waste) at or near the point of generation. Once this limit has been reached or the generation of this waste is complete, the container(s) shall either be transferred to a 90-day storage area, to an on-site TSDF or, in some cases, directly to an off-site TSDF. Waste coordinators shall work with each project/generator in the establishment and management of satellite accumulation areas.

### **7.2.2 Generator Staging Area**

Projects/generators may accumulate nonhazardous waste or radiological waste to stage for shipment. Waste coordinators shall work with each project/generator in the establishment and management of generator staging areas (GSA). The staging timeframes shall not exceed the requirements set for in DOE (2001) M 435.1, *Radioactive Waste Management Manual*.

### **7.2.3 90-Day Storage Areas**

Projects/generators may accumulate an unlimited quantity of hazardous waste in a storage area or containment building for up to 90 days. During this time period, final characterization of the waste shall be performed for the waste to be either transferred to an on-site TSDF for staging with other containers to optimize shipment or directly to an off-site TSDF. Waste coordinators shall work with each project/generator in the establishment and management of 90-day storage areas.

### **7.2.4 30-Day Temporary Area (Polychlorinated Biphenyl Waste)**

Projects/generators may accumulate PCB solid waste in a staging area for up to 30 days. On or before the expiration of the time period, the waste must either be transferred to an on-site TSDF or directly to an off-site TSDF. Waste coordinators shall work with each project/generator in the establishment and management of 30-day temporary areas for PCB waste.

### **7.2.5 Comprehensive Environmental Response, Compensation, and Liability Act Storage**

While a primary goal of the PRS waste management strategy is to pursue immediate disposition of CERCLA waste upon generation and characterization, there may still be instances where some waste may require temporary storage prior to disposal. Cleanup activities under the FFA have the potential to generate various types of regulated waste, including LLW, RCRA, TSCA, and mixed waste. Section 121(e)(1) of CERCLA exempts on-site CERCLA actions from obtaining permits for management of waste. However, CERCLA still requires management of these wastes in accordance with the substantive requirements of ARARs. The CERCLA decision documents and project-specific waste management plans will identify ARARs that must be attained for each response action conducted under the FFA. In addition, to provide regulatory flexibility for cleanup actions, EPA has developed the following policies and rulemakings:

- Management within the area of contamination
- Establishment of staging piles and temporary units for remediation waste.

PRS will consider application of these approaches on a case-by-case basis in accordance with 40 CFR 264.553 and 40 CFR 264.554.

### **7.2.6 Inspections**

PRS shall perform inspections of temporary storage locations in accordance with -3010, *Waste Generator Responsibilities for Temporary On-Site Storage of Waste Materials at Paducah*. These inspections include checking postings, labels, container integrity, and general housekeeping.

## **7.3 STORAGE FACILITIES**

Within the PGDP site boundary, PRS operates RCRA Part B permitted storage facilities as well as storage facilities for low-level radioactive waste and TSCA waste. The PRS strategy is to manage newly generated waste at the point of generation and to gradually eliminate the need for on-site storage. GSAs



and “milk runs” shall be used to optimize waste shipments to off-site TSDFs. On a case-by-case basis, newly generated waste may need to be transferred to the on-site TSDF. If necessary, this shall be performed in accordance with the approved WAC (BJC/PAD-11). See Appendix E for the entire list of waste storage facilities. PRS shall perform routine inspections of these storage facilities in accordance with Standard Operating Procedure No. 525, *Inspection of DOE Waste Storage Facilities*.

## 8.0 DISPOSITION STRATEGY

### 8.1 OVERVIEW

PRS shall characterize and package all waste in accordance with an approved WMP and the applicable TSDF WAC. Decontamination techniques shall be performed to the greatest extent practical. All wastes shall be evaluated for the best technical and cost effective disposition path with the following hierarchy:

1. Reuse/recycle
2. C-746-U Landfill or on-site treatment
3. Commercial disposal (LLW)
4. NTS (LLW)
5. Commercial TSDF for treatment/disposal (RCRA, TSCA, MLLW, etc.).

### 8.2 APPROVAL OF EXEMPTIONS FOR USE OF NON-DEPARTMENT OF ENERGY FACILITIES FOR LOW-LEVEL WASTE

DOE (2001) Manual 435.1-1, *Radioactive Waste Management Manual*, Chapter 1, 2.F (4) states that DOE radioactive waste shall be treated, stored and, in the case of low-level waste, disposed of at the site where the waste is generated, if practical, or at another DOE facility. Exemptions may be approved to allow use of non-DOE facilities for storage, treatment, or disposal of DOE radioactive waste. Further, on December 6, 2002, assistant secretary for environmental monitoring issued a memorandum directing the use of blanket exemptions from DOE Order 435.1 for treatment and/or disposal of low-level waste and mixed low-level waste at commercial facilities.

On April 15, 2003, the DOE Paducah Site requested and received approval of a blanket exemption to dispose of DOE LLW and MLLW at commercial sites. This blanket approval is still in effect and will be utilized by PRS.

### 8.3 WASTEWATER

Wastewater is generated as a result of the following:

- Sump water collection: Sump water is collected from C-733 and various other locations around the site on occasion. C-404 (inactive landfill) leachate is handled through the wastewater program.
- Waste repackaging activities that generate decant water. Decant water is collected as a part of waste repackaging efforts in preparation for disposition. Free liquids are decanted from waste being repackaged for the disposal in the C-746-U Landfill or at off-site locations like Energy Solutions.
- Wastewater storage tank cleanout water/rinsate: Rinsate collection accounts for a sizable portion of the wastewater inventory. Since tanks are reused, they must be cleaned out between uses to prevent cross contamination.
- Individual on-site project generated wastewater: On-site projects (like scrap metal or demolition and decontamination) generate waste water without the project means to treat water for discharge. This wastewater is collected and treated as part of the waste operations/disposition scope.

This wastewater is collected and transported to storage in C-752-A (the only heated facility).

The water is sampled for discharge determination. If the wastewater does not meet Kentucky Pollutant Discharge Elimination System limits, the wastewater is treated by a carbon-canister filtration system (2 gallons per minute) with a pretreatment filter to capture solids. This treats PCB contaminated water and typically removes enough solids to meet discharge parameters (occasionally a second run-through is required). Other types of wastewater contamination consist of radionuclide contamination and oil and grease. If the radiological contamination is in the solids, the treatment unit may be enough to get the water down to discharge limits. Otherwise, there is no existing on-site treatment capability for these types of waste.

Once wastewater is properly treated and/or is verified by characterization to meet discharge limits, it is discharged through Outfall 001.

Occasionally, the C-746-U and C-746-S Landfill leachate requires treatment to meet the WAC requirements prior to entering the C-615 water treatment facility. The methodology described above has been used.

Stormwater is managed in accordance with the Best Management Plan required by the Kentucky Pollution Discharge Elimination System permit no. KY0004049. The plan addresses control and/or abatement of the discharge of pollutants from ancillary areas containing toxic or hazardous substances or those substances which could result in environmental emergency.

#### **8.4 SOLID AND LOW-LEVEL RADIOACTIVE WASTE**

The C-746-U Landfill is PRS' primary disposition path for all waste meeting the acceptance criteria (BJC/PAD-11). In addition, the PGDP has an approved authorized limits request for disposal of soil and debris waste from construction, maintenance, environmental restoration, and decontamination activities at the C-746-U Landfill (BJC/PAD-491).

EnergySolutions shall be utilized as the primary disposal option for bulk waste and low activity waste streams not meeting the C-746-U Landfill WAC. NTS shall be utilized for classified and higher activity waste streams (greater than Class A as defined by the Nuclear Regulatory Commission under Title 10 of the CFR). This strategy is consistent with the site's blanket exemption to DOE Order 435.1, which cites the following factors in favoring commercial disposal at EnergySolutions over disposal at the NTS landfill:

- The waste can be transported more cost effectively by rail than truck (NTS does not have rail access).
- Certain waste streams meet the acceptance criteria at EnergySolutions and do not require repackaging that would be necessary to facilitate NTS burial; this eliminates potential exposure to asbestos and radiation and represents a level of effort cost avoidance.

