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Portsmouth/Paducah Project Office
1017 Majestic Drive, Suite 200
Lexington, Kentucky 40513
(859) 219-4000

OCT 26 2018

Mr. Jeff Bradford, Program Manager
Four Rivers Nuclear Partnership, LLC
5511 Hobbs Road
Kevil, Kentucky 42053

PPPO-02-5140955-19A

Dear Mr. Bradford:

CONTRACT NO. DE-EM0004895: APPROVAL OF DELIVERABLE NO. 130, WASTE MANAGEMENT PLAN, CP2-WM-0001/FR1

Reference: Letter from J. Bradford to M. Fultz, "Four Rivers Nuclear Partnership, LLC, Deliverable No. 130—*Four Rivers Nuclear Partnership, LLC, Paducah Deactivation and Remediation Project Waste Management Plan*, CP2-WM-0001/FR1, Replacement Pages," (FRNP-19-1652), dated October 23, 2018

The U.S. Department of Energy approves the revised Four Rivers Nuclear Partnership, LLC Deliverable No. 130, Waste Management Plan.

If you have any questions or require additional information, please contact Tracey Duncan at (270) 441-6862.

Sincerely,

Robert E. Edwards III

Robert E. Edwards, III
Manager
Portsmouth/Paducah Project Office

e-copy:
april.ladd@pppo.gov, PPPO
brandy.mitchell@pad.pppo.gov, FRNP
cory.hicks@pad.pppo.gov, FRNP
daniel.lillard@pppo.gov, PPPO
frnpcorrespondence@pad.pppo.gov, FRNP
james.miller@pad.pppo.gov, FRNP
jeff.bradford@pad.pppo.gov, FRNP
jennifer.woodard@pppo.gov, PPPO
joseph.stanley@pad.pppo.gov, FRN
karen.testerman@pppo.gov, SMSI
kim.knerr@pppo.gov, PPPO
larry.glover@pad.pppo.gov, FRNP
marcia.fultz@pppo.gov, PPO
myrna.redfield@pad.pppo.gov, FRNP
norm.sandlin@pad.pppo.gov, FRNP
pad.rmc@pad.pppo.gov, SSI
robert.edwards@pppo.gov, PPPO
tracey.duncan@pppo.gov, PPPO

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CP2-WM-0001/FR1

Four Rivers Nuclear Partnership, LLC, Paducah Deactivation and Remediation Project Waste Management Plan

This document is approved for public release per review by:

David Hayden — 10-29-18

FRNP Classification Support — Date

CP2-WM-0001/FR1

Four Rivers Nuclear Partnership, LLC, Paducah Deactivation and Remediation Project Waste Management Plan

Date Issued—October 2018

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

Prepared by
FOUR RIVERS NUCLEAR PARTNERSHIP, LLC,
managing the
Deactivation and Remediation Project at the
Paducah Gaseous Diffusion Plant
under Contract DE-EM0004895

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APPROVALS

Four Rivers Nuclear Partnership, LLC,
Paducah Deactivation and Remediation Project
Waste Management Plan

CP2-WM-0001/FR1

October 2018

Mike Zeiss
Waste Facility Operations Manager

10/29/18
Date

James Miller
Waste, Materials, and Environmental Services Director

10/29/18
Date

Effective Date: 10/31/18

Review Date: 10/29/21

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REVISION LOG

Revision Number	Description of Changes	Pages Affected
FR0	Initial Release	All
FR1	Added language to the Executive Summary regarding cost allowances. Added Section 4.3 and other language regarding cost allowances for waste reduction as well as language regarding recycling process description. Updated Appendix B. General nonintent changes made. Updated Appendix A to clarify process for contained-in determinations for environmental media and related waste streams.	All

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ACRONYMS

ACM	asbestos-containing material
AEA	Atomic Energy Act
AL	Authorized Limit
ALARA	as low as reasonably achievable
AOC	area of contamination
ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CWA	Clean Water Act
DOE	U.S. Department of Energy
DOE M	DOE Manual
DOE O	DOE Order
DOT	U.S. Department of Transportation
DQO	data quality objective
DSA	documented safety analysis
DSSI	Diversified Scientific Services, Inc.
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
FOR	field operating record
FRNP	Four Rivers Nuclear Partnership, LLC
GSA	generator staging area
HWFP	Hazardous Waste Management Facility Permit (KY8-890-008-982)
ISMS	Integrated Safety Management System
IWTS	Integrated Waste Tracking System
KAR	*Kentucky Administrative Regulations*
KDWM	Kentucky Division of Waste Management
KPDES	Kentucky Pollutant Discharge Elimination System
LDR	land disposal restriction
LLW	low-level radioactive waste
MLLW	mixed low-level waste
MTRU	mixed transuranics
NCS	Nuclear Criticality Safety
NIC	NNSS Waste Implementation Crosswalk
NDA	nondestructive assay
NNSS	Nevada National Security Site
PCB	polychlorinated biphenyls
PGDP	Paducah Gaseous Diffusion Plant
PHS	Preliminary Hazard Screening
PK	process knowledge
PPE	personal protective equipment
PPPO	Portsmouth/Paducah Project Office
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RP	radiation protection
RWMB	Radioactive Waste Management Basis
SAP	sampling and analysis plan
SB	safety basis

SCO	surface contaminated object
STP	site treatment plan
TRU	transuranics
TSCA	Toxic Substances Control Act
TSDF	treatment, storage, and disposal facility
UTS	universal treatment standards
WAC	waste acceptance criteria
WCO	waste certification official
WCS	Waste Control Specialists, Inc.
WGF	waste generation forecast
WMP	waste management plan
WWTU	wastewater treatment unit

DEFINITIONS

Analytical results—Non-SW-846 chemical analyses can be used to substantiate process knowledge. For example, an INL laboratory could analyze for certain Resource Conservation and Recovery Act (RCRA) metals in a waste using a non-SW-846 atomic absorption methodology. Because this analysis does not conform to Environmental Protection Agency (EPA)-prescribed analyses from SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, current edition, it can only serve as process knowledge information.

Asbestos-containing material (ACM)—Material containing more than 1% asbestos

Certification—A process by which a Waste Generator formally confirms that a given waste or waste stream meets the waste acceptance criteria of the facility to which the Generator intends to transfer waste for treatment, storage or disposal.

Classified material—Any item or scrap that, due to its composition, structure, or function, reveals restricted data or other classified information, either directly or through analysis, in accordance with U.S. Department of Energy (DOE) CG-SS-4, DOE CGPGD-5, or other applicable classification guidance.

Commercial grade item—Containers and packaging supplies that are industry standard with existing pedigrees.

Data quality objective (DQO)—A set of criteria established for the collection of data to ensure the data is adequate to make the required decision. For waste characterization, the DQOs will include the analyses required, the analytes (the contaminants of concern), the type and number of samples, the quality control samples and analyses, and the degree of confidence required.

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 quality control (QC) data and laboratory QC data, and also may include field records.

Debris—Solid material exceeding a 60 mm particle size that is intended for disposal and that is a manufactured object, plant or animal matter, or natural geologic material. The following materials are not debris: any material for which a specific treatment standard is provided in 40 *CFR* (Code of Federal Regulations) Part 268, Subpart D, namely lead acid batteries, cadmium batteries, and radioactive lead solids; process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludges, or air emission residues; and intact containers of hazardous waste that are not ruptured and that retain at least 75% of their original volume.

Environmental media—Soil, sediment, groundwater, and surface water.

Generator—The person or entity producing a waste that requires treatment, storage, and/or disposal. The Generator may be Four Rivers Nuclear Partnership, LLC, (FRNP) an FRNP subcontractor, another DOE prime contractor on the Paducah GDP Reservation, or a direct or tiered subcontractor to a DOE prime contractor.

Hazardous waste—Solid waste that meets the criteria in 40 *CFR* § 261.3.

Industrial waste (IW)—Solid waste generated by industrial processes and manufacturing; industrial waste is not radioactive, hazardous or mixed waste.

Low-level radioactive waste (LLW)—Radioactive waste that contains source, special nuclear, or by-product material, and which is not classified as high-level radioactive waste, transuranic (TRU) waste, spent nuclear fuel, or by-product material, as defined in Section 11e.(2) of the Atomic Energy Act (AEA), as amended.

Milk runs—A common practice in the waste management business whereby a waste transportation truck will pick up waste at one or more locations and thereby reduce the total number of off-site shipments to the extent practical.

Mixed low-level waste (MLLW)—LLW determined to contain both a hazardous component subject to RCRA, as amended, and a radioactive component subject to the Atomic Energy Act, as amended, that is to be managed in accordance with the requirements of RCRA and DOE Order 435.1, Radioactive Waste Management. MLLW also includes LLW containing polychlorinated biphenyls (PCBs), asbestos, or other such regulated toxic components managed in accordance with the Toxic Substances Control Act (TSCA).

Mixed transuranic waste (MTRU)—Waste that meets the definition of transuranic waste and contains a hazardous component subject to the (RCRA). DOE approval required prior to generation of MTRU waste.

Orphan waste—Waste with no identified disposal path.

Polychlorinated biphenyl (PCB)-contaminated—A nonliquid material containing PCBs at concentrations ≥ 50 ppm but < 500 ppm; a liquid material containing PCBs at concentrations ≥ 50 ppm but < 500 ppm or where insufficient liquid material is available for analysis; a nonporous surface having a surface concentration > 10 µg/100 cm^2 but < 100 µg/100 cm^2, measured by a standard wipe test as defined in § 761.123, Toxic Substance Control Act (TSCA) waste.

PCB article—See 40 *CFR* § 761.3. A manufactured article, other than a PCB container, that contains PCBs and whose surface(s) has been in direct contact with PCBs. "PCB article" includes capacitors, transformers, electric motors, pumps, pipes, and any other manufactured item (1) that is formed to a specific shape or design during manufacture, (2) that has end use function(s) dependent in whole or in part upon its shape or design during end use, and (3) that either has no change of chemical composition during its end use or only those changes of composition that have no commercial purpose separate from that of the PCB Article.

PCB bulk product waste—Waste derived from manufactured products containing PCBs in a nonliquid state, at any concentration where the concentration at the time of designation for disposal was ≥ 50 ppm PCBs. PCB bulk product waste does not include PCBs or PCB Items regulated for disposal under 40 *CFR* § 761.60(a) through (c), § 761.61, § 761.63, or § 761.64. PCB bulk product waste includes, but is not limited to, the following:

(1) Nonliquid bulk wastes or debris from the demolition of buildings and other man-made structures manufactured, coated, or serviced with PCBs. PCB bulk product waste does not include debris from the demolition of buildings or other man-made structures that is contaminated by spills from regulated PCBs that have not been disposed of, decontaminated, or otherwise cleaned up in accordance with subpart D of this part.

(2) PCB-containing wastes from the shredding of automobiles, household appliances, or industrial appliances.

PCB container—A package, can, bottle, bag, barrel, drum, tank, or other device that contains PCBs or PCB Articles and whose surface(s) has been in direct contact with PCBs.

PCB/radioactive waste—PCBs regulated for disposal under 40 *CFR* Part 761, Subpart D, that also contain source, special nuclear, or by-product material subject to regulation under the AEA, as amended, or naturally occurring or accelerator-produced radioactive material.

PCB remediation waste—See 40 *CFR* § 761.3. Waste containing PCBs as a result of a spill, release, or other unauthorized disposal, at the following concentrations: materials disposed of prior to April 18, 1978, that currently are at concentrations ≥ 50 ppm PCBs, regardless of the concentration of the original spill; materials that currently are at any volume or concentration where the original source was ≥ 500 ppm PCBs beginning on April 18, 1978, or ≥ 50 ppm PCBs beginning on July 2, 1979; and materials that currently are at any concentration if the PCBs are spilled or released from a source not authorized for use under this part. PCB remediation waste means soil, rags, and other debris generated as a result of any PCB spill cleanup, including, but not limited to, the following:

(1) Environmental media containing PCBs, such as soil and gravel; dredged materials, such as sediment, settled sediment fines, and aqueous liquids decanted from sediment.

(2) Sewage sludge containing < 50 ppm PCBs and not in use according to § 761.20(a)(4); PCB sewage sludge; commercial or industrial sludge contaminated as the result of a spill of PCBs, including sludges located in or removed from any pollution control device; aqueous decantate from an industrial sludge.

(3) Buildings and other man-made structures (such as concrete floors, wood floors, or walls contaminated from a leaking PCB or PCB-contaminated transformer), porous surfaces, and nonporous surfaces.

Process Knowledge—Knowledge (also referred to as acceptable knowledge) that is used in addition to or in place of sampling and analysis to determine if a waste is RCRA hazardous and to classify it in order to meet treatment, storage, and disposal requirements. Process knowledge must be adequate to ensure the characterization is sufficient to withstand scientific and legal challenges relative to management of the waste.

Profile—A treatment, storage, and disposal facility (TSDF) document that summarizes facility-specific waste acceptance requirements for waste streams that are similar in nature, physical and chemical composition, and radionuclide content. A profile consists of a general description of the waste, the physical, chemical, and radiological limitations for acceptance, requirements for characterization and packaging, and any other supporting data necessary to demonstrate compliance with the waste acceptance criteria of the particular on-site or off-site TSDF. Current profiles are available on the FRNP Internal Intranet site.

Radioactive Waste—Waste that is managed for its radioactive content, including solid, liquid, or gaseous material that contains radioactive nuclides regulated under the Atomic Energy Act, as amended, and of negligible economic value considering costs of recovery.

Radioactive Waste Management Basis (RWMB)—The radioactive waste management controls that are applied to DOE facilities, operations, and activities to provide near- and long-term protection of the public, workers, and environment. The radioactive waste management basis consists of controls and analyses, such as facility waste certification programs, facility waste acceptance requirements, low-level

waste disposal facility closure plans, performance assessments, composite analyses, and other facility-specific processes, procedures and analyses made to comply with DOE O 435.1 (Admin. Chg. 1) and its Manual.

RCRA—The Resource Conservation and Recovery Act of 1976. This is the law which specifies EPA as the administrator to create and enforce regulations (under Title 40 CFR) related to hazardous waste management.

Sanitary/Industrial Waste—Waste that is not regulated under RCRA, certain TSCA PCB wastes, and meets radiological free release criteria under DOE Order 458.1, "Radiation Protection of the Public and the Environment" and "Authorized Limits" approved by DOE. This may also include waste that is specifically approved for on-site landfill disposal.

Transuranic (TRU) waste—Waste that contains TRU (atomic number > 92) alpha-emitting nuclides at concentrations > 100 nCi/g with half-life > 20 years. DOE approval required prior to generation of TRU waste.

Universal Waste (UW)—Those solid wastes that are designated as universal wastes by Environmental Protection Agency regulations (40 CFR 273).

Waste Acceptance Criteria (WAC)—The requirements, terms, and conditions under which a facility will accept waste from a generator for treatment, storage and/or disposal.