#### **8.5 HAZARDOUS AND MIXED LOW-LEVEL WASTE**

PRS shall sort and segregate RCRA-regulated items to minimize the amount of waste that must be treated and disposed as RCRA. PRS shall decontaminate RCRA regulated items to the greatest extent practical to minimize the amount of mixed waste to be dispositioned and thus achieve the most cost-effective disposition path.

PRS operates several treatment facilities onsite for hazardous and mixed waste. The decision to treat waste onsite versus shipping to an off-site commercial or DOE facility must be evaluated based on several factors:

- Can the waste be handled and managed onsite in a safe and compliant manner under our existing permit and facilities?
- Does the option of treating waste onsite represent a cost savings over off-site treatment?
- Does the schedule required to treat the waste on-site meet regulatory commitments? (e.g., Federal Facilities Compliance Agreements, DOE orders, etc.)

Wastes acceptable for neutralization, precipitation, oxidation, reduction, or a combination thereof may be transferred to either the C-746-Q or the C-752-A facilities for treatment. Fluorescent bulbs and miscellaneous lamps may be treated at either the C-746-A or the C-746-Q facilities. Decanting and absorption of free liquids may occur at any of the permitted storage facilities. Treatment by compaction (volume reduction), macroencapsulation, or combination thereof may occur at C-752-A, C-746-A, C-733, or C-746-Q.

MLLW, for which on-site treatment is not a viable option, shall be packaged and shipped to the appropriate off-site TSDF for treatment and disposal (e.g., EnergySolutions, Permafrix, Waste Control Specialists, etc.). Hazardous waste that does not contain a radioactive component shall be packaged and shipped to a commercial TSDF (Clean Harbors, Heritage Environmental, Onyx).

## **8.6 TOXIC SUBSTANCES CONTROL ACT – REGULATED AND LOW-LEVEL WASTE**

TSCA and TSCA LLW consist of both liquids and solids. The Toxic Substances Control Act Incinerator (TSCAI) in Oak Ridge, Tennessee is the primary disposition path for TSCA LLW. For larger quantity waste streams, liquids are generally bulked in tote tanks (300- to 500-gallon capacity) to create a container that is easier to handle and more economical to ship. For smaller waste streams, drums designed to hold liquids (i.e., tight-head drums with small openings or “bung-holes” designed for liquid transfer) shall be used. Once liquids are bulked, a composite sample shall be taken for analysis. Upon approval, the liquids may be transferred to a tanker trailer and shipped to the TSCAI per the Toxic Substances Control Act Incinerator Burn Plan. For nonradioactive liquid PCB waste, commercial treatment at a TSCA-approved incinerator is the preferred option.

Solids that cannot be incinerated shall be managed in accordance with 40 CFR 761 requirements. PCB remediation waste, defined in 40 CFR 761.61, is generally acceptable for burial at Energy Solutions in Clive, Utah. Bulk product waste, defined in 40 CFR 761.62 as equipment with PCB-painted surfaces, is acceptable for land disposal at either a TSCA-approved landfill or an approved solid waste landfill outside the Commonwealth of Kentucky. Bulk product waste that does not exceed 49 parts per million PCBs may be disposed in the C-746-U landfill if it complies with other requirements in BJC/PAD-11, *Waste Acceptance Criteria for the Department of Energy Treatment, Storage, and Disposal Units at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*.

## **8.7 MIXED TRANSURANIC WASTE**

PRS intends to continue interim storage of mixed TRU waste in accordance with the STP. According to the STP, characterization, processing, packaging, and shipment of the waste to the waste isolation pilot plant is anticipated by January 31, 2016.

## **8.8 COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, LIABILITY ACT WASTE**

Integral to the completion of cleanup activities under the FFA is cost-effective disposition of CERCLA waste. The evaluation of the various treatment and disposal methods for CERCLA waste will be conducted as part of the engineering evaluation/cost analysis for non-time-critical removal actions and in the feasibility study for remedial actions using the nine criteria specified under 40 CFR 300.430(e)(9)(iii). The selected disposition method will be documented in the corresponding CERCLA decision documents (i.e., record of decision, action memo). Off-site disposal of CERCLA waste will be conducted in accordance with EPA's off-site rule, as required by Section 121(d)(3) of CERCLA.

## **8.9 NEVADA TEST SITE PROGRAM**

PRS shall maintain a certified NTS program for the PGDP. The waste certification officer shall serve as the single point of contact with NTS and is responsible for NTS compliance through involvement in all activities pertaining to waste management for waste streams packaged and shipped to NTS. These activities involve the following:

- Work package reviews and field activity oversight
- Profile reviews
- Shipping paperwork reviews
- Data transfers of NTS disposal documentation
- Coordination with NTS personnel to facilitate audits and surveillances.

Current NTS waste profiles approved for the PDGP are C-746-D yard debris and C-746-D scrap metal.

## 9.0 PROBLEM IDENTIFICATION AND CORRECTIVE ACTIONS

### 9.1 ISSUES TRACKING AND CORRECTIVE ACTIONS

PRS shall implement a program to track issues, corrective actions, and lessons learned, including past packaging and transportation successes and problems throughout the site and with other DOE contractors. Issues and corrective actions shall be tracked in the Issues and Corrective Actions Tracking System (ICATS) database. Lessons learned shall be tracked in the LESSONS Database (Lessons Learned System). Each project shall be responsible for developing lessons learned as applicable. These lessons shall be utilized in work planning and shall be provided to the DOE field office in accordance with DOE (1997) O 460.1B, *Packaging and Transportation Safety*.

Any occurrence (as defined under DOE (2004) O 231.1, *Environment, Safety, and Health Reporting*, and DOE M 231.1-2 (2003), *Occurrence Reporting and Processing of Operations Information*) related to waste management activities shall be reported and documented in the Occurrence Reporting Processing System database.

### 9.2 STOP WORK AUTHORITY

PRS shall implement a ISMS for waste management facilities, operation, and activities, including plans/procedures that will ensure waste is managed as follows:

- Protect the public from exposure to radiation from radioactive materials
- Protect the environment
- Protect workers, including following requirements for radiation protection.

PRS workers have the authority to stop work when the task poses an imminent risk to the individual or the environment per the following procedures:

- PR-3405PP, *Suspension of Work for Portsmouth and Paducah*
- BJC-EH-2018, *Suspension of Work (Safety Related)*
- BJC-EH-2015, *Safety Concerns (I Care, We Care)*.

## **10.0 MANAGEMENT AND INDEPENDENT ASSESSMENTS**

### **10.1 MANAGEMENT ASSESSMENTS**

PRS has established a formalized management assessment process to evaluate the adequacy and effectiveness of procedure implementation, work performance, and contract performance deliverables and expectations. This assessment process requires managers at every level to assess the performance of the activities assigned to their function or project and document their observations and findings. The management assessment also includes an evaluation to determine if an integrated safety management system program is focusing on meeting both customer requirements and strategic goals. Management assessments for waste management activities shall be performed in accordance with PRS-CDL-0058, *Quality Assurance Program Plan (QAPP) for Environmental Remediation and Waste Management for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*.

### **10.2 INDEPENDENT ASSESSMENTS**

Independent assessments (or audits) are routinely planned, scheduled, and conducted to evaluate compliance with environmental, health, safety, quality, and regulatory requirements; the adequacy of work performance, and to promote continuous improvement. These planned assessments are separate from, and in addition to management assessments. Assessment schedules, and the allocation of resources needed to meet these schedules, are based on the status, hazard, and complexity of the activity or process being assessed. Schedule flexibility allows performance of additional assessments of PRS and subcontractor activities for identified areas of concern. The assessment process includes follow-up by project and/or functional management to assure corrective actions are implemented when deficiencies are identified. Management assessments for waste management activities shall be performed in accordance with PRS-CDL-0058, *Quality Assurance Program Plan (QAPP) for Environmental Remediation and Waste Management for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*.