Waste Certification Official (WCO)—This position is responsible for ensuring the FRNP Waste Certification Program including, plans, procedures and guidance documents, are available to support waste operations. This person is independent of the projects and is the primary contact for the Nevada National Security Site (NNSS) and other waste management activities.

Waste Type—This refers to the general regulatory classification of a population of waste. These categories are determined in accordance with applicable state and federal agency regulations, orders, and policies. General waste type examples include, but are not limited to: radioactive waste, RCRA hazardous waste, mixed waste, regulated asbestos waste, construction/demolition waste. Specific waste type examples are: transuranic radioactive waste, F-, K-, P- and U-listed RCRA hazardous wastes, category I non-friable asbestos waste, and wooden construction debris.

EXECUTIVE SUMMARY

This Waste Management Plan (WMP) addresses the safe and compliant management of wastes through the application of consistent waste management practices at the Paducah Site under the Four Rivers Nuclear Partnership, LLC, Paducah Deactivation and Remediation Project (FRNP). The document sets forth the requirements for managing low-level radioactive, mixed low-level radioactive, Resource Conservation and Recovery Act (RCRA) hazardous, Toxic Substances Control Act (TSCA), sanitary, classified, and/or transuranic waste at the Paducah Site. Waste generated at the Paducah Site must be characterized and managed in accordance with all applicable state and federal laws and regulations. These wastes also must be managed in accordance with U.S. Department of Energy (DOE) Orders and requirements and procedures developed by FRNP, which are written and updated, as necessary, for compliance with the stated requirements. Additionally, the waste must be characterized and managed to meet the waste acceptance criteria (WAC) for receiving facilities engaged in the treatment and/or ultimate disposition of the waste. The approach outlined in this plan also is consistent with FRNP's *Pollution Prevention/Waste Minimization Plan*, CP2-ES-0005, and the *FRNP Sustainability Plan*, CP2-ES-0100.

This WMP is not intended to replace project-specific WMPs that would be developed for future Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and non-CERCLA projects. The most current applicable or relevant and appropriate requirements and waste generation forecasts, classification, and characterization data will be provided. Implementation of this approach is intended to provide a consistent approach to the management of waste generated at the Paducah Site.

Work resulting in the generation or the potential generation of any waste shall be planned, authorized, and accomplished under controlled conditions, in accordance with this WMP along with the approved work instructions and procedures. Incorporating careful planning into projects ensures end-point disposition paths are identified prior to waste generation, with priority placed on reuse and recycling of materials that would otherwise be disposed of. This planning also allows implementation of cost-effective pollution prevention techniques, practices, and policies, as outlined in CP2-ES-0005 and CP2-ES-0100. As required by the Hazardous Waste Management Facility Permit, the costs of waste management must be considered in the liability, transportation, recordkeeping, personnel, pollution control, treatment, disposal, compliance, and oversight costs to the extent feasible. Each project manager is accountable for the waste they generate through the budgeting process. Each project manager, with the assistance of the Waste and Materials organization, is responsible for evaluating cost savings, considering waste minimization and recycling options available for the types of waste generated.

Processes important to waste disposition activities (e.g., characterization, radiological surveys) shall have controls or verification steps identified as part of operating procedures. Controls shall be established and maintained to ensure the traceability of the waste from the point of generation through final disposition.

Requirements for waste management planning shall be incorporated into the contracts of all subcontractors that are involved in the generation of waste. A waste representative (e.g., waste engineer, field engineer, field coordinator) shall be assigned to each subcontractor to assist in work planning and development.

FRNP shall characterize waste in accordance with the applicable regulations, DOE Orders, profile and procedure requirements, and the applicable treatment, storage, and disposal facility (TSDF) 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 reduce and, where possible, eliminate the generation and release of DOE wastes and pollutants thereby minimizing the amount of regulated waste (RCRA and TSCA) requiring treatment and disposal. Wastes shall be evaluated for the best technical and/or cost-effective disposition path with the following hierarchy:

(1) Reduce/reuse/recycle
(2) C-746-U Contained Landfill or on-site treatment
(3) Nevada National Security Site
(4) Commercial disposal
(5) Commercial TSDF for treatment/disposal

As a mechanism to ensure continuous improvement in waste management and support the targets and objectives outlined in CP2-ES-0005 and CP2-ES-0100, FRNP 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 database. Lessons learned (including operating experience lessons learned) shall be tracked in the lessons learned database. Each project shall be responsible for developing lessons learned, as applicable.

1. INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this Waste Management Plan (WMP) is to provide a systematic approach to the management of waste generated by U.S. Department of Energy (DOE) activities at the Paducah Site under the Four Rivers Nuclear Partnership, LLC, Paducah Deactivation and Remediation Project (FRNP) and to protect the health and safety of the worker, the public, and the environment. This plan covers all wastes located at the Paducah Site, including but not limited to, wastes generated by past DOE contractors as well as newly generated wastes. The use of the term waste hereafter refers to both types of wastes. The scope of this document is to set forth the requirements for managing sanitary waste and waste meeting Authorized Limits (ALs) for C-746-U Landfill, low-level waste (LLW), Resource Conservation and Recovery Act (RCRA) waste, Toxic Substances Control Act (TSCA) waste, and/or transuranic (TRU) waste at Paducah Gaseous Diffusion Plant (PGDP). The plan also addresses the management of nonradioactive and nonhazardous 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.

Wastes generated during FRNP activities must be characterized and managed in accordance with applicable state and federal laws and regulations. These wastes also must be managed in accordance with DOE Orders and requirements and procedures used by FRNP, which are written and updated, as necessary, for compliance with the stated requirements. Additionally, the wastes must be characterized and managed to meet the waste acceptance criteria (WAC) for receiving treatment, storage, and disposal facilities (TSDFs) engaged in the treatment and/or ultimate disposition of the wastes.

Appendix A to this WMP is a protocol contained in the U.S. Environmental Protection Agency's (EPA) 1998 guidance, *Management of Remediation Wastes under RCRA*, outlining management options for remediation wastes. The protocol provides a regulatory background and application of selected regulatory policies that will be used for management of certain listed wastes at Paducah Site. These include the basis for hazardous waste listings, land disposal restrictions (LDRs), contained-in determinations, and health-based standards approved by the Kentucky Division of Waste Management (KDWM) and EPA Region 4, for the management of environmental media and related waste streams at the site.

This WMP shall be incorporated by reference into future Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) documents, supplementing project-specific WMPs; however, the most current applicable or relevant and appropriate requirements (ARARs) and waste generation forecast, classification, and characterization data will be provided, as applicable, in project-specific waste management plans, work instruction, procedures, and/or CERCLA work plans. Implementation of this WMP will mitigate inconsistencies with regard to waste management and will streamline the development and approval process for forthcoming project-specific documents.

Appendix B to this WMP includes FRNP Radioactive Waste Management Basis for the DOE-owned waste management facilities located at the Paducah Site, which is a requirement of DOE Order (O) 435.1 (Admin. Chg. 1), *Radioactive Waste Management*.

1.2 ORGANIZATION, STRUCTURE, AND RESPONSIBILITIES

FRNP will implement the general requirements and responsibilities of DOE Manual (DOE M) 435.1-1, *Radioactive Waste Management Manual*, and through programs and procedures identified in

CP2-HS-1000, *Integrated Safety Management System Description*, CP2-ES-0101, *Environmental Management System for the Deactivation and Remediation Project, Paducah Gaseous Diffusion Plant, Paducah, Kentucky* and DOE O 458.1 (Admin. Chg. 3), *Radiation Protection of the Public and the Environment*.

Specific functional waste management activities shall be integrated across the following areas:

Contracts and Purchasing—Establishes purchase orders or contracts with analytical laboratories, subcontractors, waste transportation companies, and TSDFs. Procures empty hazardous materials containers, labels, placards, shipping forms, etc. in accordance with Four Rivers Nuclear Partnership, LLC., Paducah Deactivation and Remediation Contract (FRNP) quality assurance (QA) program.

Records Management—Manages/retains records generated during waste generation, management, and treatment/disposal in accordance with DOE O 200.1A, *Information Technology Management*, 243.1B, *Records Management Program*, and DOE O 414.1D (Admin. Chg. 1), *Quality Assurance*. Waste management records are maintained in a combination of paper and electronic formats (e.g., tracking forms, shipment paperwork, characterization information, and radiological data). Electronic records for waste containers and associated characterization information will be maintained within the Integrated Waste Tracking System (IWTS). Field operating records (FORs) are records that are compiled, revised, or made complete over time or are required by permit or procedure to be located at a designated work area. Due to the nature of FORs, an exception is granted to maintain the record copy at the work location until the project file is closed and all other recordkeeping requirements are met (e.g., RCRA).

Procedures Management—Maintains administrative and technical (operating) procedures in accordance with CP3-OP-0002, *Developing and Maintaining FRNP Performance Documents*. These procedures address cradle-to-grave waste management practices as well as routine and off-normal waste operations.

Sample and Data Management—Develops and implements sampling and data management activities for a sampling program that includes, as applicable, sampling/analysis of effluent discharges, groundwater, air emissions, and wastes [e.g., isotopic information, total activity, contributing radionuclides, fissile material mass, enrichments, hazardous characteristics/constituents, hazardous pollutants, polychlorinated biphenyls (PCBs)]. Activities will be performed in accordance with CP2-ES-0063, *Environmental Monitoring Data Management Implementation Plan at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*.

Waste Management—Refines the waste disposition strategy for each project or work scope. Provides waste management expertise to projects such as, but not limited to, waste cost estimates, waste trending, etc. Waste Management supports the projects by assisting in characterization of the waste, selection of appropriate containers, and oversight of waste packaging, container closure, tamper/intrusion indicating device application, requests for waste management support, and pre-transportation inspection of containers. Ensures proper management of waste during staging/storage on-site; maintains inventory of waste generated and follows the process for compiling radiological and chemical material inventories to comply with facility nuclear safety basis documents inventory controls; and works with transportation group to dispose of the waste to the appropriate receiving facility.

Quality Assurance—Ensures that packaging supplies (containers, liners, absorbent, etc.) meet the requirements set forth by the project generating the waste (e.g., through receipt inspections) and maintains an Approved Suppliers List in accordance with the FRNP QA program. Ensures work is performed in accordance with approved plans/procedures and conducts routine surveillances of waste management activities. Activities will be performed in accordance with CP2-QA-1000, *Quality Assurance Program Description for the Four Rivers Nuclear Partnership, LLC., Paducah Deactivation and Remediation*

Project Paducah, Kentucky, that meet the requirements of 10 *CFR* Part 830, Subpart A, *Quality Assurance Requirements*; DOE O 414.1D (Admin. Chg. 1), *Quality Assurance*.

Radiation Protection—Reviews and approves methods of conducting transportation surveys for the receipt and off-site shipment of hazardous materials, performs radiological surveys of packaging to determine the appropriate labels and transport index, and ascertains that appropriate surface contamination limits are not exceeded. A radiation protection (RP) representative will develop, as needed, 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 O 458.1 (Admin. Chg. 3), *Radiation Protection of the Public and Environment*.

Regulatory Compliance—Ensures that appropriate regulations pertaining to waste determinations and waste generation, storage, and disposal are identified. Verifies that appropriate notifications, if required, are filed with regulatory agencies upon concurrence by DOE. Maintains environmental permits/approvals.

Training—Establishes and maintains the training implementation matrix and training files FRNP personnel and subcontractors engaged in waste management activities, including fissile material certification. A training and qualification program shall be implemented for waste management program personnel and shall meet federal/state/local regulations (e.g., 40 *CFR* § 264.16, 49 *CFR* § 172.704) and, for personnel working in nuclear facilities, the requirements of DOE O 426.2 (Admin. Chg. 1), *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*.

Waste Transportation—Provides guidance to the waste engineers/field engineers/field coordinators/generators regarding package selection, packaging, marking, and labeling of containers. Completes and certifies shipping papers and/or manifests for off-site shipments; calls and schedules carriers; inspects, coordinates, and provides guidance on loading and securing packages aboard the conveyance; ensures that carrier is offered the appropriate placards; instructs carrier; and provides emergency instructions to carriers. Waste shall be packaged and transported in accordance with federal/state/local regulations (e.g., 40 *CFR* Part 262, *Standards Applicable to Generators of Hazardous Waste*; 40 *CFR* Part 264, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities*; and 49 *CFR* Part 172, *Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements*) and with DOE O 460.1C, *Packaging and Transportation Safety*, and DOE O 460.2A, *Departmental Materials Transportation and Packaging Management*.

Waste Certification Official (WCO)—Certifies and releases waste for shipment and disposal to Nevada National Security Site (NNSS). Verify that waste is packaged and prepared for transport in accordance with the NNSS WAC.

1.3 SPECIFIC PROJECT RESPONSIBILITIES

The project manager shall be responsible for ensuring the requirements of this section are met. Procedures, methods, and work instructions shall be developed for each project at the Paducah Site involving waste management.

(1) Work shall be planned, authorized, and accomplished under controlled conditions, in accordance with this WMP along with project-specific waste management plans, approved work instructions, and procedures. Processes important to waste disposition activities (e.g., characterization, radiological surveys) shall have controls or verification steps identified as part of operating procedures and/or

work control documents. Controls shall be established to ensure the traceability of the waste from the point of generation through final disposition.

(2) Requirements for waste management planning shall be incorporated into the contracts of all subcontractors that are involved in the generation of waste. A waste representative shall be assigned to each subcontractor, if generating waste, to assist in work planning and development.

The following must be addressed on a project-specific basis:

(a) Waste Generation Forecast (WGF) (by waste stream)—This information is provided to Regulatory Compliance and DOE-PPPO annually and as may be required by federal/state/local regulations. It will be provided in the CERCLA work plan for projects performed in accordance with CERCLA authority. The following information, as available, also shall be supplied to Waste Management as part of the WGF:

i. Waste category [e.g., LLW, mixed low-level waste (MLLW), TSCA LLW, TRU, RCRA, TSCA, asbestos-containing material (ACM)];

ii. Waste stream description [e.g., product, personal protective equipment (PPE), soil, debris];

iii. Waste codes or special identification;

iv. Special handling requirements (e.g., PCBs, asbestos, classified);

v. Estimated quantity (volume, mass, or estimated density for the various waste types);

vi. Planned disposition facility(ies);

vii. Type and number of containers to be used to package and transport the waste; and

viii. Type of absorbents and/or liners to be used to package the waste.

(b) Handling of Classified Waste—If classified waste is to be managed, the project shall address it. The FRNP/Swift & Staley Team security specialists will provide guidance in the preparation and handling of documentation concerning the generation, transport, and disposition of classified waste.

(c) Waste Characterization—Waste characterization specific information will be incorporated into the work plan for projects performed in accordance with CERCLA and will be included in work instructions/procedures for all projects. Waste characterization may be based upon the following:

i. Chemical characterization strategy [process knowledge (PK), sampling/analysis, field screening]; and

ii. Radiological characterization strategy (PK, sampling/analysis, field screening).

(d) Orphan Waste—Waste streams with no disposition pathway shall be generated only in accordance with approved conditions, which, at a minimum, will address the following:

i. Programmatic need to generate the waste;
ii. Characteristics and issues preventing the disposition of the waste;
iii. Safe and compliant storage of the waste until disposal can be achieved;

iv. Activities and plans for achieving final disposition of the waste; and
v. Methods of segregation that might limit wastes without an identified disposition pathway.

This information shall be presented to senior management and DOE during work planning and shall be incorporated into work instructions or procedures. The DOE Portsmouth/Paducah Project Office Manager must approve the generation of TRU, MTRU, and waste with no identified path to disposal.

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2. WASTE MANAGEMENT COMPLIANCE DRIVERS

Waste generated on the project shall be managed in accordance with contract, 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 O 435.1** (Admin. Chg. 1), ***Radioactive Waste Management***—This Order ensures that DOE radioactive waste is managed in a manner that is protective of worker and public health and the environment. Program documents and implementing procedures are identified in CP2-HS-1000, *Integrated Safety Management System Description*, and in Appendix B, *Radioactive Waste Management Basis for the Radioactive Waste Management Facilities, Four Rivers Nuclear Partnership, LLC Paducah Deactivation and Remediation Project.*

- **DOE O 458.1** (Admin. Chg. 3), ***Radiation Protection of the Public and Environment***—Establishes requirements to protect the public and the environment against undue risk from radiation associated with radiological activities.

- **10 CFR Part 835**, ***Occupational Radiation Protection***—Establishes radiation protection standards, limits, and program requirements for protecting individuals from ionizing radiation resulting from the conduct of DOE activities.

- **RCRA**—Establishes the standards for hazardous and MLLW waste identification, treatment, storage, and disposal of solid and hazardous waste managed by the project.

- **TSCA**—Establishes requirements for identifying, storing, transporting, and treating PCB and PCB/Radioactive waste.

- **Department of Transportation (DOT)** —Establishes the standards for packaging, classification, and communication of hazardous material in commerce.

- **Hazardous Waste Management Facility Permit (HWFP) No. KY8-890-008-982**—Specifies conditions for hazardous waste management units and corrective action for solid waste management units at the Paducah Site, including regulatory provisions for hazardous and MLLW treatment, storage, and disposal activities.

- **Solid Waste Permit Number 073-00045/073-00014/073-00015**—Specifies conditions for operation of the C-746-U Landfill and post closure care of the C-746-S&T Landfills, including the regulatory provisions for solid waste disposal activities of the project.

- **Federal Facility Agreement (FFA)**—The FFA, as required by Section 120 of CERCLA, is a tri-party agreement among DOE, EPA, and Kentucky Energy and Environment Cabinet (Kentucky) (formerly the Kentucky Natural Resources and Environmental Protection Cabinet) signed in 1998. The FFA provides the legal and regulatory framework for conducting site cleanup activities under the RCRA/CERCLA corrective/remedial actions process at the site.

- **TSCA- Compliance Agreement**—This agreement was signed between the EPA and DOE in 1992 modified in 1997, and modified again on May 30, 2017. The agreement requires the development and implementation of action plans for removal and disposal of PCB material.

- **2003 Agreed Order**—The October 1, 2003, Agreed Order between DOE and the KDWM sets forth establishment of health-based levels for environmental media and associated debris contaminated with hazardous waste.

- **DOE Memorandum**—"Secretarial Memorandum for Heads of Department Elements on the Release of Materials for Reuse and Recycle," Bill Richardson, Washington, DC, February 14, 2000.

- **DOE Memorandum**—"Secretarial Memorandum for Heads of All Departmental Elements on the Release of Surplus and Scrap Materials," Bill Richardson, Washington, DC, July 13, 2000.

- **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 if mixed waste is stored over a year.

- **DOE Agreement with Tennessee Valley Authority (TVA)** —Agreement with Tennessee Valley Authority (TVA) Shawnee Fossil Plant for DOE to accept certain Tc-99 contaminated wastes.

- **DOE Contract No. DE-EM0004895**—Department of Energy Prime Contract for Deactivation and Remediation of the Paducah Gaseous Diffusion Plant. Contract between DOE and FRNP for the deactivation and remediation of the PGDP.

3. WASTE MANAGEMENT

Waste Management is an integrated, sitewide organization focused on safe, cost-effective, and compliant disposition of wastes from the FRNP. For organizational structure, see latest version of the FRNP's organization chart.

Waste Management is integrated into projects by assigning trained waste representatives (e.g., waste engineers, field engineers, field coordinators) directly to each project. These waste representatives specialize in waste planning and pollution prevention/waste minimization, characterization, disposition path planning, profile development, and transportation in cooperation with the Waste Transportation group. The waste management support process starts with waste stream identification, emphasizing waste minimization and elimination, and includes waste characterization/sampling strategies. 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.

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4. POLLUTION PREVENTION AND WASTE MINIMIZATION

FRNP shall plan waste management activities to meet the obligations and responsibilities under Executive Order 13693, *Planning for Federal Sustainability in the Next Decade*, and the *Pollution Prevention Act of 1990*.

FRNP document CP2-ES-0005, *Pollution Prevention/Waste Minimization Plan for the Deactivation and Remediation Project, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, establishes policy, goals, and roles/responsibilities related to pollution prevention and waste minimization. This plan also discusses the integration of pollution prevention and waste minimization into the environmental management system. FRNP 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,
- Perform as many tasks outside a contamination area as possible,
- Limit the materials taken into contamination areas,
- Avoid unnecessary entry/reentry into contamination areas,
- Decontaminate items to the greatest extent practical, and
- Aggressively sort and segregate materials.

Reuse/Recycle—Recycling is limited at the Paducah Site by the DOE moratorium on the release of volumetrically contaminated metals (January 12, 2000) and by the DOE suspension on unrestricted release for recycling of scrap metals from radiation areas within DOE facilities (July 13, 2000). If the moratorium is lifted, this will allow FRNP to increase the recycle efforts and, in some instances, offset disposal costs. As materials are identified and characterized as prospects for recycling or reuse, a thorough trade-off analysis of economic, health, safety, and waste volume benefits that could be realized by innovative recycling approaches will be conducted.

The Infrastructure Contractor supports general office recycling, where janitorial services are provided to FRNP as a Government Furnished Service by separation and retrieval of office recyclables/trash and the recycling of electronic equipment (e.g., computers, cell phones, printers, scanners). Items typically recycled by the Infrastructure Contractor are paper, metal/aluminum cans, plastics, card board, toner cartridges, and electronic equipment. FRNP actively manages other non-contaminated recyclables in accordance with CP2-WM-0002, *Four Rivers Nuclear Partnership, LLC, Paducah Deactivation and Remediation Project Asset Recovery and Recycling Program Plan*.

Other wastes, such as concrete, structural steel, and universal wastes (e.g., batteries, bulbs), are evaluated during project planning for release in accordance with CP3-RP-1109, *Radioactive Contamination Control and Monitoring*. If appropriate, these materials are then segregated and shipped for recycling. Excess property, such as equipment, spare parts, etc. is managed in accordance with CP2-WM-0702, *Personal Property Disposition Plan*, and CP3-PR-1001, *Property Management*. Excess property may be offered for

use at other sites in lieu of disposal. Off-site release of these items must meet the requirements of DOE O 458.1 (Admin. Chg. 3) and have DOE concurrence prior to release.

Dispose. FRNP will utilize existing DOE treatment/disposal contracts for waste types generated or will negotiate facility/waste specific contracts when determined to be advantageous to the DOE. Selection of the disposition alternative typically will be based on being compliant and being the most cost-effective; however, circumstances may require another alternative to be selected, provided it is compliant, because of other project-related issues (e.g., schedule, availability, recent quality of the disposition provider).

4.1 WASTE AVOIDANCE

When possible, the generation of waste shall be avoided or minimized. Material and equipment packaging shall be removed, whenever possible, before items are brought into contaminated areas to prevent cross contamination. Contamination control for equipment will be implemented to eliminate or reduce the need for decontamination. Contaminated tools shall remain within the contaminated area for reuse where possible. Entries into contamination areas shall be limited to those personnel required to perform, supervise, and oversee work to minimize the generation of secondary waste such as personal protective equipment (PPE) donning and doffing.

4.2 VOLUME REDUCTION

In order to meet goals for waste minimization and to optimize the total costs associated with on-site waste management and ultimate disposition, volume reduction may be employed for any given project. Volume reduction shall be considered during work plan development and executed beginning with sorting and segregation activities. Volume reduction may be accomplished by compaction, disassembling, and cutting or shearing of system components and demolition debris to practical dimensions for container loading (based on equipment capabilities and cost-effectiveness of size reduction efforts). Activities that potentially would generate fugitive emissions will include plans for the control of emissions. Volume reduction that would constitute treatment of hazardous waste is discussed in Section 8 of this WMP.

4.3 COST ALLOCATION FOR WASTE REDUCTION

As required by the Hazardous Waste Management Facility Permit, the costs of waste management must be considered in the liability, transportation, recordkeeping, personnel, pollution control, treatment, disposal, compliance, and oversight costs to the extent feasible. Each project manager is accountable for the waste they generate through the budgeting process. Each project manager, with the assistance of the Waste and Materials organization, is responsible for evaluating cost savings considering waste minimization and recycling options available for the types of waste generated. This cost allocation is managed through the FRNP Project Controls System. This system is an integrated work scope, schedule, and cost control system comprised of policies, procedures, desktop instructions, workflow processes, reports, and data management systems that provide for the effective planning and control of work scope, cost and schedule. The system also meets the internal needs of project management for performance monitoring and management of work

The system defines planning and control processes that are instrumental in helping management accomplish project scope in an orderly and cost-effective manner. This system is the primary cost and schedule management tool used to meet both external and internal project management objectives. Frequent management reviews and project status meetings are conducted by senior FRNP management

(at least monthly) to address scope, schedule, and cost performance. Waste disposition costs are managed and addressed as part of these routine reviews.

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5. REGULATORY CLASSIFICATION OF WASTE

Wastes are to be characterized at the point of generation in accordance with applicable federal/state/local regulations and DOE Orders. This section provides an overview of the various types of regulated wastes generated at the Paducah Site.

Classified waste is managed in accordance with the applicable regulations and the Site Security Plan.

5.1 SANITARY/INDUSTRIAL WASTE

Sanitary/industrial waste is solid waste, including ACM, which is not radioactive and is not hazardous. Sanitary waste may be disposed of in off-site disposal locations approved by FRNP or may be disposed of in the C-746-U Contained Landfill in accordance with CP2-WM-0011, *Waste Acceptance Criteria for the Treatment, Storage, and Disposal Facilities at the Paducah U.S. Department of Energy Site*. Primary WAC considerations for the C-746-U Contained Landfill are that the waste must meet the AL for radionuclides (in accordance with DOE O 458.1 Admin. Chg. 3), be RCRA nonhazardous, contain no free liquids, and not exceed a PCB concentration of 49 parts per million (ppm). The waste stream for the landfill that uses AL must be approved by DOE. Primary considerations for off-site disposal of sanitary/industrial waste are that the waste meets the receiving facilities' requirements and has been approved by DOE for release in accordance with DOE O 458.1 (Admin. Chg. 3) or is being disposed of under a DOE-approved AL. To determine if the waste meets ALs, sampling/surveying shall be conducted using a graded approach consistent with the requirements of DOE/HS-004, *Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual*.

5.2 RADIOACTIVE WASTE

The following categories of radioactive wastes are defined in this plan (see "Definitions").

5.2.1 Low-Level Waste

Waste that exceeds the C-746-U Contained Landfill AL for radionuclides, if going to C-746-U landfill, or that exceeds DOE O 458.1 limits for other ALs is RCRA nonhazardous and is not regulated under TSCA shall be characterized as LLW. LLW shall be managed in accordance with this Plan, DOE O 435.1 (Admin. Chg. 1) and DOE M 435.1-1. AL waste is managed as LLW until transported to the landfill. NOTE: Waste that meets AL is tracked as sanitary waste upon verification that it meets the ALs.

5.2.2 Transuranic Waste

Waste containing TRU (atomic number > 92) radionuclides emitting alpha radiation with a half-life greater than 20 years and with activity concentrations greater than 100 nCi/g will be characterized as TRU waste. TRU waste shall be managed in accordance with this plan, DOE O 435.1 (Admin. Chg. 1), and DOE M 435.1-1 (Admin. Chg. 2).

5.2.3 Mixed Waste

Waste containing both RCRA hazardous waste, as discussed in Section 5.4, and radioactive waste, as discussed in Section 5.2, shall be managed in accordance with the requirement for each respective component.

5.2.4 PCB/Radioactive Waste

PCB waste, regulated, as discussed in Section 5.3, that also contains radioactive waste, as discussed in Section 5.2, shall be managed in accordance with the requirement for each respective component; however, 40 *CFR* § 761.50 also provides the following guidance for PCB/radioactive waste:

> …if, taking into account only the properties of the PCBs in the waste (and not the radioactive properties of the waste), the waste meets the requirements for disposal in a facility permitted, licensed, or registered by a State as a municipal or non-municipal non-hazardous waste landfill (e.g., PCB bulk product waste under § 761.62(b)(1)), then the person may dispose of the PCB/radioactive waste, without regard to the PCB component of the waste, on the basis of its radioactive properties in accordance with all applicable requirements for the radioactive component of the waste.

5.3 PCB WASTE

The following categories of PCB wastes are defined in this plan (see definitions) and also may meet the definition of PCB radioactive waste.

5.3.1 PCB Articles

PCB articles (e.g., capacitors, transformers, electric motors, pumps, pipes) are regulated if the liquid/potting material contains PCBs greater than or equal to 50 ppm. These items are subject to marking, storage, treatment, and disposal requirements set forth in this plan and 40 *CFR* Part 761, *Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions*, Subparts C and D.

5.3.2 PCB Containers

Any container (e.g., B-25 box, intermodal, Sealand, bag, drum, or tank) that has been used to contain PCBs and whose surface(s) has been in direct contact with PCBs at a concentration greater than or equal to 50 ppm is subject to regulations until the container has been decontaminated in accordance with 40 *CFR* § 761.79. PCB containers used for PCBs either shall be decontaminated for reuse in accordance with 40 *CFR* § 761.79, disposed of in a chemical waste landfill, or incinerated in a high temperature incinerator. PCB containers used only for PCBs at a concentration of less than 500 ppm that is also radioactive waste, as discussed in Section 5.2, may be disposed of based solely upon the radioactive component of the waste (as discussed in Section 5.2.4).