## 11.0 REFERENCES

### Agreements and Permits

- Cabinet, 1997, Agreed Order, File No. DWM-30039-042, Commonwealth of Kentucky National Resources and Environmental Protection Cabinet, Frankfort, KY, September
- Cabinet, 2003, Agreed Order, Commonwealth of Kentucky National Resources and Environmental Protection Cabinet, File Nos. DWM-31434-042, DAQ-31740-030 and DOW-26141042, Frankfort, KY, October
- Cabinet, 2004, Hazardous Waste Facility Operating Permit – Renewal, Commonwealth of Kentucky National Resources and Environmental Protection Cabinet, No. KY88990008982, Frankfort, KY, October
- Cabinet, 2006, Solid Waste Permit, No. 073-00045/073-00014/073-00015, Commonwealth of Kentucky National Resources and Environmental Protection Cabinet Frankfort, KY, February
- EPA, 1998. Federal Facility Agreement for the Paducah Gaseous Diffusion Plant, U.S. Environmental Protection Agency, Atlanta, GA, February
- EPA, 1992, Toxic Substances Control Act Uranium Enrichment Federal Facilities Compliance Agreement, U.S. Environmental Protection Agency, Atlanta, GA, February
- Cabinet, 1998. Kentucky Pollution Discharge Elimination System Permit to Discharge Treated Wastewater into Waters of the Commonwealth, Commonwealth of Kentucky National Resources and Environmental Protection Cabinet, No. KY0004049, Frankfort, KY, January

### Regulations

- EPA, 2004, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Update IIIB, November
- Executive Order 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*
- Executive Order 13101, *Greening the Government through Waste Prevention, Recycling, and Federal Acquisition*
- 10 CFR, *Energy*
- 40 CFR, *Protection of the Environment*
- 49 CFR, *Transportation*

### DOE Orders

- DOE CG-SS-3, Classification Guide for Safeguards and Security Information
- DOE CG-PGD-5
- DOE, 1996, Information Management Program, DOE O 200.1, U.S. Department of Energy, September
- DOE, 2003, Occurrence Reporting Casual Analysis Guide, DOE M 231.1-2, O, U.S. Department of Energy, August
- DOE, 2001, Federal Employee Training, DOE O 360.1B, U.S. Department of Energy, October
- DOE, 2005, Quality Assurance, DOE O 414.1C, U.S. Department of Energy, June
- DOE, 2001, Radioactive Waste Management, DOE O 435.1 Chg. 1, U.S. Department of Energy, August
- DOE, 2001, Radioactive Waste Management Manual, DOE M 435.1-1 Chg. 1, U.S. Department of Energy, June
- DOE, 1997, *Packaging and Transportation Safety*, DOE O 460.1-1, U.S. Department of Energy, June
- DOE, 2004, *Departmental Materials Transportation and Packaging Management*, DOE O 460.2A, U.S. Department of Energy, December
- DOE 5400.1, *General Environmental Protection Program*



- DOE, 1993, *Radiation Protection of the Public and Environment*, DOE O 5400.5 Chg.1, U.S. Department of Energy, January
- DOE, 2001, *Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities*, DOE O 5480.20A, Chg. 2, U.S. Department of Energy, July
- DOE, 2004, FY2004 Site Management Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky.

#### **Documents/Procedures**

- BJC, 2002, Suspension of Work (Safety Related), Document No. BJC-EH-2018, Bechtel Jacobs Company, LLC, October
- BJC, 2003, Safety Concerns (I Care, We Care), Document No. BJC-EH-2015, Bechtel Jacobs Company, LLC, October
- BJC, 2004, *Integrated Safety Management System Description*, Document No. BJC-GM-1400PP, Bechtel Jacobs Company, LLC, October
- BJC/PAD-11, *Waste Acceptance Criteria for the Department of Energy Treatment, Storage, and Disposal Units at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*
- BJC, 2004, *Transportation Safety Document for On-Site Transportation within the Paducah Gaseous Diffusion Plant, Paducah, KY*, Document No. BJC/PAD-661/R2, Bechtel Jacobs Company, LLC, December
- PA-3028, *Paducah Transportation Program*
- PR-3405PP, Suspension of Work for Portsmouth and Paducah
- PA-3010, *Waste Generator Responsibilities for Temporary On-Site Storage of Waste Materials at Paducah*
- PA-3011, *Certification of Paducah LLW for Disposal at the Nevada Test Site*, and/or PA-3013, *Offsite Shipment Management Review*
- BJC/PAD-491, *Authorized Limits Request for Solid Waste Disposal at Landfill C-746-U at the Paducah Gaseous Diffusion Plant.*

#### **Other**

- PRS, 2004, Paducah Contract, Document No. DE-AC30-06W05001, Paducah Remediation Services, LLC (PRS), January
- PRS-CDL-0058, *Quality Assurance Program Plan (QAPP) for Environmental Remediation and Waste Management for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky.*
- DOE, 2005, *Toxic Substances Control Act Incinerator Fiscal Years 2006 through 2009 Burn Plan*

**APPENDIX A**  
**DOE ORDER IMPLEMENTATION CROSSWALK**

## Appendix A: DOE Order Implementation Crosswalk

Description	Other DOE Documents Referenced	Other Regulatory Requirements	Primary PRS Implementing Document(s)
DOE 435.1 "Radioactive Waste Management"			
Att. 1 (Subparagraph 1.A.): Systematic planning & execution of Waste Management	N/A	N/A	PRS-CDL-0029 (See Comment #1) * Project specific plans & procedures.
Att. 1 (Subparagraph 1.B.): Protect public, environment, & workers.	N/A	N/A	PRS-CDL-0029 (See Comment #1) * Project specific plans & procedures.
Att. 1 (Subparagraph 1.C.): Assist DOE in P2/Wmin.	Exec. Order 12856, Exec. Order 13101, DOE 5400.1	Pollution Prevention Act of 1990	PRS-CDL-0029 (See Comment #1) * Project specific plans & procedures.
Att. 1 (Subparagraph 1.D.): Comply with DOE M 435.1-1 unless specifically exempted.	DOE M 435.1-1	N/A	See DOE M 435.1 Below
Att. 1 (Subparagraph 1.E.): Incorporate requirements of DOE O 435.1 & DOE M 435.1-1 into contracts with subcontractors.	N/A	N/A	PRS-CDL-0029 (See Comment #1) BJC-GM-1400PP, "Integrated Safety Management System Description." * Project specific plans & procedures.
DOE M 435.1-1 "Radioactive Waste Management Manual"			
I.E.(1) "Analysis of Operations Information"	DOE O 231.1A	N/A	See Comment #2
I.E.(2) "Classified Waste"	DOE 5632.1C, DOE 5633.3B	N/A	See Comment #2
I.E.(3) "Conduct of Operations"	DOE 5480.19	N/A	PA-1306, "Paducah Classification and Information Control"
I.E.(4) "Criticality Safety"	DOE O 420.1B	N/A	See Comment #2 BJC-GM-2000, "Conduct of Operations for Project, Facilities, and Activities"
I.E.(5) "Emergency Management Program"	DOE O 151.1C	N/A	See Comment #2 BJC-NS-1003, "Nuclear Criticality Safety Program"
I.E.(6) "Environmental and Occurrence Reporting"	DOE O 231.1A Chg 1	N/A	See Comment #2 BJC-EP-3021, "Emergency Management Organization Program"
I.E.(7) "Environmental Monitoring"	DOE 5400.1, DOE 5400.5	N/A	See Comment #2 BJC-PQ-1220, "Occurrence Notification & Reporting"
I.E.(8) "Hazard Analysis Documentation and Authorization Basis"	DOE-STD-1027-92, DOE-EM-STD-5502-94, DOE O 425.1A, DOE O 5480.21, 5480.22, 5480.23	N/A	See Comment #2 BJC-GM-036, "Environmental Data Management" See Comment #2 BJC/OR-1112, "Hazard Categorization/ Classification and Hazards Analysis Application Guide"
			BJC-PQ-1150, "Standards Management" BJC-NS-1002, "Safety Documentation for Hazard Category 2 & 3 Nuclear Facilities" BJC-NS-1009, "Safety Documentation for Radiological and Non-Nuclear Facilities"

## Appendix A: DOE Order Implementation Crosswalk

Description	Other DOE Documents Referenced	Other Regulatory Requirements	Primary PRS Implementing Document(s)
1.E.(9) "Life-Cycle Asset Management"	DOE O 430.1A, DOE 4330.4B	N/A	See Comment #2
1.E.(10) "Mixed Waste"	N/A	AEA, RCRA	Paducah Site Treatment Plan
1.E.(11) "Packaging and Transportation"	DOE O 460.1, DOE O 460.2	N/A	See DOE O 460.1 & 460.2 Below
1.E.(12) "Quality Assurance Program"	DOE O 414.1C	10 CFR 830.120	See Comment #2
1.E.(13) "Radiation Protection"	DOE 5400.5	10 CFR Part 835	See Comment #2
1.E.(14) "Records Management"	DOE O 200.1, DOE O 414.1	N/A	BJC/OR-301, "Radiation Protection Program" See Comment #2
1.E.(15) "Release of Waste Containing Residual Radioactive Material"	DOE 5400.5	N/A	BJC-OS-1001, "Records Management, Including Document Control" See Comment #2
1.E.(16) "Safeguards and Security"	DOE O 470.1	N/A	BJC/OR-301, "Radiation Protection Program" PRS has contracted with Swift & Staley to perform this service.
1.E.(17) "Safety Management System"	DOE P 450.4, DOE P 450.5, DOE M 411.1-1	48 CFR Chapter 9	See Comment #2
1.E.(18) "Site Evaluation and Facility Design"	DOE O 420.1, DOE O 430.1A	N/A	PRS will address this in specific plans as needed.
1.E.(19) "Training and Qualification"	DOE O 360.1, DOE 5480.20A	N/A	See Comment #2 BJC-HR-0702, "Training Program" BJC-HR-0710, "Development and Administration of Training Position Descriptions" BJC-HR-0724, "Training and Qualification Program for Personnel in Category 2 and 3 Nuclear Facilities"
1.E.(20) "Waste Minimization and Pollution Prevention"	Exec. Order 12856, Exec. Order 13101, DOE 5400.1	N/A	PRS-CDL-0029 (See Comment #1) * Project specific plans & procedures.
1.E.(21) "Worker Protection"	DOE O 440.1A	N/A	See Comment #2

Note: PRS does not manage High-Level Waste.

Note: PRS stores Mixed TRU waste in accordance with the STP. Characterization, processing, packaging and shipment of the waste to the Waste Isolation Pilot Plant is anticipated by January 31, 2016.

## Appendix A: DOE Order Implementation Crosswalk

Description	Other DOE Documents Referenced	Other Regulatory Requirements	Primary PRS Implementing Document(s)
IV.A. "Definition of Low-Level Waste"	DOE O 435.1	AEA, RCRA	Site Treatment Plan
IV.B. "Management of Specific Wastes"	DOE O 435.1	TSCA	BJC-EH-3030, "Toxic Substances Control Act (TSCA) and Polychlorinated Biphenyl (PCB) Program Description"
(1) "Mixed Low-Level Waste"			
(2) "TSCA-Regulated Waste"			DOE UE TSCA FFCA
(3) "Accelerator-Produced Waste"	DOE O 435.1	N/A	PRS does not manage this waste type.
(4) "(1) e.(2) and Naturally Occurring Radioactive Material"	N/A	N/A	PRS does not manage this waste type.
IV.C. "Complex-Wide Low-Level Waste Management Program"	DOE M 435.1 (Section 2B & 2D)	N/A	PRS Site-wide Waste Management Plan
IV.D. Radioactive Waste Management Basis"			
(1) "Generators"	N/A	N/A	BJC-NS-1015, "Generation, Review, Approval, and Control of Authorization Agreements and Radioactive Waste Management Basis"
(2) "Treatment Facilities"	N/A	N/A	PRS does not typically perform waste treatment. If the need arises, it will be addressed in project specific work plans.
(3) "Storage Facilities"	N/A	N/A	BJC/PAD-11, "Waste Acceptance Criteria for the Department of Energy Treatment, Storage, and Disposal Units at the Paducah Gaseous Diffusion Plant, Paducah, KY"
(4) "Disposal Facilities"	N/A	N/A	PRS does not have a Disposal Facility under DOE O 435.1.
IV.E. "Contingency Actions"	DOE O 435.1	N/A	PRS does not typically engage in these activities. If the need arises, it will be addressed in project specific work plans.
IV.F. "Corrective Actions"	DOE O 435.1	N/A	BJC-PQ-1210, "Issues Management Program"
IV.G. "Waste Acceptance"	N/A	N/A	BJC/PAD-11, "Waste Acceptance Criteria for the Department of Energy Treatment, Storage, and Disposal Units at the Paducah Gaseous Diffusion Plant, Paducah, KY"
IV.H. "Waste Generation Planning"	N/A	N/A	BJC/PAD-11, "Waste Acceptance Criteria for the Department of Energy Treatment, Storage, and Disposal Units at the Paducah Gaseous Diffusion Plant, Paducah, KY"
IV.I. "Waste Characterization"	N/A	N/A	BJC/PAD-437, "Waste Characterization Plan for the Paducah Site, Paducah, Kentucky"
IV.J. "Waste Certification"	N/A	N/A	PA-3011, "Certification of Paducah LLW for Disposal at the Nevada Test Site"
			PA-3013, "Offsite Shipment Management Review"
			PA-3025, "Preparation and Processing of Paducah Landfill Packages"

## Appendix A: DOE Order Implementation Crosswalk

Description	Other DOE Documents Referenced	Other Regulatory Requirements	Primary PRS Implementing Document(s)
IV.K. "Waste Transfer"	N/A	N/A	BJC/PAD-11, "Waste Acceptance Criteria for the Department of Energy Treatment, Storage, and Disposal Units at the Paducah Gaseous Diffusion Plant, Paducah, KY"
IV.L. "Packaging and Transportation"			
(1) "Packaging"	N/A	N/A	PA-3015, "Guidelines for Packaging Waste for Release from the Paducah Site" * Project specific plans & procedures.
(2) "Transportation"	N/A	N/A	PRS Site-wide Waste Management Plan
IV.M. "Site Evaluation and Facility Design"	N/A	N/A	PRS will address this in specific plans as needed.
IV.N. "Storage and Staging"	N/A	N/A	BJC/PAD-11, "Waste Acceptance Criteria for the Department of Energy Treatment, Storage, and Disposal Units at the Paducah Gaseous Diffusion Plant, Paducah, KY"
IV.O. "Treatment"	N/A	N/A	PA-3010, "Waste Generator Responsibilities for Temporary On-Site Storage of Regulated Waste Materials at Paducah" PRS does not typically perform waste treatment. If the need arises, it will be addressed in project specific work plans.
IV.P. "Disposal"			
(1) "Performance Objectives"	N/A	N/A	PRS does not operate disposal facilities under DOE O 435.1.
(2) "Performance Assessment"	N/A	N/A	
(3) "Composite Analysis"	N/A	N/A	
(4) "Performance Assessment and Composite Analysis Maintenance"	N/A	N/A	
(5) "Disposal Authorization"	N/A	N/A	
(6) "Disposal Facility Operations"	N/A	N/A	
(7) "Alternative Requirements for Low-Level Waste Disposal Facility Design and Operation"	N/A	N/A	
IV.Q. "Closure"			
(1) "Disposal Facility Closure Plans"	N/A	N/A	PRS does not operate disposal facilities under DOE O 435.1.
(2) "Disposal Facility Closure"	N/A	N/A	
IV.R. "Monitoring"			
(1) "All Waste Facilities"	N/A	N/A	Kentucky Division of Waste Management Hazardous Waste Management Permit EPA ID #KY8890008982
(2) "Liquid Waste Storage Facilities"	N/A	N/A	Kentucky Division of Waste Management Hazardous Waste Management Permit EPA ID #KY8890008982
(3) "Disposal Facilities"	N/A	N/A	PRS does not operate disposal facilities under DOE O 435.1.
DOE O 460.1 "Packaging and Transportation Safety"			
Att. 2 (Paragraph 1): Offsite Shipments not otherwise subject to DOT, follow tribal, state, ...	N/A	49 CFR	BJC-FS-1001, "Work Control Process" PA-3015, "Guidelines for Packaging Waste for Release from the Paducah Site"