5.3.3 PCB Bulk Product Waste

PCB bulk product waste (e.g., plastics, wire insulation, molded rubber parts, applied dried paints, adhesives, fluorescent light ballasts containing PCBs in the potting material) are regulated for disposal if the concentration of PCBs in the coating/plastic is greater than or equal to 50 ppm. For hard/dried coatings, plastics, rubber, and non-leaking ballast, 40 *CFR* Part 761, Subpart D, allows disposal in a state, licensed, municipal waste landfill (e.g., C-746-U Contained Landfill); however, *Kentucky Administrative Regulations* (*KAR*) (401 *KAR* 47:030 § 8) prohibit the disposal of PCB wastes at a concentration greater than 49 ppm. In KDWM correspondence dated August 11, 2008, KDWM provided regulatory guidance whereby a demonstration of the 49 ppm can be based upon the concentration of the PCBs using a representative sampling approach that allows consideration of both the coating and weight of the material (i.e., overall waste stream) to which the coating is applied. The concentration in the waste stream is

calculated based upon the concentration of PCBs in the coating multiplied by the estimated weight of the coating divided by the weight of the waste stream, including substrate materials removed.

5.3.4 PCB Remediation Waste

PCB remediation waste results from ongoing management of historical releases of PCBs and cleanup of PCB contamination around PGDP. This waste is regulated for disposal based upon identified method of accomplishment (e.g., if the project is being done under self-implementing authority for high occupancy use, the regulatory limit for PCB concentration is 1 ppm; however, if the project is being completed under CERCLA where a risked based concentration has been developed and approved by the EPA, the regulatory limit is this risk-based concentration). PCB remediation waste is characterized based upon the highest concentration removed from the cleanup. Phased cleanup can be utilized to minimize the generation of regulated PCB remediation wastes. PCB remediation waste greater than 500 ppm with potential for liquid separation shall be sent for high temperature incineration. Nonliquid PCB remediation waste with a concentration of less than or equal to 49 ppm may be disposed of in the C-746-U Contained Landfill.

5.3.5 PCB Decontamination

Debris and equipment identified may be decontaminated in accordance with 40 *CFR* § 761.79. Upon completion of the decontamination process, the debris and equipment (such as equipment used for the excavation of a PCB remediation site or for troughing activities) are not regulated for reuse and/or disposal. The decontamination solutions/residues are regulated for disposal in the same manner as the source. No equipment, including containers, shall be reused until it has been decontaminated in accordance with 40 *CFR* § 761.79.

Aqueous wastes containing PCBs also may be treated in accordance with 40 *CFR* § 761.79. Upon completion of the treatment process the wastewaters that meet Kentucky's water quality criteria may be discharged to the Kentucky Pollutant Discharge Elimination System (KPDES)-permitted Outfall 001. The treatment filters/residues are regulated for disposal in the same manner as the source.

5.3.6 PCB Spill Cleanup Residues

Wastes, such as absorbents, PPE, cleaning solutions, etc. resulting from PCB decontamination activities are characterized and managed in accordance with 40 *CFR* Part 761, Subpart D, requirements. These wastes result from the cleanup of spills of oils and liquids from PCB articles with PCB concentrations of 50 ppm or greater.

5.4 RCRA WASTE

RCRA hazardous waste (RCRA characteristic waste and RCRA listed waste) is fully defined in 40 *CFR* Part 261, *Identification and Listing of Hazardous Wastes*, and 401 *KAR* Chapter 31, *Identification and Listing of Hazardous Wastes*, and also may meet the definition of mixed waste. RCRA hazardous waste also is subject to the LDRs in 40 *CFR* Part 268 and 401 *KAR* Chapter 37.

5.4.1 RCRA Characteristic Waste

Wastes that exhibit one of the characteristics below are regulated as RCRA characteristic waste (40 *CFR* Part 261, Subpart C) and are specified with a D code:

- Ignitable (e.g., flashpoint < 140°F, oxidizer, ignitable compressed gas)
- Corrosive (e.g., pH < 2 or > 12.5, corrodes steel at ¼ inch per year)
- Reactive (e.g., explosive, cyanides, sulfides)
- Toxic [e.g., fail toxicity characteristic leaching procedure for lead, cadmium, chromium, trichloroethene (TCE), benzene, etc.]

5.4.2 RCRA Listed Waste

Wastes that are identified on one of the lists below are regulated as RCRA listed waste (40 *CFR* Part 261, Subpart D):

- F-List: nonspecific sources (e.g., spent solvents, plating operations)
- K-List: specific sources (no known at the PGDP)
- P-List: acute hazardous chemicals (e.g., unused epinephrine vials)
- U-List: toxic chemicals (e.g., unused TCE)

5.4.2.1 Environmental media that may contain a RCRA listed waste

Environmental media (e.g., soil, sediments, groundwater, and surface water) will be characterized and subsequently managed in accordance with Appendix A, Protocol for Management of Remediation Wastes at PGDP. The health-based levels identified in Appendix A originally were approved by KDWM in the 2003 Agreed Order and by EPA in correspondence dated March 5, 2009.

5.4.2.2 Debris that may be contaminated with a RCRA listed waste

Debris means solid material exceeding a 60 mm particle size that is intended for disposal and that is a manufactured object; plant or animal matter; or natural geologic material. The following materials are not debris: any material for which a specific treatment standard is provided in 40 *CFR* Part 268, Subpart D, namely lead acid batteries, cadmium batteries, and radioactive lead solids; process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludges, or air emission residues; and intact containers of hazardous waste that are not ruptured and that retain at least 75% of their original volume. A mixture of debris that has not been treated to the standards provided by 40 *CFR* § 268.45 and other material is subject to regulation as debris if the mixture is comprised primarily of debris, by volume, based on visual inspection. Debris associated or contaminated with environmental media will be characterized and subsequently managed in accordance with Appendix A. The health-based levels identified in Appendix A originally were approved by KDWM in the 2003 Agreed Order and by EPA in correspondence dated May 19, 2009.

5.4.2.3 Related waste that may contain or be contaminated with a RCRA listed waste

Waste generated as a result of handling/sampling/management of environmental media and/or associated debris (e.g., investigation derived waste and PPE) will be managed in accordance with Appendix A.

5.4.3 RCRA Mixture Rule

When a solid waste is mixed with a hazardous waste, the resultant mixture must be managed as a hazardous waste. If the hazardous waste was characteristic or listed solely because of ignitability,

corrosivity or reactivity, then the resultant mixture is hazardous only if it continues to exhibit the characteristic of the hazardous waste. The mixture rule, including exemptions or exceptions to the rule, is addressed in 401 *KAR* 31:010 § 3 and 40 *CFR* § 261.3.

5.4.4 RCRA Derived-from Rule

When a solid waste is derived from RCRA hazardous waste (e.g., treatment residues or residues remaining in tanks or containers), the resultant waste is a hazardous waste. Similar to the mixture rule, if the hazardous waste was characteristic or listed solely because of ignitability, corrosivity, or reactivity, then the derived-from waste is hazardous only if it continues to exhibit the characteristic of the hazardous waste. The derived-from rule, including exemptions or exceptions to the rule, is addressed in 401 *KAR* 31:010 § 3 and 40 *CFR* § 261.3.

A key exception to the derived-from rule is the concept of "exempt in, exempt out." That is, if a waste is exempt from hazardous waste management standards, such as groundwater that no longer contains TCE listed waste, residues generated from its treatment, storage, or disposal also are exempt from regulation [58 *FR* 15286, March 22, 1993]. This concept is the basis for characterizing environmental media and associated debris discussed in Section 5.4.2 and further specified in Appendix A.

5.4.5 Treated Hazardous Waste

In some cases, wastes that were hazardous when first generated, but have been treated to eliminate the characteristic or have been deemed no longer to contain a hazardous waste, remain subject to the RCRA LDRs (see Appendix A; 401 *KAR* 37:040 § 10; and 40 *CFR* § 268.49).

5.4.6 Key RCRA Exemptions

- Universal wastes (i.e., batteries, light bulbs, thermostats, and pesticides) that have been authorized for free release can be sent for recycling. If sent for recycling, they are exempted from hazardous waste regulations provided they are marked as "Universal Waste" and sent for recycling within one year of accumulation.

- Used oil is any oil refined from crude oil or any synthetic oil that has been used and because of such use is contaminated by physical or chemical impurities. This includes lubricants, coolants, emulsions, etc. It does not include oil-based products used as solvents refined from crude oil or manufactured from synthetic materials. If recycled pursuant to 40 *CFR* Part 279, *Standards for the Management of Used Oil*, used oil is exempted from hazardous waste management requirements; however, it must meet DOE O 458.1 if it originates from within the Controlled Area RCRA wastewaters generally are treated on-site under the RCRA Wastewater Treatment Unit (WWTU) exemption provided they meet the WAC of the on-site treatment facility. The WWTU exemption is discussed further in Section 8 of this WMP.

- Area of Contamination (AOC) Policy. In what typically is referred to as the AOC policy, EPA interprets RCRA to allow certain discrete areas of generally dispersed contamination to be considered RCRA units (usually landfills). Because an AOC is equated to a RCRA land-based unit, consolidation and *in situ* treatment of hazardous waste within the AOC do not create a new point of hazardous waste generation for purposes of RCRA. This interpretation allows wastes to be consolidated or treated *in situ* within an AOC without triggering LDRs or minimum technology requirements. Treatment standards for *in situ* treatment or consolidation are established in the record of decision for each AOC. The AOC interpretation may be applied to any hazardous remediation waste (including non-media wastes) that is in or on the land. Note that the AOC policy only covers consolidation and

other *in situ* waste management techniques carried out within an AOC. The use of the AOC concept requires approval from KDWM, and for CERCLA projects, EPA as well.

5.5 ACM

ACM is defined in this plan (see definitions). The removal of asbestos is regulated under 40 *CFR* Part 61, *National Emissions Standards for Hazardous Air Pollutants*, Subpart M.

6. WASTE CHARACTERIZATION

Waste characterization activities at PGDP shall incorporate and follow the requirements of DOE O 435.1 (Admin. Chg. 1), state and federal regulations/guidance, FRNP requirements, and the respective WAC for receiving facilities. Wastes generated will be characterized to determine proper storage requirements, to establish disposal path, to demonstrate that the waste meets the above stated requirements, and also to follow the protocol established in Appendix A.

6.1 PROCESS KNOWLEDGE-BASED DETERMINATIONS

Historical data exists that include information regarding physical form of material, construction of material, the nature of radioactivity present and/or details of the process(es). Historical data can be found about uranium materials, chemical trapping materials, ACM, PCBs, and other chemical hazards such as Freon, hydrocarbons, strong oxidizing agents, and arsenic. Estimates of waste can be calculated using building drawings, engineering designs or other documents that contain dimensions and specifications. Additional data can include radiological surveys, past intrusive sample data, technical basis documents, and/or performance data. All of this information can be considered Process Knowledge (PK). This information shall be traceable and documented.

PK-based determinations will be utilized for many waste streams and waste forms at the site. Throughout the waste characterization process, FRNP will employ subject matter experts for technical support in areas such as waste characterization, packing, form completion, and shipping. PK-based determination includes the following:

- Generator knowledge of waste streams and materials,
- Waste analysis data obtained from previous projects at PGDP or from other facilities, and
- Knowledge of the waste matrix.

6.1.1 Generator Process Knowledge of Waste Streams and Materials

PK may be used to demonstrate that the generating process was well documented and controlled and did not involve the use or generation of any materials that could result in the waste being regulated. Conversely, PK may provide all the necessary information to properly identify wastes as RCRA hazardous, MLLW, PCB, ACM, or combinations thereof. When PK is not sufficient to identify all RCRA waste codes and or the regulatory status with regard to TSCA or ACM, sampling and analyses will be employed. Past processes will be evaluated by collecting the following information: the raw materials used in the process, the chemistry and physics of the process, and the product and/or wastes produced during the process. Personnel who were involved during past or ongoing operations will be sought to provide the knowledge base. Historical documents such as process drawings and operating logs will be obtained to supplement PK.

In some cases, PK is most appropriate. DOE and EPA have issued guidance (*Waste Analysis at Facilities that Generate, Store, Treat, and Dispose of Hazardous Wastes*, Office of Solid Waste and Emergency Response 9938.4-03) that discusses the appropriate application of PK for the characterization of mixed waste. The guidance states that PK is most appropriate for waste characterization when one or more of the following conditions exist.

1. Collection of representative samples from a waste stream is difficult due to its physical nature. This applies to solid matrices such as metals, glass, or wood materials.

2. Waste collection and analysis of material would result in an unacceptable risk of radiation exposure. DOE and Nuclear Regulatory Commission policy requires that exposure to hazardous material must be maintained as low as reasonably achievable (ALARA) (the use of ALARA means to optimize the activity, not that the exposure has to be zero).

3. Waste is heterogeneous in composition to the extent that collecting a representative sample is difficult.

6.1.2 Waste Analysis Data Obtained from Previous Projects

For waste streams and materials inherently similar by nature, FRNP may rely on previous analytical data to make waste determinations.

6.1.3 Knowledge of the Waste Matrix

The physical characteristics of the waste matrix may preclude the waste from exhibiting certain properties. For example, by definition, a nonliquid waste matrix is not capable of exhibiting the RCRA characteristic of corrosivity. Similarly, bulk structural steel with virtually no absorptive capacity will not fail RCRA toxicity characteristic testing (provided no surface coatings have been applied). For coated materials, knowledge of the composition of the coating may be sufficient to make a waste determination.

6.2 FIELD SCREENING

As discussed further below, field screening must be conducted for compliance with health and safety procedures. These field screenings, along with any supplemental screenings, may be used to provide additional support for knowledge-based determinations. Field screenings often may be suitable to demonstrate a material is regulated (i.e., LLW, MLLW, RCRA, and TSCA). Field screenings also may be suitable to demonstrate a material is not regulated provided the detection limits are below regulatory levels of concern. Field screening must have sufficient quality to ensure data meets data quality objectives (DQOs).

6.2.1 Field Screening for Radioactive Materials

Radiological Protection (RP) conducts radiological screening by emission type and physical condition. In general, RP determines fixed, loose, and total contamination levels for either alpha or beta/gamma radiation. Waste Disposition uses radiation surveys generated by RP to characterize surface contaminated objects (SCO) for conformance to DOE O 458.1 (Admin. Chg. 3), DOE O 435.1 (Admin. Chg. 1), C-746-U Contained Landfill ALs for waste disposal, and to the U.S. Department of Transportation (DOT) limits for SCO-I and SCO-II wastes and for contamination control.

6.2.2 Field Screening for Volatile Chemicals

Industrial hygiene conducts field screening of materials and containers to determine compliance with occupational exposure regulations. Typical equipment includes total vapor meters (photoionization detectors) and detector tubes. Waste Disposition may use this information to determine the presence or absence of specific contaminants based on the detection capabilities of the devices.

6.2.3 Field Screening for PCBs

Waste Management conducts field screening of PCBs in oils. Waste Management uses EPA's Method 9079 to screen for the presence of PCBs. If the screening kit indicates the possible presence of PCBs, samples are collected to quantify the concentration.

6.2.4 Field Screening for Lead

Waste Management uses lead test kits as a qualitative indicator of the presence and the relative abundance of lead on pieces of debris. Lead solids are declared RCRA hazardous for waste code D008. Debris with lead solder is characterized based on the amount of solder relative to the total mass of the piece of debris.