## Appendix A: DOE Order Implementation Crosswalk

Description	Other DOE Documents Referenced	Other Regulatory Requirements	Primary PRS Implementing Document(s)
Att. 2 (Paragraph 2.): DOT exemptions for non-compliant packages or shipments	N/A	49 CFR 107.105, 49 CFR 171-49 CFR 173.411	PRS does not use non-compliant packages. PA-3015, "Guidelines for Packaging Waste for Release from the Paducah Site"
Att. 2 (Subparagraph 3. a.): Strong Tight Containers	N/A		PA-3028, "Paducah Transportation Program" * Project specific plans & procedures.
Att. 2 (Subparagraph 3. b.): Type A Containers	N/A	49 CFR 173.415	PA-3015, "Guidelines for Packaging Waste for Release from the Paducah Site"
Att. 2 (Subparagraph 3. c.): Fissile or Type B Packagings	N/A	49 CFR 173.7(d), 49 CFR 173.416, 49 CFR 173.417	PA-3028, "Paducah Transportation Program" * Project specific plans & procedures. PRS does not typically use Fissile or Type B packages. If the need arises, it will be addressed in project specific work plans.
Att. 2 (Subparagraph 3. d.): Additional Requirements for Plutonium Packagings	N/A	10 CFR 71.63, 10 CFR 71.64, 10 CFR Part 871	PRS does not ship plutonium packages.
Att. 2 (Subparagraph 3. e.): DOT Specification Packagings	N/A	49 CFR	PA-3015, "Guidelines for Packaging Waste for Release from the Paducah Site"
Att. 2 (Paragraph 4.): QA program for Type B and Fissile packages.	N/A	10 CFR Part 71, Subpart H	PA-3028, "Paducah Transportation Program" * Project specific plans & procedures. PRS does not typically use Type B or Fissile packages. If the need arises, it will be addressed in project specific work plans.
Att. 2 (Paragraph 5.): Operating controls & procedures for Type B, fissile, or plutonium packaging	N/A	10 CFR Part 71, Subpart G	PRS does not typically use Type B, fissile, or plutonium packages. If the need arises, it will be addressed in project specific work plans.
Att. 2 (Paragraph 6.): International regulations for domestic portions.	N/A	49 CFR 171.11, 49 CFR 171.12(b)	PRS does not typically ship internationally. If the need arises, it will be addressed in project specific work plans.
Att. 2 (Paragraph 7.): On-site shipments	N/A	49 CFR Parts 171-180	BJC/PAD-661, "Transportation Safety Document for On-site Transport Within the Paducah Gaseous Diffusion Plant, Paducah, Kentucky"
Att. 2 (Paragraph 8.): Lessons Learned Programs	N/A	N/A	BJC/OR-43, "Bechtel Jacobs Company LLC Quality Assurance Program Plan for Environmental Management and Enrichment Facilities at Oak Ridge, Tennessee, Portsmouth, Ohio, and Paducah, Kentucky"
Att. 2 (Paragraph 9.): Training Program	N/A	N/A	BJC-PQ-1210, "Issues Management Program" BJC-PQ-1220, "Occurrence Notification & Reporting" BJC-PQ-1610, "PAAA Non-Compliance Determination & Reporting" BJC-HR-0702, "Training Program"

## Appendix A: DOE Order Implementation Crosswalk

Description	Other DOE Documents Referenced	Other Regulatory Requirements	Primary PRS Implementing Document(s)
DOE O 460.2 "Departmental Materials Transportation and Packaging Management" Att. 2 (Paragraph 1.): Conduct operations in compliance with ...	N/A	Federal, State, local, and Tribal requirements, 49 CFR	BJC-FS-1001, "Work Control Process" PA-3015, "Guidelines for Packaging Waste for Release from the Paducah Site"
Att. 2 (Subparagraph 2.a.): Use automated transportation system.	N/A	N/A	PA-3028, "Paducah Transportation Program"
Att. 2 (Subparagraph 2.b.): Use of government funds.	N/A	N/A	Preparation of Purchase Memorandums, BJC-DE-1005, "Requisition Document Indexes, and Field Material Requisitions"
Att. 2 (Subparagraph 2.c.): Consignment of shipments	N/A	N/A	PA-3028, "Paducah Transportation Program"
Att. 2 (Subparagraph 2.d.): Military Air Transportation	N/A	DOD 4500.9-R	PRS does not use military air transportation.
Att. 2 (Subparagraph 2.e.): Special Train Services	N/A	N/A	PRS does not typically use special train services. If the need arises, it will be addressed in project specific work plans.
Att. 2 (Paragraph 3.): Consignee Shipment Notifications for fissile material or >Type A	N/A	N/A	PRS does not typically ship fissile or more than Type A. If the need arises, it will be addressed in project specific work plans.
Att. 2 (Subparagraph 4.a.): Carrier Evaluations	N/A	N/A	TR-9502, "Guidelines for Motor Carriers"
Att. 2 (Subparagraph 4.b.): Rail Tenders and tariffs reflect lowest commercial rates	N/A	N/A	TR-9512, "Motor Carrier Safety Compliance"
Att. 2 (Subparagraph 4.c.): Carrier Rates	N/A	N/A	BJC-DE-1005, "Preparation of Purchase Memorandums, Requisition Document Indexes, and
Att. 2 (Subparagraph 4.d.): Other than low-cost carrier	N/A	N/A	BJC-DE-1005, "Preparation of Purchase Memorandums, Requisition Document Indexes, and
Att. 2 (Paragraph 5.): Emergency Notification/Response	N/A	N/A	BJC-DE-1005, "Preparation of Purchase Memorandums, Requisition Document Indexes, and
Att. 2 (Paragraph 6.): Receipt of Materials	N/A	49 CFR 172.604	PA-3028, "Paducah Transportation Program"
Att. 2 (Paragraph 7.): Transportation of Explosive Substances and Articles	N/A	10 CFR 835.405, 49 CFR 177.843	TR-9507, "Shipping Paper Requirements" See Comment #1
Att. 2 (Paragraph 8.): Compliance Evaluations	N/A	N/A	BJC/OR-301, "Radiation Protection Program" PRS does not typically transport explosive substances and articles. If the need arises, it will be addressed in project specific work plans.
	N/A	N/A	BJC/OR-43, "Bechtel Jacobs Company LLC Quality Assurance Program Plan for Environmental Management and Enrichment Facilities at Oak Ridge, Tennessee, Portsmouth, Ohio, and Paducah, Kentucky"

**Comments**

- #1: PRS-CDD-0029, "Paducah Environmental Remediation Project Waste Management Plan, Paducah, Kentucky"
- #2: Refer to BJC-GM-1400PP, "Integrated Safety Management System Description" for detailed implementation crosswalk.
- #3: The document #'s listed assume the current revision (DOE Orders, Procedures, etc.)



**APPENDIX B**

**PROJECT-SPECIFIC WASTE MANAGEMENT STRATEGY**

## Appendix B: Project-Specific Waste Management Strategy

Characterization Strategy Material Disposition Project	Processing Strategy	Disposition Strategy
<p><b>Nickel Ingots</b></p> <ul style="list-style-type: none"> <li>Review existing process knowledge</li> <li>Review historical sample data &amp; radiological surveys.</li> <li>Present recycle options &amp; proposed plan to DOE.</li> </ul> <p><b>General &amp; Regulated Scrap</b></p> <ul style="list-style-type: none"> <li>Use existing process knowledge &amp; analytical results, visual verification &amp; radiological surveys.</li> <li>Use Non-Destructive Assay as applicable</li> </ul> <p><b>Classified Scrap</b></p> <ul style="list-style-type: none"> <li>Use existing process knowledge &amp; analytical results, visual verification &amp; radiological surveys.</li> </ul> <p><b>Scrap Pile Soils</b></p> <ul style="list-style-type: none"> <li>Use the following to identify hot spots: <ul style="list-style-type: none"> <li>Existing process knowledge &amp; analytical results</li> <li>Hand held instrumentation to detect rad.</li> <li>Additional sampling or field screening as necessary</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Perform additional radiological surveys as needed.</li> <li>Repalletize for storage and/or shipment to a recycler.</li> </ul> <ul style="list-style-type: none"> <li>Sort &amp; segregate RCRA/TSCA items.</li> <li>Size reduction to meet TSDF WAC.</li> <li>Load into appropriate shipping containers.</li> </ul> <ul style="list-style-type: none"> <li>Size reduction via shear to meet NTS WAC.</li> <li>Load into IP-1 Cargo Containers (S/Ls)</li> </ul> <ul style="list-style-type: none"> <li>Excavate hot spots with excavator.</li> <li>Verify cleanup objectives have been met (With instrumentation identified in Char. Strategy).</li> <li>Backfill excavated areas with gravel &amp; compact.</li> <li>Reseed areas with vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>Recycle per approved plan or relocate to C-752 Storage Pad.</li> </ul> <ul style="list-style-type: none"> <li>Solid Waste: C-746-U Landfill (Rolloff Boxes)</li> <li>LLW: Energy Solutions [Gondola Railcars], or NTS [IP-1 Cargo Containers]</li> <li>TSCA (Bulk Prod. Rule): Energy Solutions [Gondola Railcars].</li> <li>MLLW: Energy Solutions [Drums or B-25 Boxes for Treatment]</li> <li>RCRA: Clean Harbors, Heritage Environmental, Onyx [Drums or B-25 Boxes]</li> </ul> <ul style="list-style-type: none"> <li>LLW: NTS [IP-1 Cargo Containers]</li> </ul> <ul style="list-style-type: none"> <li>Solid Waste: C-746-U Landfill [Rolloff Boxes]</li> <li>LLW: Energy Solutions [Gondola Railcars], or NTS [IP-1 Cargo Container]</li> </ul>
<p><b>Radiological Characterization</b></p> <ul style="list-style-type: none"> <li>Existing process knowledge &amp; analytical results</li> <li>Ludlum 3030 Alpha/Beta Counter: Perform Surveys</li> <li>Nal Hand Held with PHA (Sodium Iodide Detection): Detect Anomalies</li> <li>Neutron Slab with Coin Counter: Detect &amp; quantify total U</li> <li>U-235 Quantification HpGe and Cart: Determine quantity &amp; enrichment</li> <li>Sample Analysis: Verify process knowledge</li> <li>Use Non-Destructive Assay as applicable</li> </ul> <p><b>Chemical Characterization</b></p> <ul style="list-style-type: none"> <li>Existing process knowledge &amp; analytical results</li> <li>Additional sampling or field screening as necessary</li> </ul>	<p><b>Containerized Material</b></p> <ul style="list-style-type: none"> <li>Visual verification, remove prohibited items, overpack or repack as necessary to meet TSDF WAC.</li> <li>Misc. Equipment <ul style="list-style-type: none"> <li>Sort &amp; Segregate RCRA/TSCA Items.</li> <li>Size reduce as needed to meet TSDF WAC.</li> </ul> </li> <li>RCRA Items <ul style="list-style-type: none"> <li>Package as necessary to meet TSDF WAC.</li> </ul> </li> <li>TSCA (Liquids) <ul style="list-style-type: none"> <li>Package in drums or Tote Tanks.</li> <li>Sample to meet TSCAI WAC.</li> </ul> </li> <li>TSCA (Sludge) <ul style="list-style-type: none"> <li>Overpack original drums into liquid rated IP-1 containers to meet DOT &amp; TSDF WAC.</li> <li>Stage and sample batches to meet TSCAI WAC.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Solid Waste: C-746-U Landfill [Rolloff Boxes]</li> <li>LLW: Energy Solutions [Gondola Railcars or B-25 Boxes], or NTS [IP-1 Cargo Container]</li> <li>MLLW: Energy Solutions, Permatix, WCS [Drums or B-25 Boxes for treatment]</li> <li>TSCA (Liquids): TSCAI [Drums, Tote Tanks, or Tanker]</li> <li>TSCA (Sludge): TSCAI [Drums]</li> <li>RCRA: Clean Harbors, Heritage Environmental, Onyx [Drums or B-25 Boxes]</li> </ul>

## Appendix B: Project-Specific Waste Management Strategy

Characterization Strategy	Processing Strategy	Disposition Strategy
<ul style="list-style-type: none"> <li>* Radiological Characterization               <ul style="list-style-type: none"> <li>- Existing process knowledge &amp; analytical results</li> <li>- Ludlum 3030 Alpha/Beta Counter: Perform Surveys</li> <li>- Nal Hand Held with PHA (Sodium Iodide Detection): Detect Anomolies</li> <li>- Neutron Slab with Coin Counter: Detect &amp; quantify total U</li> <li>- U-235 Quantification HpGe and Cart: Determine quantity &amp; enrichment</li> <li>- Sample Analysis: Verify process knowledge</li> <li>- Use Non-Destructive Assay as applicable</li> </ul> </li> <li>* Chemical Characterization               <ul style="list-style-type: none"> <li>- Existing process knowledge &amp; analytical results</li> <li>- Additional sampling or field screening as necessary</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>* Containerized Material               <ul style="list-style-type: none"> <li>- Visual verification, remove prohibited items, overpack or repack as necessary to meet TSDF WAC.</li> </ul> </li> <li>* Misc. Equipment               <ul style="list-style-type: none"> <li>- Sort &amp; Segregate RCRA/TSCA Items.</li> <li>- Size reduce as needed to meet TSDF WAC.</li> </ul> </li> <li>* RCRA Items               <ul style="list-style-type: none"> <li>- Package as necessary to meet TSDF WAC.</li> </ul> </li> <li>* TSCA (Liquids)               <ul style="list-style-type: none"> <li>- Package in drums or Tote Tanks.</li> <li>- Sample to meet TSCAI WAC.</li> </ul> </li> <li>* TSCA (Sludge)               <ul style="list-style-type: none"> <li>- Overpack original drums into liquid rated IP-1 containers to meet DOT.</li> <li>- Stage and sample batches to meet TSCAI WAC.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>* Sanitary Waste: C-746-U Landfill [Rolloff Boxes]</li> <li>* LLW: Energy Solutions [B-25 Boxes], or NTS [Drums, B-25s, or IP-1 Cargo Containers]</li> <li>* RCRA Mixed: Energy Solutions, Permafrix, WCS [B-25 Boxes for Treatment]</li> <li>* TSCA Mixed (Liquids): TSCAI [Drums/Tote Tanks/Tankers]</li> <li>* TSCA Mixed (Sludge): TSCAI [Drums]</li> <li>* TSCA: Energy Solutions or TSCA approved landfill</li> <li>* RCRA: Clean Harbors, Heritage Environmental, Onyx [Drums or B-25 Boxes]</li> </ul>
<ul style="list-style-type: none"> <li>* Radiological Characterization               <ul style="list-style-type: none"> <li>- Existing process knowledge &amp; existing analytical results</li> <li>- Ludlum 3030 Alpha/Beta Counter: Perform Surveys</li> <li>- Use Non-Destructive Assay as applicable</li> </ul> </li> <li>* Chemical Characterization               <ul style="list-style-type: none"> <li>- Existing process knowledge &amp; existing analytical results</li> <li>- Additional sampling or field screening as necessary</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>* Reduce, Reuse, Recycle.</li> <li>* Sort &amp; segregate RCRA/TSCA items.</li> <li>* Decontaminate items as practical.</li> <li>* Size reduce as needed to meet TSDF WAC.</li> <li>* Package waste in accordance with DOT and TSDF WAC at the point of generation.</li> </ul>	<ul style="list-style-type: none"> <li>* Wastewater: C-615 Water Treatment Facility [Tote Tanks]</li> <li>* LLW: Energy Solutions [B-25 Boxes], or NTS [Drums, B-25s, or IP-1 Cargo Containers]</li> <li>* RCRA Mixed: Energy Solutions, Permafrix, WCS [B-25s for Treatment]</li> <li>* TSCA Mixed (Liquids): TSCAI [Drums/Tote Tanks/Tanker]</li> <li>* TSCA Mixed (Sludge): TSCAI [Drums]</li> <li>* TSCA: Energy Solutions or TSCA approved landfill</li> <li>* RCRA: Clean Harbors, Heritage Environmental, Onyx [Drums or B-25 boxes]</li> </ul>
<ul style="list-style-type: none"> <li>* Radiological Characterization               <ul style="list-style-type: none"> <li>- Existing process knowledge &amp; analytical results</li> <li>- Hand held instrumentation to detect rad.</li> <li>- Additional sampling or field screening as necessary</li> </ul> </li> <li>* Chemical Characterization               <ul style="list-style-type: none"> <li>- Existing process knowledge &amp; analytical results</li> <li>- Additional sampling or field screening as necessary</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>* TSCA (Liquids)               <ul style="list-style-type: none"> <li>- Package in drums or Tote Tanks.</li> <li>- Sample to meet TSCAI WAC.</li> </ul> </li> <li>* TSCA (Solids)               <ul style="list-style-type: none"> <li>- Package as necessary to meet DOT &amp; TSDF WAC.</li> <li>- Stage and sample batches to meet TSCAI WAC.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>* TSCA Mixed (Liquids): TSCAI [Drums/Tote Tanks/Tanker]</li> <li>* TSCA Mixed (Solids): TSCAI [Drums]</li> </ul>