6.2.5 Field Screening for pH

Waste Management conducts field screenings of liquids for pH using pH test strips or pH meters. If pH is close to the regulatory action levels of RCRA, the liquid is sampled and tested for pH at a DOE-audited laboratory.

6.3 SAMPLING AND ANALYSIS

The sampling and analysis process is designed to generate objective data of known quality to support decision-making regarding the regulatory status and management requirements for waste and materials. The DQO process is utilized to establish the quality and quantity of data required to satisfy decision-making needs. CP3-ES-5003, *Quality Assured Data*, establishes that all data released for decision making and/or external use have received adequate quality assurance reviews. CP2-QA-1000 ensures that QA requirements are implemented on a consistent and appropriate basis throughout data gathering activities.

Project-specific sampling and analysis plans (SAPs) will provide the direction for specific sampling activities. SAPs reference standard operating procedures to implement specific sampling requirements and are written generically to cover sampling activities that follow the same protocol during each sampling event.

6.3.1 Sampling Protocol

The plan for sample collection must be responsive to both regulatory and scientific objectives. Determinations of whether a waste material should be categorized as a RCRA/TSCA waste shall be based on the specifications defined in SW-846, *Test Methods for Evaluating Solid Waste Physical/Chemical Methods*, Chapter Nine, latest revision.

The waste characterization process relies upon collecting samples that exhibit on average, the properties of a whole population. Sampling accuracy is dependent upon collecting unbiased samples from a population. Three forms of random sampling will be utilized for waste determinations: (1) simple random sampling, (2) stratified random sampling, and (3) systematic random sampling.

On occasion, with approval from the Waste Management manager or designee, judgmental sampling (i.e., biased sampling) can be used for waste determinations if supplemented by PK and/or if the sample(s) taken for waste determinations are based on screening data/information (surveys/staining) that indicates the area sampled has a high probability of conservatively addressing contaminants of concern. To characterize waste populations, this method shall be scrutinized because of the following:

- Potential for having higher life-cycle costs from sampling through disposition if the sample result causes waste to have a different characterization and disposition pathway than unbiased sampling;
- Can cause false high loading of contaminants being tracked in landfill(s); and
- Can cause discrepancies in material accountability (particularly with large waste streams).

6.3.2 Statistical Evaluation of Sampling Data

Statistical inference may be used to support waste characterization decision making. RCRA regulations and guidance generally require that waste generators determine with statistical confidence of 90% (one-sided) or greater to determine if specified parameters of concern for a given population exceed a regulatory threshold (e.g., toxicity characteristic determinations).

Some regulatory programs do not specify required confidence levels for demonstrating compliance with respect to a numerical threshold (e.g., TSCA regulations). When statistics are used to support waste characterization decisions, regardless of regulatory drivers or lack thereof, guidance found in CP3-WM-0437, *Waste Characterization and Profiling*, shall be used. This guidance includes evaluation of sample distributions (e.g., normal, lognormal, etc.), treatment of nondetect values for RCRA/TSCA determinations, how to report radiological data and associated error, treatment of duplicate analysis, and how to form a 90% confidence limit.

6.3.3 DQO Process

The DQO process addresses data quality indicators to support the generation of data of known quality. The process will be elaborated on within project-specific SAPs and QA plans.

6.3.4 Evaluation of Data

Analytical data will be assessed per CP3-ES-5003, *Quality Assured Data*, and any further requirements specified within a project-specific QAPP. Data also may be selected to undergo a third party, independent validation. Once the data have been assessed/validated, summary statistics will be developed to support decision making. For decisions that require comparison with a regulatory threshold, a 90% confidence limit will be applied. Based on this evaluation the waste will be assigned specific handling, packaging, treatment, and disposal procedures.

6.4 NONDESTRUCTIVE ASSAY

Where applicable, FRNP 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 utilized effectively for waste characterization to meet the requirements of CP2-WM-0011; CP3-WM-3025, *Preparation and Processing of Paducah Landfill Packages*; and/or off-site TSDF WAC. NDA measurement data may be used if it originates from a DOE-Approved Quality System for nondestructive Assay Program and proper verification of data usability, via visual examination and/or physical weight comparisons with like components, has taken place.

6.5 PROFILE DEVELOPMENT

FRNP shall develop broad profiles for sitewide application to the greatest extent practical. These profiles will be based on waste generation and physical, chemical, and radiological characteristics. Each project will develop container specific waste identifications for each waste stream 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.

6.6 WASTE PACKAGE CERTIFICATION

FRNP shall certify waste as meeting waste acceptance requirements at the applicable receiving facility prior to being transferred to the receiving facility. This certification shall be performed in accordance with CP3-QA-2501, *Waste Certification*, for NNSS waste and/or CP3-WM-3028, *Off-site Shipping*, for other TSDFs.

6.7 WASTE CHARACTERIZATION PROCESS

The waste characterization process establishes requirements for the physical, chemical, and radiological characterization of all wastes produced. This process is provided in CP3-WM-0437.

6.8 NNSS COMPLIANCE PLAN

The *Four Rivers Nuclear Partnership, LLC. Paducah Deactivation and Remediation Project Nevada National Security Site Waste Acceptance Criteria Implementation Crosswalk (NIC) for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, CP2-QA-2500, demonstrates that programmatic compliance with specified requirements (key elements of the NNSS WAC) has been evaluated. The NIC is a tool to help generators evaluate their program documents for compliance with the NNSS WAC. Implementation of FRNP's QA Program and applicable procedures, processes, or methods referenced in the NIC ensures compliance with NNSS WAC requirements. The WCO reviews and submits the NIC through DOE annually to ensure referenced data are current.

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7. WASTE STAGING AND STORAGE

FRNP will utilize IWTS for cradle-to-grave tracking of wastes and recyclables. Each item or container in the database is identified by a unique tracking number and its on-site storage location; upon off-site shipment, the final destination and shipment details are included in the database. The information maintained is part of the RCRA Operating Record.

7.1 WASTE PACKAGING

Waste generation triggers requirements for the development and approval of work instructions for waste packaging. The waste packaging work instructions shall reference waste packaging procedures, which include the following:

- Roles and responsibilities;
- Container selection, inspection, and preparation, including use of absorbents;
- Waste preparation, including removal of prohibited items, sorting, and segregating;
- Waste packaging, container closure, security, and storage (application of intrusion indicating devises/tamper indicating devices);
- Consolidating waste containers to the extent practicable to minimize the number of shipments;
- Ensuring container types are appropriate for the physical properties of the wastes (e.g., bulk containers for bulk wastes, liquid rated containers for liquid wastes, vented containers for potentially flammable wastes);
- Ensuring container types are compatible with the chemical properties of the waste (e.g., corrosives, reactives, etc. may require liners);
- Ensuring that incompatible wastes are not placed in the same container;
- Ensuring that containers holding hazardous waste that is incompatible with wastes or materials stored nearby is separated from the other materials or protected from them by means of a dike, berm, wall, or other device;
- Ensuring container types are appropriate for the radiological properties of the wastes (e.g., IP-1, IP-2, Type A requirements); and
- Ensuring security requirements are satisfied.

The container management group purchases and leases DOT shipping containers based on the requirements and needs of the generator. The QA or Waste Certification is responsible for the receipt inspection of new DOT containers in accordance with CP3-QA-2500, *Procurement, Inspection and Management of Items Critical for Paducah Off-Site Waste Shipments*.

The QA or Waste Certification is responsible for the receipt inspection of the first time use of reusable DOT containers and Waste Management is responsible for pre-service inspection for subsequent reuse of these containers. Receipt inspection is the process of verifying that the containers meet the manufacturer's design specifications. QA also maintains the list of approved vendors and verifies that the vendor's quality program meets DOT requirements.

7.2 CONTAINER MANAGEMENT AND TRACKING

FRNP shall develop and implement a centralized container management function. All containers will be procured by container management per generator request, approved container specification and from the most cost effective container manufacturers.

Container contents are recorded at the point of generation and the status and location of the container is tracked through on-site movement, storage, on-site treatment or disposal, or off-site shipment.
A unique waste container identification number is assigned to each waste container used at FRNP. As the status and/or location of waste containers change, updates to the container tracking must be made accordingly. Once filled, additional information must be tracked using the Waste Item Container Log, including the following:

- Date packaged;
- Waste type (LLW, MLLW, TSCA LLW, RCRA, TSCA, etc.);
- Waste weight, gross weight;
- Waste codes (as applicable by PK or analytical data);
- Waste description (including physical form);
- Waste location; and
- Radionuclides (as applicable by PK or analytical data).

Shipment information shall be tracked, including shipment number, date, and destination. FRNP uses one site database for container tracking. In all cases, container-tracking information shall be maintained in IWTS. Projects may utilize temporary staging areas (i.e., 90-day areas, satellite accumulation areas, etc.) to temporarily stage waste. It is the projects responsibility to track waste accordingly and perform the necessary inspections and maintain the waste compliantly—see Staging and Accumulation Areas of this WMP.

7.3 CONTAINER MARKING, LABELING, AND POSTING

Containerized waste will be marked and labeled indicating the type of waste (e.g., hazardous waste, PCB, radioactive) in accordance with CP2-WM-0011, *Waste Acceptance Criteria for the Treatment, Storage, and Disposal Facilities at the Paducah U.S. Department of Energy Site*, and CP3-WM-3015, *Waste Packaging*.

7.4 STAGING AND ACCUMULATION AREAS

Waste accumulation and storage is performed in accordance with CP3-WM-1037, *Generation and Temporary Storage of Waste Materials*. FRNP will maximize the use of satellite storage areas, satellite accumulation areas, and 90-day storage areas in lieu of transferring waste to the waste storage facilities.

7.4.1 Satellite Accumulation Areas

Projects/generators may accumulate up to 55-gal of hazardous waste or mixed waste (or 1 quart of acutely hazardous waste) per waste stream at or near the point of generation. Once this limit has been reached or the generation of this waste is complete, the container(s) either shall be transferred to a 90-day storage area within 48 hours, to an on-site TSDF or, in some cases, directly to an off-site TSDF. A waste representative(s) shall work with each project/generator in the establishment and management of satellite accumulation areas.

7.4.2 Generator Staging Areas

Projects/generators may accumulate nonhazardous waste or radiological waste to stage for shipment. A waste representative(s) shall work with each project/generator in the establishment and management of generator staging areas (GSAs). The staging time frames shall not exceed the requirements set for in DOE M 435.1 (Admin. Chg. 2) and documented safety analysis (DSA).

7.4.3 90-Day Accumulation 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 or directly to an off-site TSDF. A waste representative(s) shall work with each project/generator in the establishment and management of 90-day storage areas and ensure waste is transferred from the areas within the allowed accumulation time.

7.4.4 30-Day Temporary TSCA Storage Areas

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 either must be transferred to an on-site TSDF or directly to an off-site TSDF. A waste representative(s) shall work with each project/generator in the establishment and management of 30-day temporary areas for PCB waste and ensure waste is transferred from the areas within the allowed storage time.

7.4.5 Universal Waste Storage

As a universal waste generator/handler, FRNP may accumulate universal waste for no longer than one year from the date the universal waste is generated or received from another handler. A waste representative(s) shall work with each project/generator in the establishment and management of universal waste storage areas and ensure universal waste is transferred from the areas within the allowed accumulation time.

7.4.6 CERCLA Storage

Section 121(e)(1) of CERCLA exempts on-site CERCLA actions from obtaining permits for management of waste. CERCLA still requires management of these wastes in accordance with the substantive requirements of ARARs. The CERCLA decision documents 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 AOC, as discussed further in Section 5.4.5; and

- Establishment of staging piles and temporary units for remediation waste; any utilization of staging piles or temporary units will be addressed on a project-specific basis.

7.4.7 Temporary Units

CERCLA hazardous waste may be stored in "temporary units" in tanks or containers, if they are described in a work plan. A temporary unit must be located within the contiguous property under the control of the owner/operator where the wastes to be managed in the temporary unit originated. For temporary units, the EPA Regional Administrator may replace the design, operating, or closure standard applicable to these units with alternative requirements that protect human health and the environment.

7.4.8 Staging Piles

CERCLA hazardous waste and/or PCB waste may be stored in a "staging pile," if waste is solid, nonflowing remediation waste (as defined in 40 *CFR* § 260.10). A staging pile must be located within the contiguous property under the control of the owner/operator where the wastes to be managed in the staging pile originated. The staging pile must facilitate a reliable, effective, and protective remedy. The staging pile must be designed so as to prevent or minimize releases of hazardous wastes and hazardous constituents into the environment, and minimize or adequately control cross-media transfer, as necessary to protect human health and the environment (for example, through the use of liners, covers, runoff/run-on controls, as appropriate). The staging pile must not operate for more than two years for hazardous waste; however, the regional administrator can authorize a 180-day extension. PCB remediation wastes may not be stored longer than 180 days.

7.4.9 Inspections of Staging and Accumulation Areas

Inspections of temporary storage locations shall be conducted in accordance with CP3-WM-1037, *Generation and Temporary Storage of Waste Materials*. These inspections include checking postings, labels, container integrity, and general housekeeping. Each project is responsible for assignment of inspectors for these areas.

7.5 INVENTORY CONTROL FOR WASTES

Inventory controls for specific permanent waste management facilities (as defined by the nuclear safety basis document) must be implemented in accordance with CP2-WM-0006, *Facility Safety Basis Inventory Control Plan for Paducah Waste Storage Facilities*. Other facility-specific inventory controls may apply to facilities not addressed in CP2-WM-0006. These other inventory controls shall be equivalent and implemented by the facility manager.

The IWTS database has the capability to track waste and associated characterization information, and it also has the capability to perform safety basis calculation and track nuclear and chemical inventory per building to ensure assigned thresholds are not exceeded. Use of the safety basis inventory control aspects of IWTS shall include appropriate validation against existing programs/systems currently used for inventory control. The IWTS shall be approved by the nuclear safety program manager prior to use for this function.

7.5.1 Inventory Control for Wastes Destined for Off-Site Disposition

The Waste Management group assigns a unique inventory number to containers prior to waste packaging. This inventory number is unique to the waste packaged in the container and allows reuse of shipping containers. For waste disposed of off-site, Waste Management tracks the inventory from packaging to transport to the off-site facility and the transportation group tracks the waste through treatment and disposal and maintains required records associated with waste packages until the project is complete. Waste containers shipped to off-site disposal sites shall be tracked using the IWTS database.

For shipments with enriched material (greater than or equal to 0.7121 wt.% U-235) with greater than 0.5 g total uranium or depleted material (less than 0.7121 wt.% U-235) with greater than 500 g total uranium, a tally out form is provided in accordance with CP3-NM-3001, *External Shipments and Receipts of Nuclear Material.*

7.5.2 Inventory Control for Wastes Destined for the C-746-U Contained Landfill

Waste destined for disposal at the C-746-U Contained Landfill is controlled in accordance with CP3-WM-3025, *Preparation and Processing of Paducah Landfill Packages*. Per this procedure, the Facility Manager is responsibly to sign off on each landfill package prior to its acceptance for disposal. Inventory numbers are assigned based on the request for disposal number. Waste containers shipped to the C-746-U Landfill shall be tracked using the IWTS database.