## Appendix B: Project-Specific Waste Management Strategy

Characterization Strategy Environmental Restoration Project	Processing Strategy	Disposition Strategy
<p><b>Plumes</b></p> <ul style="list-style-type: none"> <li>- Existing process knowledge &amp; analytical results</li> <li>- Additional sampling as necessary</li> </ul>	<ul style="list-style-type: none"> <li>* Reduce, Reuse, Recycle.</li> <li>* Sort &amp; segregate RCRA/TSCA items.</li> <li>* Decontaminate items as practical.</li> <li>* Package waste in accordance with DOT and TSDF WAC at the point of generation.</li> </ul>	<ul style="list-style-type: none"> <li>* PPE: C-746-U Landfill [Rolloff Boxes]</li> <li>* Spent Resin: EnergySolutions [Drums or B-25 Boxes], or NTS [Drums or B-25 Boxes]</li> <li>* Spent Carbon: Regenerate &amp; Reuse</li> </ul>
<p><b>Remedial Action/Remediation Investigation</b></p> <ul style="list-style-type: none"> <li>- Existing process knowledge &amp; analytical results</li> <li>- Additional sampling as necessary</li> </ul>	<ul style="list-style-type: none"> <li>* Reduce, Reuse, Recycle.</li> <li>* Sort &amp; segregate RCRA/TSCA items.</li> <li>* Decontaminate items as practical.</li> <li>* Package waste in accordance with DOT and TSDF WAC at the point of generation.</li> </ul>	<ul style="list-style-type: none"> <li>* PPE: C-746-U Landfill [Rolloff Boxes]</li> <li>* Drill Cuttings (MLLW): EnergySolutions, Permafrix, WCS [Drums or B-25s for Treatment]</li> <li>* Drill Cuttings (RCRA): Clean Harbors, Heritage Environmental, WCS [Drums or B-25s for Treatment]</li> <li>* Well Development Water &amp; Decontamination Water: C-615 Water Treatment Facility [Tote Tanks]</li> </ul>
<p><b>Infrastructure Removal</b></p> <ul style="list-style-type: none"> <li>* Radiological Characterization</li> <li>- Existing process knowledge &amp; analytical results</li> <li>- Hand held instrumentation to detect rad.</li> <li>- Additional sampling or field screening as necessary</li> <li>- Use Non-Destructive Assay as applicable</li> <li>* Chemical Characterization</li> <li>- Existing process knowledge &amp; analytical results</li> <li>- Additional sampling or field screening as necessary</li> </ul>	<ul style="list-style-type: none"> <li>* Reduce, Reuse, Recycle</li> <li>* Sort &amp; segregate RCRA/TSCA items.</li> <li>* Decontaminate items as practical.</li> <li>* Size reduce as necessary.</li> <li>* Package waste in accordance with DOT and TSDF WAC at the point of generation.</li> </ul>	<ul style="list-style-type: none"> <li>* Sanitary Waste: C-746-U Landfill [Rolloff Boxes]</li> <li>* LLW: EnergySolutions [Drums or B-25 Boxes], or NTS [Drums, B-25s, or IP-1 Cargo Containers]</li> <li>* RCRA Mixed: EnergySolutions, Permafrix, WCS [B-25 Boxes for Treatment]</li> <li>* RCRA: Clean Harbors, Heritage Environmental, Onyx [Drums or B-25 Boxes]</li> </ul>
<p><b>Soils Project</b></p> <ul style="list-style-type: none"> <li>* Use the following to identify contaminated areas:</li> <li>- Existing process knowledge &amp; analytical results</li> <li>- Hand held instrumentation to detect rad.</li> <li>- Additional sampling or field screening as necessary</li> </ul>	<ul style="list-style-type: none"> <li>* Excavate contaminated areas with excavator.</li> <li>* Verify cleanup objectives have been met (With instrumentation identified in Char. Strategy).</li> <li>* Backfill excavated areas with gravel &amp; compact.</li> <li>* Reseed areas with vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>* Solid Waste: C-746-U Landfill [Rolloff Boxes]</li> <li>* LLW: Energy Solutions [Gondola Railcars], or NTS [IP-1 Cargo Container]</li> </ul>

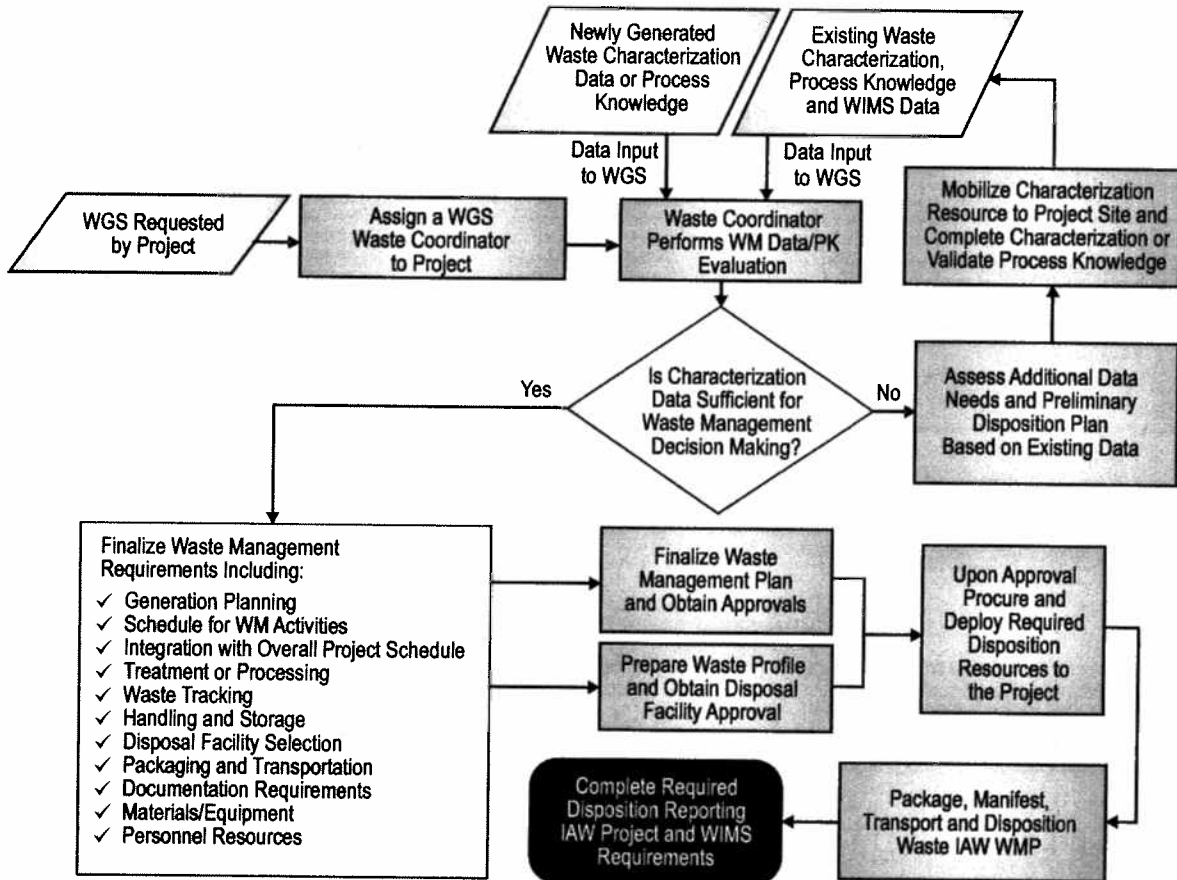
## Appendix B: Project-Specific Waste Management Strategy