7.6 STORAGE FACILITIES

Waste Management storage facilities are used to not only store waste containers but are also used to sort, segregate, survey, and repackage waste. Shipments directly from GSA (milk runs) shall be used to optimize waste shipments to off-site TSDFs only as necessary. If necessary, this shall be performed in accordance with the approved WAC and the HWFP. Routine inspections of waste storage areas/facilities are performed in accordance with CP3-WM-0023, *Inspection of DOE Waste Storage Facilities and Tanks*, and the HWFP, as applicable.

The HWFP and WAC (CP2-WM-0011) specify the waste streams and treatment methods acceptable (see Section 8 of this Plan), respectively, at the hazardous waste facilities. The primary waste storage facilities at the PGDP include the following:

- C-733—This permitted facility is used to store LLW, mixed waste, PCB waste, and hazardous waste. This facility is the only facility authorized to store ignitable hazardous waste with a flash point less than 100°F.

- C-746-B1—This gravel pad is a waste staging area located west of C-746-A. The gravel pad is used to store scrap metal, pallets, etc. for size reduction prior to going for disposal.

- C-746-H3—This facility is used to temporarily stage LLW, recyclable scrap metal, PCB waste, solid waste capable of meeting the Agreed Order for disposal at the C-746-U Contained Landfill. This facility is used to facilitate sorting and segregation activities.

- C-746-Q—This permitted facility is used to store LLW, TRU waste, greater than Class C waste, classified waste, mixed waste, PCB waste, hazardous waste, and fissile material. Waste in this facility may be treated with absorbents to remove free liquids, repackaged (including sorting/consolidating to

facilitate shipment), overpacked, or analyzed using NDA. This facility is also permitted for treatment, sampling, and repackaging of certain PGDP RCRA waste.

- C-746-Q1—This is not a permitted facility. This facility is used to store empty containers. It can be used to store nonhazardous fissile material or LLW.

- C-746-V—This outside gravel pad is a waste staging area. LLW and solid waste is temporarily stored here.

- C-752-A—This permitted facility is used to store LLW, mixed waste, PCB waste, waste water and hazardous waste. Hazardous waste treatment, sampling, and repacking occur at this facility. The facility also serves as the pollution prevention waste minimization consolidation center. This facility may store ignitable waste with a flash point greater than 100°F. Waste water treatment activities also occur in this facility.

- C-753-A—This facility is used to store LLW and PCB waste. Spare equipment and storage of empty containers also occur in this facility.

- C-754—This facility is used to store LLW temporarily. This facility is used to facilitate sorting, segregation, and packaging activities.

- C-757—This facility is used to temporarily store LLW, mixed waste, and hazardous waste. This facility houses a RCRA 90-day accumulation area. This facility is used to facilitate sorting, sampling, and segregation activities. C-759—This gravel pad is a staging area for waste staging and processing of LLW in preparation of disposal.

- C-760—This gravel pad is a 90-day accumulation area primarily for sanitary/industrial waste identified for the on-site landfill.

- C-761—This gravel pad is a staging area for inbound and outbound shipments to and from the Paducah site.

- C-335 Nuclear Criticality Safety (NCS) Area—This area is used to store fissile and potential fissile waste material awaiting further characterization.

- C-301—This facility can be utilized to stage material for processing (primarily size-reduction) prior to off-site shipment.

8. TREATMENT

Wastewaters generated at the PGDP (e.g., landfill leachate, well development/purge waters, runoff surface waters, and decontamination solutions) generally are treated at on-site facilities permitted under the Clean Water Act (CWA), specifically the KPDES permit (No. KY0004049).

In most cases, FRNP will elect to manage wastewaters that carry a hazardous waste listing or hazardous characteristic in an on-site KPDES permitted unit that qualifies for the Wastewater Treatment Unit (WWTU) exemption [see 401 *KAR* 34:010 and 40 *CFR* § 264.1(g)(6)]. Following are the key qualifications for the WWTU exemption:

- Aqueous solutions must be wastewater, generally assumed to be wastes that "are substantially water with contaminants amounting to a few percent at most."

- Unit must be subject to the CWA (i.e., KPDES permitting program).

- Unit must meet the definition of a "wastewater treatment unit," as defined in 40 *CFR* § 260.10 (i.e., meets the definition of tank or tank system in 40 *CFR* § 260.10).

EPA has not promulgated a definition of wastewater, but has addressed this issue under guidance.

These wastewaters are required to be discharged at an authorized KPDES outfall flume, whereupon the hazardous waste listings and LDR treatment standards are RCRA-exempt as a point-source discharge [401 *KAR* 31:010 § 4(1)(b) and 40 *CFR* § 261.4(a)(2)]. Direct discharges or point-source discharges are from sources such as pipes and sewers. Section 502 of the CWA defines a "point source" as any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure. The term "discharge" when used without qualification includes a discharge of a pollutant and a discharge of pollutants.

Wastewaters derived from environmental media (e.g., groundwater) that have been deemed to no longer contain a listed hazardous waste (see Appendix A, Protocol for Management of Remediation Wastes at the PGDP) may be eligible for management in impoundments permitted under the KPDES program provided the wastewater LDRs are met. Any such wastewaters that have been declared to no longer contain a listed waste, but still exceed the wastewater LDR of 0.054 mg/L TCE or 1,1,1-trichloroethane (TCA), cannot be managed in a surface impoundment and, consequently, are required to be managed in containers for off-site disposal or a WWTU (i.e., a tank or tank system).

Environmental media-related waste streams that have been deemed neither to be derived from nor mixed with a listed hazardous waste may be managed in impoundments permitted under the KPDES, because neither a hazardous listing nor an LDR has attached to the waste stream, provided they do not exhibit a characteristic.

Other nonhazardous wastewaters (e.g., runoff, decant, decontamination solutions) may be discharged directly to KPDES-permitted Outfall 001, if water quality criteria are met. If the water quality criteria are not met, these wastewaters may be treated on-site to meet KPDES-permit limits prior to discharge.
Non-wastewaters and other wastes generated at the Paducah Site and legacy wastes may require treatment to meet RCRA LDR treatment standards and/or disposal facility requirements, eliminate a hazardous characteristic, or to comply with DOT regulations for transportation of specific materials.

RCRA treatment authorized under the Paducah Site hazardous waste permit includes neutralization, oxidation, reduction, precipitation, and stabilization in containers. Waste requiring RCRA treatment not covered by the existing hazardous waste permit may require off-site treatment unless the permit is modified or such treatment is authorized by a CERCLA decision document.

The decision to treat waste on-site versus shipping to an off-site commercial or DOE facility must be evaluated based on several factors, including these:

- Can the waste be handled and managed on-site in a safe and compliant manner under existing permits and facilities?

- Does the option of treating waste on-site represent a cost savings over off-site treatment?

- Does the schedule required to treat the waste on-site meet regulatory commitments (e.g., Federal Facility Compliance Agreements, DOE Orders)?

- For CERCLA projects, consideration of the nine criteria contained in 40 *CFR* § 300.430(e)(9)(iii) and the CERCLA off-site rule, as provided in 40 *CFR* § 300.440, also are required.

Wastes acceptable for neutralization, precipitation, oxidation, reduction, stabilization, 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 the C-746-Q facility or recycled through an off-site recycler for mercury reclamation. 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 only at C-746-Q, C-752-A, or C-733. Treatment at the hazardous waste storage/treatment facilities must be in accordance with applicable conditions and requirements of the HWFP. The HWFP and WAC (PAD-WD-0011/CP2-WM-0011) specify the waste streams and treatment methods acceptable, respectively, at the hazardous waste facilities.

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. Use of a commercial TSDF [e.g., Energy*Solutions*, Perma-Fix, and Waste Control Specialists (WCS)] may be requested for waste streams meeting the exemption criteria in DOE O 435.1 (Admin. Chg. 1). Hazardous waste that does not contain a radioactive component may be packaged and shipped to an appropriate commercial TSDF (e.g., Clean Harbors, Heritage Environmental, Onyx, WCS). Hazardous waste containing residual amounts of radioactive material that has an approved DOE AL may be treated and disposed of at an FRNP-approved nonradioactive licensed facility. ALs for lube oil and transformer oil has been approved by DOE for thermal destruction at Clean Harbors, Deer Park, Texas, and Veolia in Port Arthur, TX. Waste management facilities are considered critical suppliers and must be approved by FRNP for waste acceptance.

Off-site treatment may occur at any of the designated off-site disposition facilities discussed in Section 9 of this WMP or at off-site treatment facilities such as the Perma-Fix Diversified Scientific Services, Inc., (DSSI) facility in Oak Ridge, Tennessee, under the DOE Treatment Basic Ordering Agreement (BOA).

8.1 WASTE DISPOSITION

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 memorandum). 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 and 40 *CFR* § 300.440.

CERCLA Project wastes, including all secondary wastes, such that the waste disposal is ongoing during the remediation/removal activity, all waste disposal is required to be completed within 45 days after the completion of the remedial/removal process, and waste disposal is completed prior to submittal of the D1 Remedial Action Completion Report or D1 Completion Notice to DOE.

Each waste type has unique disposal or treatment requirements, which are dictated by state and federal regulations and TSDF WAC. Waste disposition characterizes each waste stream to determine the applicable pathway for treatment/disposal. Factors that influence the final waste disposition pathway include these:

- Safety
- Packaging options
- Transportation options
- TSDF compliance history
- TSDF permit and license status
- Overall value to the government
- Schedule

8.2 DISPOSITION OF WASTEWATERS

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 disposal in the C-746-U Contained Landfill or at off-site locations like Energy*Solutions* or NNSS.

- Wastewater storage tank cleanout water/rinseate. Rinseate collection accounts for a sizeable portion of the wastewater inventory. Because tanks are reused, they must be cleaned out between uses to prevent cross contamination.

- Individual on-site project generated wastewater. On-site projects [e.g., decontamination and decommissioning projects] may generate wastewater without establishing a treatment system at their location. This wastewater may be collected and treated as part of the waste operations/disposition scope. The project that generates this wastewater covers the cost of the on-site treatment and disposal.

In some instances, projects may coordinate with waste disposition wastewater subject matter expert(s) and Regulatory Compliance to treat and dispose of wastewater from their locations.

Wastewater that is collected for treatment and disposal by waste management is transported to storage in C-733, C-753-A, C-752-C, and C-752-A (the only heated permitted facility) for storage prior to discharge.

All wastewater is sampled for discharge determination. If the wastewater does not meet KPDES limits, the wastewater may be treated on-site through a carbon filtration system designed to remove PCB contaminants and solids to meet discharge protocols. Other types of wastewater contamination include radionuclides, metals, oil, and grease. If radiological contamination is in the solids, the treatment unit may be able to treat the water below KPDES limits and thus may be discharged on-site without further treatment. In cases where the radiological contamination is elevated above release criteria, the radioactive metals may be precipitated and filtered to separate the metals from the water. This treatment must be verified by analysis and approval for discharge supplied by regulatory compliance personnel and the Environmental Radiological Protection Program Manager or designee.

Wastewaters containing radionuclides discharged to the environment will be characterized, consistent with the potential for on- and off-site impacts. An assessment of radiological consequences, as necessary, to demonstrate compliance with the requirements of DOE O 458.1 (Admin. Chg. 3), shall be conducted.

Leachate from the C-746-U and C-746-S Landfills currently is treated at the C-746-U Leachate Treatment System for discharge through Outfall 020. In an event where an alternate treatment to the C-746-U Leachate Treatment System is needed, there are two alternatives for dealing with the leachate. The first alternative is treatment at the C-615 Wastewater Treatment Facility with discharge to KPDES-permitted Outfall 008. If the leachate does not meet the C-615 WAC or if the C-615 facility does not have sufficient capacity, the second alternative is for the leachate to be treated in the C-752-A carbon filtration system with discharge to KPDES-permitted Outfall 001.

Hazardous waste leachate from the closed C-404 Landfill shall be stored at C-752-A pending a decision on waste disposition. Options for disposition of C-404 leachate may include treatment in the C-752-A carbon filtration system and discharge to KPDES-permitted Outfall 001, which may or may not include a step for uranium precipitation depending on analytical results, or the leachate may be shipped off-site to a permitted facility for treatment and disposal.

8.3 DISPOSITION OF SOLID WASTES

The C-746-U Landfill is the preferred disposition path for all waste meeting the CP2-WM-0011 WAC for the facility. In addition, PGDP has an approved ALs process for the C-746-U Landfill for requesting disposal of soil and debris waste with residual radioactive contamination from construction, maintenance, environmental restoration, and decontamination and decommissioning activities.

8.4 DISPOSITION OF ASBESTOS WASTES

ACM waste meeting the WAC for the C-746-U Landfill may be disposed of via ALs or no-rad-added determination at the C-746-U Landfill. ACM that does not meet the WAC for disposal at the C-746-U Landfill shall be disposed of at an off-site TSDF.

8.5 DISPOSITION OF LOW LEVEL WASTE

In accordance with DOE O 435.1 (Admin. Chg. 1), 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. If DOE capabilities are not practical or cost-effective, exemptions may be approved to allow use of non-DOE facilities for the storage, treatment, or disposal of DOE radioactive waste. Such exemptions may be requested for waste streams meeting the exemption criteria in DOE O 435.1 (Admin. Chg. 1).

Currently, Energy*Solutions* is used as the primary disposal option for bulk waste and low activity waste streams not meeting the C-746-U Landfill WAC. This strategy is consistent with the annual exemption to DOE O 435.1 (Admin. Chg. 1), which cites the following factors in favoring commercial disposal at Energy*Solutions* over disposal at the NNSS landfill:

- The waste can be transported more cost effectively by rail than truck (NNSS does not have rail access).

- Certain waste streams meet the acceptance criteria at Energy*Solutions* and do not require repackaging that would be necessary to facilitate NNSS burial; this eliminates potential exposure to asbestos and radiation and represents a level of effort cost avoidance.

In addition, FRNP has added WCS as a disposal option for bulk waste and low activity wastes streams not meeting the C-746-U Landfill WAC.

8.6 DISPOSITION OF HAZARDOUS WASTE AND MIXED WASTE

Hazardous and mixed waste must meet applicable LDR treatment standards prior to ultimate disposal. The available treatment options for hazardous and mixed waste are discussed in Section 8 of this WMP. The primary disposal options for treated waste are Energy*Solutions*, NNSS, and WCS. Hazardous waste that does not meet the definition of mixed waste or TRU waste may be dispositioned at a commercial TSDF (e.g., Clean Harbors, Heritage Environmental, and Onyx).

8.7 DISPOSITION OF PCB WASTES

The Perma-Fix DSSI Facility in Oak Ridge, Tennessee, currently accepts PCB/radioactive waste liquids for thermal treatment.

For nonradioactive liquid PCB waste, commercial treatment at a TSCA-approved incinerator is the preferred option.

PCB remediation waste (see definition) generally is acceptable for burial at Energy*Solutions* in Clive, Utah, and WCS in Andrews, Texas.

PCB bulk product waste (see definition) is acceptable for land disposal at a TSCA-approved landfill, an approved solid waste landfill outside the Commonwealth of Kentucky, or the C-746-U Contained Landfill in accordance with site procedures and KDWM guidance outlined in correspondence dated August 11, 2008.

Solid waste that does not exceed 49 ppm PCBs or otherwise meet the definition of PCB contaminated waste (see definition) may be disposed of in the C-746-U Contained Landfill if it complies with all other requirements in CP2-WM-0011.

8.8 DISPOSITION OF TRU WASTE

Any future mixed TRU waste generated at PGDP will be managed in accordance with the STP and/or existing protocols for contact-handled TRU waste destined for the Waste Isolation Pilot Plant. All reasonable actions have been utilized to minimize waste generation and to preclude the generation of TRU and MTRU wastes from any operations on the FRNP project. FRNP will obtain DOE approval prior to generation of TRU or MTRU waste.

8.9 DISPOSITION AT NNSS

Where feasible and cost-effective, LLW and qualified mixed wastes will be disposed of at NNSS. Disposal at facilities other than NNSS are authorized by the DOE Portsmouth/Paducah Project Office (PPPO) Manager per an exemption under DOE O 435.1 (Admin. Chg. 1). NNSS shall be used for classified and higher activity waste streams (greater than Class C as defined by the Nuclear Regulatory Commission under Title 10 of the *CFR*).

FRNP shall maintain a certified NNSS program for PGDP. The WCO, with oversight from PPPO, shall serve as the single point of contact with NNSS and will be responsible for NNSS compliance through involvement in all activities pertaining to waste management for waste streams packaged and shipped to NNSS. These activities will involve the following:

- Waste Certification Program;
- Work package reviews and field activity oversight;
- Profile reviews;
- Shipping paperwork reviews;
- Data transfers of NNSS disposal documentation;
- Coordination with NNSS personnel to facilitate audits and surveillances; and
- Compliance with the NNSS WAC (DOE/NV-325, *Nevada National Security Site Waste Acceptance Criteria*).

8.10 TRANSPORTATION

On-site and off-site transportation of waste shall be coordinated through the FRNP transportation team. The core of the FRNP transportation program consists of two program plans: CP2-WM-0661, *Transportation Safety Document for On-Site Transport within the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*; and CP2-WM-0025, *Four Rivers Nuclear Partnership, LLC., Transportation Security Plan for the Transport of Hazardous Materials in Commerce*. The transportation program description is presented in these transportation program plans (primarily CP2-WM-0661) as well as individual plans for specific subject areas (special projects are created as needed). CP2-WM-0661 serves

as a stand-alone safety basis document governing on-site transfers of hazardous materials and meets the requirements of DOE O 460.1C. CP2-WM-0025 provides security aspects to meet the requirements specified in 49 *CFR* Part 172, Subpart I.

The FRNP waste transportation program consists of four primary implementing procedures. Off-site transportations using highway and rail shall be performed in accordance with CP3-WM-3028, *Off-Site Shipping*. The movement of waste containers and support equipment shall be performed with CP4-WM-0019, *On-Site Transfer and Movement of Waste Containers and Other Support Equipment*. Use of commercial motor vehicles, both on-site and off-site, shall be performed in accordance with CP3-WM-3030, *Commercial Motor Vehicle Operations*. Additionally, all rail activities conducted by FRNP shall be performed in accordance with CP3-WM-0618, *Paducah Railcar Operations*.

Only designated and trained shippers shall be authorized to complete shipping papers (e.g., uniform LLW manifests, uniform hazardous waste manifests, bills of lading) and review waste shipments for compliance with 49 *CFR* Part 172. Waste shipping personnel shall be trained in accordance with 49 *CFR* Part 172, Subpart H, and FRNP's Training Program.

Waste designated for off-site disposition will be transported by one of three following modes:

(1) Over the road trucking,
(2) Rail, or
(3) A combination of truck and rail.

Decisions regarding the selection of transportation modes will involve the location, respective WACs and logistics of prospective receiving facilities, technical requirements for material handling, and overall cost comparisons. In the event rail is selected, shipments by gondolas must occur within 20 days after activity is complete unless approved by DOE.

8.11 PROBLEM IDENTIFICATION AND CORRECTIVE ACTIONS

8.11.1 Issues Tracking And Corrective Actions

As a mechanism to ensure continuous improvement in waste management and support waste reduction programs, FRNP 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 accordance with CP3-QA-3001, *Issues Management*. As applicable, nonconforming items and services are tracked according to CP3-QA-2005, *Nonconformance* Control. Lessons learned shall be tracked according to CP3-QA-3002, *Operating Experience/Lessons Learned*, in the lessons learned database. 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 O 460.1C.

Incidents or conditions related to waste management activities that meet the criteria of an occurrence as defined in CP3-QA-3005, *Occurrence Reporting*, shall be reported and documented in the Occurrence Reporting Processing System database.

8.11.2 Stop Work Authority

FRNP shall implement Integrated Safety Management System (ISMS) for waste management facilities, operation, and activities, and plans/procedures, ensuring waste is managed so that the following objectives are accomplished:

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

All visitors and workers performing work on-site have the authority to stop or pause work in accordance with CP3-HS-2009, *Stop/Suspend Work.*

8.12 MANAGEMENT AND INDEPENDENT ASSESSMENTS

8.12.1 Management Assessments

FRNP 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 ISMS program is focusing on meeting both customer requirements and strategic goals. Management assessments for waste management activities shall be performed in accordance with CP3-QA-1003, *Management and Self-Assessments*.

8.12.2 Independent Assessments

Independent assessments (or audits) are planned, scheduled, and conducted routinely 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 FRNP 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. FRNP independent assessments for waste management activities shall be performed in accordance with CP3-QA-1004, *Independent Assessment Program*.

APPENDIX A

PROTOCOL FOR MANAGEMENT OF POTENTIALLY LISTED REMEDIATION WASTES AT THE PADUCAH SITE

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A.1. REGULATORY BACKGROUND AND SELECT REGULATORY POLICIES REGARDING THE MANAGEMENT OF POTENTIALLY LISTED REMEDIATION WASTES

Sections A.1.1 through A.1.3 are excerpts from U.S. Environmental Protection Agency's (EPA's) October 14, 1998, guidance on Management of Remediation Wastes under Resource Conservation and Recovery Act (RCRA). They are included in this paper to give the regulatory background and context for the application of these polices at the Paducah Site, as discussed in Section A.2.

A.1.1 DETERMINATION OF WHEN CONTAMINATION IS CAUSED BY LISTED HAZARDOUS WASTE

Where a facility owner/operator makes a good faith effort to determine if a material is a listed hazardous waste, but cannot make such a determination because documentation regarding a source of contamination, contaminant, or waste is unavailable or inconclusive, EPA has stated that one may assume the source, contaminant, or waste is not listed hazardous waste; therefore, provided the material in question does not exhibit a characteristic of hazardous waste, RCRA requirements do not apply. This approach first was articulated in the Proposed National Oil and Hazardous Substances Pollution Contingency Plan (NCP) preamble, which notes that it often is necessary to know the source of a waste (or contaminant) to determine whether a waste is a listed hazardous waste under RCRA and also notes that, "at many Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites no information exists on the source of the wastes." The proposed NCP preamble goes on to recommend that the lead agency use available site information such as manifests, storage records, and vouchers in an effort to ascertain the sources of wastes or contaminants, but when this documentation is not available or inconclusive, the lead agency may assume that the wastes (or contaminants) are not listed RCRA hazardous wastes. This approach was confirmed in the final NCP preamble (see 53 *FR* 51444, December 21, 1988, for proposed NCP preamble discussion; 55 *FR* 8758, March 13, 1990, for final NCP preamble discussion). This approach also was discussed in the HWIR-Media proposal preamble, 61 *FR* 18805, April 29, 1996, where it was expanded to cover dates of waste disposal [i.e., if, after a good faith effort to determine dates of disposal, a facility owner/operator is unable to make such a determination because documentation of dates of disposal is unavailable or inconclusive, one may assume disposal occurred prior to the effective date of applicable land disposal restrictions (LDRs)]. This is important because, if hazardous waste originally was disposed of before the effective dates of applicable LDRs and media contaminated by the waste are determined not to contain hazardous waste when first generated (i.e., removed from the land or area of contamination), the media are not subject to RCRA requirements, including LDRs.

A.1.2 CONTAINED-IN POLICY

Contaminated environmental media, of itself, is not hazardous waste and, generally, is not subject to regulation under RCRA. Contaminated environmental media can become subject to regulation under RCRA if they "contain" hazardous waste.

If contaminated environmental media contain hazardous waste, they are subject to all applicable RCRA requirements until they no longer contain hazardous waste. EPA Region 4 and Kentucky Division of Waste Management (KDWM) consider contaminated environmental media no longer to contain hazardous waste (1) when they no longer exhibit a characteristic of hazardous waste, and (2) when

concentrations of hazardous constituents from listed hazardous wastes are below health-based levels. Generally, contaminated environmental media that do not (or no longer) contain hazardous waste are not subject to any RCRA requirements; however, in some circumstances, contaminated environmental media that contained hazardous waste when first generated (i.e., first removed from the land or area of contamination) remain subject to LDR treatment requirements even after they "no longer contain" hazardous waste.

The determination that any given volume of contaminated media does not contain hazardous waste is called a "contained-in determination." In the case of media that exhibit a characteristic of hazardous waste, the media are considered to "contain" hazardous waste for as long as they exhibit a characteristic. Once the characteristic is eliminated (e.g., through treatment), the media no longer are considered to "contain" hazardous waste. Since this determination can be made through relatively straightforward analytical testing, no formal "contained-in" determination by EPA or KDWM is required. Just like determinations about whether waste has been adequately characterized, generators of contaminated media may make independent determinations as to whether the media exhibit a characteristic of hazardous waste. In the case of media that are contaminated by listed hazardous waste, current EPA guidance recommends that contained-in determinations be made based on direct exposure using a reasonable maximum exposure scenario and that conservative, health-based, standards be used to develop the site-specific health-based levels of hazardous constituents below which contaminated environmental media would be considered no longer to contain hazardous waste. Since this determination involves development of site-specific health-based levels, EPA's or KDWM's approval is required.

In certain circumstances, the RCRA LDRs will continue to apply to contaminated media that has been determined not to contain hazardous waste. This is the case when contaminated media contain hazardous waste when they are first generated (i.e., removed from the land or area of contamination) and subsequently are determined no longer to contain hazardous waste (e.g., after treatment), but still contain hazardous constituents at concentrations above LDR treatment standards. It is also the case when media are contaminated as a result of disposal of untreated (or insufficiently treated) listed hazardous waste after the effective date of an applicable LDR treatment requirement. Of course, if no land disposal will occur (e.g., the media will be legitimately recycled), the LDR treatment standards do not apply. In addition, contaminated environmental media determined not to contain any waste (i.e., it is just media, it does not contain solid or hazardous waste) would not be subject to any RCRA Subtitle C requirements, including the LDRs, regardless of the time of the "contained-in" determination.

A.1.3 LAND DISPOSAL RESTRICTION TREATMENT STANDARDS FOR CONTAMINATED SOILS

On May 26, 1998, EPA promulgated LDR treatment standards specific to contaminated soils. Kentucky adopted these standards, effective June 13, 2007. These treatment standards require that contaminated soils that will be land disposed of be treated to reduce concentrations of hazardous constituents by 90% or meet hazardous constituent concentrations that are ten times the universal treatment standards (UTS), whichever is greater. (This typically is referred to as 90% capped by 10 times the UTS.) For contaminated soil that exhibits a characteristic of ignitable or contains reactive or corrosive hazardous waste, treatment also must eliminate the hazardous characteristic. The soil treatment standards apply to all underlying hazardous constituents reasonably expected to be present in any given volume of contaminated soil when such constituents are found at initial concentrations greater than ten times the UTS. For soil that exhibits a characteristic of toxic, ignitable, reactive or corrosive hazardous waste, treatment also is required for (1) in the case of the toxicity characteristic, the characteristic constituent; and (2) in the case of ignitability, reactivity, or corrosivity, the characteristic property. Although treatment is required for each underlying hazardous constituent, it is not necessary to monitor soil for the entire list of underlying hazardous

constituents. Generators of contaminated soil reasonably can apply knowledge of the likely contaminants present and use that knowledge to select appropriate underlying hazardous constituents or classes of constituents for monitoring. As with the LDR treatment standards for hazardous debris, generators of contaminated soil may use either the applicable universal treatment standards for the contaminating hazardous waste or the soil treatment standards.

A.2. APPLICATION OF REGULATORY POLICIES WITH REGARD TO MANAGEMENT OF REMEDIATION WASTES

Sections A.2.1 through A.2.3 discuss the application of the policies outlined in Section A.1 to Paducah projects.

A.2.1 DETERMINATION OF WHEN CONTAMINATION IS CAUSED BY LISTED HAZARDOUS WASTE

The U.S. Department of Energy (DOE) has chosen to take a conservative regulatory approach with regard to environmental media and related waste streams contaminated with trichloroethene (TCE) and 1,1,1-trichloroethane (TCA) at the PGDP site. DOE has concluded that environmental media and related waste streams contaminated with TCE and 1,1,1-TCA at detectable levels are subject to RCRA, (including the LDRs) and also RCRA guidance, such as the October 14, 1998, EPA guidance concerning *Management of Remediation Waste Under RCRA*. Conversely and to date, DOE has not reached a conclusive determination for environmental media and related waste streams contaminated with any other hazardous waste constituent at the site. In the event new information is made available by any means that would affect these determinations, DOE shall engage EPA Region 4 and KDWM with the information in an effort to make the appropriate determinations with regard to the applicability of RCRA and LDRs.

A.2.2 APPLICATION OF THE CONTAINED-IN POLICY

The 2003 Agreed Order (Order) established the process to be followed to implement the hazardous waste contained-in policy at the Paducah Site. The Order establishes specific requirements for review and approval of characterization sampling and analysis plans (SAPs) and the regulatory review of characterization data used in contained-in determinations. Contained-in determinations for solids are conditioned upon their not being characteristically hazardous.

Contaminated environmental media and related waste streams that are known to contain TCE and/or 1,1,1-TCA but need additional characterization require submittal of a SAP to KDWM for approval for conducting contained-in determinations. Following the submittal of the SAP to KDWM and approval, sampling will be conducted pursuant to the approved SAP. DOE will review and compare the assessed analytical data generated from the sampling effort to the approved health-based levels specified in the Order (Table A.1). If the environmental media/debris is above the levels found in Table A.1, the environmental media and related waste streams must be managed as RCRA-hazardous waste unless treated below the approved health-based levels. If the contaminant concentrations are below the levels found in Table A.1, the media and any associated debris would be determined not to “contain” a listed waste. Within 20 days of receipt of final validated data for entry into the Oak Ridge Environmental Information System database, DOE shall submit its contained-in determination and all supporting analytical data to KDWM for review. KDWM will review DOE’s determination and provide notification

of any concerns that KDWM has within 30 days. The process for conducting contained-in determinations for CERCLA response actions, including the submittal of any necessary SAPs and other supporting information, shall be outlined in the appropriate CERCLA document and follow the review process specified in the FFA.