Characterization Strategy	Processing Strategy	Disposition Strategy
<p><b>Facilities Disposition Project</b></p> <ul style="list-style-type: none"> <li>* Radiological Characterization                             <ul style="list-style-type: none"> <li>- Existing process knowledge &amp; analytical results</li> <li>- Ludlum 3030 Alpha/Beta Counter: Perform Surveys</li> <li>- Nal Hand Held with PHA (Sodium Iodide Detection): Detect Anomalies</li> <li>- Neutron Slab with Coin Counter: Detect &amp; quantify total U</li> <li>- U-235 Quantification HpGe and Cart: Determine quantity &amp; enrichment</li> <li>- Sample Analysis: Verify process knowledge</li> <li>- Use Non-Destructive Assay as applicable</li> </ul> </li> <li>* Chemical Characterization                             <ul style="list-style-type: none"> <li>- Existing process knowledge &amp; analytical results</li> <li>- Additional sampling or field screening as necessary</li> </ul> </li> </ul> <p><b>Environmental Monitoring Project</b></p> <ul style="list-style-type: none"> <li>* Radiological Characterization                             <ul style="list-style-type: none"> <li>- Existing process knowledge &amp; historical analytical results</li> <li>- Current analytical results.</li> </ul> </li> <li>* Chemical Characterization                             <ul style="list-style-type: none"> <li>- Existing process knowledge &amp; historical analytical results</li> <li>- Current analytical results.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>* Reduce, Reuse, Recycle.</li> <li>* Sort &amp; segregate RCRA/TSCA items.</li> <li>* Decontaminate items as practical.</li> <li>* Size reduce as needed to meet TSDF WAC.</li> <li>* Package waste in accordance with DOT and TSDF WAC at the point of generation.</li> </ul>	<ul style="list-style-type: none"> <li>* Sanitary Waste: C-746-U Landfill [Rolloff Boxes]</li> <li>* LLW: EnergySolutions [Drums or B-25 Boxes], or NTS [Drums, B-25s, or IP-1 Cargo Containers]</li> <li>* RCRA Mixed: EnergySolutions, Permatix, WCS [B-25 Boxes for Treatment]</li> <li>* TSCA Mixed (Liquids): TSCAI [Tote Tanks/Tankers]</li> <li>* TSCA Mixed (Sludge): TSCAI [Drums]</li> <li>* TSCA: EnergySolutions or TSCA approved landfill</li> <li>* RCRA: Clean Harbors, Heritage Environmental, Onyx [Drums or B-25 Boxes]</li> </ul>
<ul style="list-style-type: none"> <li>* Reduce, Reuse, Recycle.</li> <li>* Sort &amp; segregate RCRA/TSCA items.</li> <li>* Decontaminate items as practical.</li> <li>* Package waste in accordance with DOT and TSDF WAC at the point of generation.</li> </ul>	<ul style="list-style-type: none"> <li>* Water Samples (Clean): Return to original outfall</li> <li>* Water Samples (Contaminated): C-615 Water Treatment Facility</li> <li>* Soil Samples (Clean): Return to original location</li> <li>* Soil Samples (Contaminated): Appropriate TSDF.</li> </ul>	

**APPENDIX C**

**WASTE GENERATOR SERVICES PROCESS FLOW**

## Waste Generator Services Process Flow



**APPENDIX D**

**EXISTING PROJECT-SPECIFIC WASTE MANAGEMENT PLANS**



## Appendix D: Existing Project-Specific Waste Management Plans

Project	Document #	Document Name	Status
<b>Existing Waste Management Plans (Or Equivalent)</b>			
Scrap Metal	N/A	Waste Management Plan for Paducah Scrap Metal Removal and Dipsoal at the Paducha Gaseous Diffusion Plant, Paducah , Kentucky	Current
DMSAs	BJC/PAD-186/R5	Paducah Gaseous Diffusion Plant Department of Energy Material Storage Area Characterization/Remediation Plan, Paduch, Kentucky	Current
WD & WF Ops	W/PAD-01-102	WESKEM, LLC Paducah Waste Management	Current
D&D	BJC/PAD-745	Waste Management Plan for the C-405 Incinerator, PGDP Paducah, Kentucky	Being Developed
D&D	BJC/PAD-728	Waste Management Plan for the C-402 Lime House at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky.	Current
D&D	BJC/PAD-735	Waste Management Plan for the C-603 Nitrogen Generating Facility at the Paducah Gasoeous Diffusion Plant, Paducah, Kentucky	Current
D&D	DOE/OR/07-2012&D1	Removal Action Work Plan for the C-410 Complex Infrastructure D&D Project at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky	Current

## **APPENDIX E**

# **WASTE GENERATOR SERVICES ACTIVITIES AND LOCATIONS**

## Appendix E: Waste Generator Services Activities & Locations

Facility Number	Facility Name	Type of Construction	Area (ft <sup>2</sup> )	Activities
<b>Scrap Metal Yards</b>				
C-746-H4	Nickel Ingot Storage Pad	Concrete	48,750	Nickel Ingots, a small amount of aluminum ingots, some aluminum billets, and steel molds from nickel/aluminum smelting processes
C-746-P	East, regulated yard	Fenced Area	268,750	Switchgears (mostly clean - steam cleaned), fuel fired furnace, mounds of wire (potentially containing PCBs and/or asbestos-containing materials, small office trailer, railroad spikes in cans, and miscellaneous piles of scrap
C-746-C	Contaminated Excess Yard	Fenced Area	138,000	Large segregated scrap metal pile of mostly nickel-plated steel and deteriorated drums containing metal turnings on pallets
C-746-E	Contaminated Excess Yard	Fenced Area	138,276	Converter shells, motor housings, wooden pallets, metal turnings in drums, and vent/duct gaskets potentially containing PCBs
C-747-A	UF4 Drum Mountain		16,700	Crushed drums (previously containing UF4) and autoclaves that are 6 feet in diameter with ends removed. The autoclaves are addressed under the Engineering Evaluation/Cost Analysis for Scrap Metal
C-746-C1	Contaminated Excess Yard	Fenced Area	189,400	Aluminum compressor fan blades (potentially volumetrically contaminated) and ordnance shipping braces
C-746-E1	Contaminated Excess Yard	Fenced Area	113,226	Piles of aluminum components and piles of nickel-plated steel from process equipment.
C-746-P1	Clean Excess Metal	Fenced Area	200,000	Scrap, drums, drained transformers, and railroad equipment
C-747-B	Burial Area		4,070	Contaminated forklifts and contaminated wood pallets
C-746-D	Classified Excess Yard	Fenced Area	59,400	Nickel plated steel, aluminum, compressors, and debris
<b>Waste Storage Facilities</b>				
C-301	Low-Level Waste Storage	Structural Steel Metal Siding	2,802	Storage: LLW, MLLW
C-331	Process Building	Structural Steel and Corrugated Siding	514,560	Storage: LLW, TSCA/RAD
C-333	Process Building	Structural Steel and Corrugated Siding	1,065,060	Storage: LLW, TSCA/RAD

## Appendix E: Waste Generator Services Activities & Locations

Facility Number	Facility Name	Type of Construction	Area (ft <sup>2</sup> )	Activities
C-335	Process Building	Structural Steel and Corrugated Siding	514,560	Storage: LLW, TSCA/RAD
C-337	Process Building	Structural Steel and Corrugated Siding	1,065,060	Storage: LLW, TSCA
C-733	Waste Oil and Chemical Storage Facility	Structural	4,224	Storage: LLW, MLLW, RCRA, TSCA
C-746-A	North Warehouse	Prefabricated Metal	72,000	Storage: LLW, MLLW, RCRA, TSCA
C-746-B	South Warehouse	Prefabricated Metal	72,000	Storage: LLW, TSCA
C-746-H3	PEM Storage Slab	Concrete	56,150	Storage: LLW, MLLW, RCRA
C-746-M	Waste Uranium Chip Storage Facility	Prefabricated Metal	432	Storage: LLW, MLLW
C-746-Q	Hazardous and LLW Storage	Prefabricated Metal	33,165	Storage: LLW, MLLW, RCRA, TSCA
C-746-V	ER Waste Staging Area	Gravel Pad	10,000	Storage: LLW
C-752	RA Waste Holding Pad	Concrete Slab	8,800	
C-752-A	ER Waste Storage Facility I	Prefabricated Metal	43,600	Storage: LLW, MLLW, RCRA, TSCA Sampling & Repackaging P2/WMin Consolidation Center
C-753-A	TSCA Storage Facility	Prefabricated Metal	31,600	Storage: LLW, TSCA