Approved site-specific health-based levels for environmental media and associated debris at the Paducah Site with respect to TCE and 1,1,1-TCA are found in Table A.1, Approved Health-Based Levels. The health-based levels originally were approved by KDWM in the Order in 2003 and by EPA in correspondence dated March 5, 2009, and May 19, 2009 (Table A.1).

Table A.1. Approved Health-Based Levels

Contaminant	Solids	Aqueous Liquids
TCE	39.2 ppm	0.081 ppb
1,1,1-TCA	2,080 ppm	N/A*

*Aqueous solutions that meet the health-based level for TCE also shall be deemed to no longer contain 1,1,1-TCA.

The Order defines aqueous liquids as groundwater, including purge/well development water and sample residuals water. The Order defines solids as soils, sediments, drill cuttings, and solid sample residuals.

Related waste streams consist of the following: debris such as personal protective equipment (PPE), sampling equipment, and other materials that have been contaminated with environmental media, drilling fluids, decontamination water, landfill leachate, wastewaters, wastewater treatment media, and wastewater treatment sludges.

Paragraph 117 of the Order allows for the application of a “headworks exemption” to wastewaters that have concentrations below 1 ppm TCE and 25 ppm 1,1,1-TCA. The exemption applies to wastewaters defined as well purge water, well sampling water, and well development water generated during any sampling and investigation efforts that are destined for treatment at an on-site wastewater treatment facility and discharged through a KPDES-permitted outfall. This exemption not only excludes wastewater from being declared a listed hazardous waste, but also applies to related waste streams such as PPE, sludge, debris, etc. that are generated from management of any such wastewater with concentrations below 1 ppm and 25 ppm as a result of the treatment process [paragraph 117 of the Order references 401 *KAR* Chapter 31:010 § 3(1)(b)4. a. and b. This *KAR* was replaced by 40 *CFR* § 261.3 (a) (2)(iv)(A)].

Environmental media and related waste streams that are determined to no longer contain listed hazardous waste and that are not characteristically hazardous must meet LDR treatment standards prior to disposal in a Subtitle D landfill.

A.2.3 APPLICATION OF LAND DISPOSAL RESTRICTIONS TO CONTAMINATED MEDIA AND RELATED WASTE STREAMS

In accordance with Kentucky and EPA hazardous waste regulations, all RCRA hazardous wastes are subject to the LDRs. As stated in Section 2.1, DOE has made the determination that LDRs also apply to media that has been deemed no longer to contain and debris that has been deemed to be no longer

contaminated with F001, F002, and U228 (TCE and 1,1,1-TCA) listed waste. The applicable LDR Treatment Standards are presented in Table A.2.

Table A.2. LDR Treatment Standards

Contaminant	Alt. Std. for Debris	Alt. Std. for Soils	Non-wastewaters	Wastewaters
TCE	40 *CFR* § 268.45	60 ppm	6 ppm	0.054 ppm
1,1,1-TCA	40 *CFR* § 268.45	60 ppm	6 ppm	0.054 ppm

Media that has been deemed to no longer contain a F001, F002, and U228 (TCE and 1,1,1-TCA) listed waste and debris that has been deemed no longer to be contaminated with F001, F002, and U228 (TCE and 1,1,1-TCA) listed waste may be disposed of in a Subtitle D landfill provided they meet the applicable LDR treatment standards, do not exhibit a hazardous characteristic, and otherwise meet the receiving facilities waste acceptance criteria.

Aqueous media that has been deemed to contain a listed hazardous waste and/or exceeds wastewater LDRs and aqueous-related wastes that have been deemed to be derived-from or mixed with a listed hazardous waste shall be treated at a wastewater treatment unit permitted by the KPDES program. These wastewaters ultimately will be discharged through a KPDES outfall, whereupon the hazardous waste listings and LDR treatment standards no longer will apply at the point-source discharge [40 *CFR* § 261.4(a)(2)].

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APPENDIX B

RADIOACTIVE WASTE MANAGEMENT BASIS FOR THE FRNP RADIOACTIVE WASTE MANAGEMENT FACILITIES

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B.1. PURPOSE AND SCOPE

The purpose of this document is to describe the Radioactive Waste Management Basis (RWMB) for the PGDP waste management facilities. This RWMB summarizes the waste management facilities and program documentation utilized FRNP.

FRNP will operate and maintain the waste storage facilities identified in the contract in compliance with applicable permits, and restrictions. Any facilities not required or effective for operations will be compliantly placed into STANDBY mode and DOE concurrence gained prior to deactivation shutdown.

An RWMB is required by DOE O 435.1 (Admin. Chg. 1), *Radioactive Waste Management*. DOE Guide 435.1-1, *Implementing Guide for Use with DOE M 435.1-1*, states the objective of the RWMB is "to ensure that the hazards associated with radioactive waste management facilities, operations, and activities have been identified, their potential impacts analyzed, and appropriate controls documented, implemented, and maintained for the protection of workers, the public and the environment." The RWMB for the PGDP waste management facilities is based on existing FRNP programs and procedures that systematically identify, assess, and control radiological hazards associated with radioactive waste management activities at the Paducah Site and during transport for final disposition at permitted and DOE-approved waste treatment, storage, and disposal facilities (TSDFs). Material disposed under an AL is not subject to the requirements of the RWMB.

The major elements discussed in this RWMB document include the following:

- Identifying the types of radioactive wastes and the radioactive waste management facilities at Paducah Site.
- Identifying the safety basis (SB) documents applicable to the waste management facilities.
- Providing an overview and discussion of the FRNP Waste Management Program and requirements and procedures that will ensure radioactive wastes are identified, managed, and disposed of in compliance with federal and state hazardous waste management rules and regulations and DOE regulations, Orders, and guidance.

B.2. RADIOACTIVE WASTE MANAGEMENT BASIS DOCUMENTS

The purpose of this waste management plan is to provide a systematic approach to the management of waste generated 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 Order 435.1 (Admin. Chg. 1), *Radioactive Waste Management*, and DOE M 435.1-1, *Radioactive Waste Management Manual*, which requires FRNP 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 (Admin. Chg. 1).

In addition to this plan, the primary documents establishing the basis for the programs that address RWMB requirements for Paducah Site are the following:

- FRNP Contract DE-EM0004895 with DOE for Deactivation and Remediation of the Paducah Site.

- CP2-HS-1000, *Integrated Safety Management System Description*—This document establishes a single, defined safety management system for integrating industrial safety management requirements into work planning and execution processes to effectively protect employees, the public, and the natural environment.

- CP1-NS-3000, *Documented Safety Analysis for the Department of Energy Paducah Site Deactivation and Remediation Project*, Safety Management Program Descriptions for Paducah Environmental Remediation Project Facilities—This document provides descriptions that collectively address Safety Management Plan (SMP) Descriptions for criticality safety; radiation protection; hazardous material protection; emergency planning; radioactive and hazardous material waste management; decontamination and decommissioning; initial testing; in service surveillance; and maintenance, management, organization, and institutional safety provisions; quality assurance; human factors; procedures and training; and operational safety. The purpose of the SMP Descriptions is to present information that is common to the Paducah Environmental Remediation Project's Hazard Category (HC) 2 and 3 nuclear and nonnuclear facilities. It is intended to complement the facility-specific SB documents. SMPs applicable to waste management are provided by CP1-NS-3000, latest approved revision, *Documented Safety Analysis for the Department of Energy Paducah Site Deactivation and Remediation Project*.

- CP2-WM-0006, latest approved revision, *Facility Safety Basis Inventory Control Plan for Paducah Waste Storage Facilities*—This plan documents the inventory control methodology for waste storage facilities at the Paducah Site. The goal of the inventory control methodology is to ensure compliance with chemical and radiological limits as stated both in this plan and in various facility SB documents.

- KY8-890-008-982, latest approved revision, Kentucky Division of Waste Management, *PGDP Hazardous Waste Management Permit*—This document is the DOE Paducah Site Resource Conservation and Recovery Act (RCRA) Part B Permit approved by the Kentucky Energy and Environment Cabinet's (KEEC) Division of Waste Management (KDWM) and incorporates applicable provisions of the Agreed Orders and Compliance Agreements. The Part B Permit establishes the enforceable requirements for facilities, operations, and activities that are managed and operated in compliance with this permit.

Additional requirements that may influence FRNP compliance with the requirements of DOE Order 435.1 (Admin. Chg. 1) are set forth in the regulatory agreements among DOE, KEEC, EPA, and KDWM. The requirements set forth in these regulatory agreements are incorporated into affected FRNP procedures, plans, and work authorization documents. The regulatory documents impacting establishment and implementation of the RWMB at PGDP are the following:

- Federal Facility Agreement (FFA) among DOE, KEEC, and EPA (1998)—Pursuant to 42 U.S.C.A. § 9620, the agreement directs the comprehensive remediation of the PGDP through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. The FFA will impact the process for closing radioactive waste management facilities, particularly those subject to RCRA permits.

- Agreed Order (2003), DWM-31434-042, DAQ-31740-060, DOW-26141-042—FRNP complies with this agreement that establishes a risk-based contained-in basis and responsibilities to address storage

and characterization of containerized wastes, remediation of environmental media, and disposal of wastes impacted by contained-in determinations. It also addressed issues of completing facility closures pursuant to the CERCLA FFA.

- Agreed Order/Site Treatment Plan, DWM-30039-042, latest approved revision and concurrences—FRNP complies with applicable provisions of this agreement that establishes responsibilities and commitments for conducting actions required for storage and treatment of hazardous waste that is radioactively contaminated.

- *Toxic Substances Control Act Uranium Enrichment Federal Facilities Compliance Agreement,* latest approved revision and concurrences—FRNP complies with applicable provisions of this agreement, which establishes responsibilities and commitments for conducting actions required for polychlorinated biphenyl waste including waste that is radioactively contaminated.

- Implementing documents that flow down from the primary documents, listed above, that govern the development and implementation of SB documents include the following:

  — CP3-HS-2004, latest approved revision, *Job Hazard Analysis*—This procedure provides guidance for the protection of personnel and the environment by establishing a graded approach for systematically reviewing planned work to identify hazards and preventive measures to control those hazards.

  — CP1-NS-1001, latest approved revision, *Nuclear Criticality Safety Policy*—This document is a policy statement that brings the company values to the forefront and applies the principles of Integrated Safety Management (ISM) to integrate NCS into the daily planning and performance of FRNP work. The NCS Program shall meet the general and specific requirements of DOE O 420.1C, *Facility Safety*, Chapter III, Nuclear Criticality Safety.

  — CP2-NS-1000, *Nuclear Criticality Safety Program Description Document* establishes the basis for the deactivation NCS program and ensures that NCS hazards are evaluated and that NCS limits and controls are established and effectively implemented to provide safety to the public, workers, and the environment.

  — CP3-NS-2001 latest revision, *Unreviewed Safety Question Reviews*—This procedure establishes the process for determining whether proposed changes are adequately evaluated relative to the approved DSA or Hazards Assessment Document. Those proposed changes determined to involve unreviewed safety questions are brought to the attention of the DOE for review and approval before changes are made.

  — CP4-NS-2005, latest approved version, *Preliminary Hazard Screening Process*—The purpose of this procedure is to implement specific requirements 10 *CFR* Part 830, Subpart B, *Safety Basis Requirements*; 29 *CFR* § 1910.119, *Process Safety Management of Highly Hazardous Chemicals*.

  — CP2-WM-0011, latest approved revision, *Waste Acceptance Criteria for the Treatment Storage and Disposal Facilities at the Paducah U.S. Department of Energy Site*—This document establishes the waste acceptance criteria (WAC) for Paducah Site TSDFs and defines the requirements, terms, and conditions under which wastes will be accepted. This WAC applies to all newly generated or newly discovered wastes that are being offered for acceptance to any Paducah Site TSDF and includes low-level waste (LLW), RCRA waste, mixed low-level waste (MLLW), Toxic Substances Control Act (TSCA) and TSCA-LLW, and transuranic (TRU) waste.

— CP3-WM-0016, latest approved revision, *Waste Handling and Storage in DOE Waste Storage Facilities*—The purpose of this procedure is to implement the management of RCRA, TSCA, LLW, and mixed waste program requirements to provide regulatory compliance and ensure personnel safety while performing activities in DOE waste storage facilities.

— CP3-WM-0023, latest approved revision, *Inspection of DOE Waste Storage Facilities and Tanks*—The purpose of this procedure is to establish requirements for performing and documenting periodic inspections, controlling inspection forms, and tank-testing requirements for waste storage facilities operated by FRNP.

— CP3-WM-0437, latest approved revision, *Waste Characterization and Profiling*—This procedure provides the requirements and methodologies for the characterization of waste streams and containers. This procedure establishes how waste characterization will be implemented to ensure that all waste is properly characterized for RCRA, TSCA, and radiological constituents and addresses waste profiling including both on-site (i.e., C-746-U Landfill) and off-site disposal.

— CP3-WM-1037, latest approved revision, *Generation and Temporary Storage of Waste Materials*—This procedure directs actions for establishment, operation, inspection, and discontinuance for temporarily storing hazardous and nonhazardous wastes in a safe and environmentally acceptable manner that complies with regulatory and company requirements.

— CP3-QA-2501, latest approved revision, *Waste Certification*—The purpose of this procedure is to establish waste certification activities at PGDP. This includes, but is not limited to, detailed methods for inspection of containers, container preparation activities, waste packaging oversight, shipment preparation, and certification of waste generated for disposal at the Nevada Nuclear Security Site (NNSS) in accordance with the latest revision of the WAC and other waste shipments as directed by management. This procedure also establishes the methods for scheduling and performing surveillances on functions critical to the NNSS Waste Certification Program.

— CP3-WM-3015, latest approved revision, *Waste Packaging*—This procedure provides the requirements to follow in order to oversee and direct the packaging of waste containers for on-site (C-746-U Landfill) and off-site (NNSS or other commercial TSDF) disposition.

— CP3-WM-3028, latest approved revision, *Off-Site Shipping*—This procedure provides instructions for preparing shipments of hazardous materials to ensure they are shipped properly. This procedure provides the processes to satisfy the requirements related to waste shipments. The requirements of this procedure apply to all off-site shipments of hazardous materials (HM) and wastes by highway and rail performed by FRNP at PGDP, unless exempt from shipping papers per 49 *CFR*.

— CP3-WM-0015, latest approved revision, *Management of Fissile Waste Material*—This procedure applies to the labeling, sampling/characterization, on-site transportation, waste processing, inspection, and storage of fissionable waste material and spacing-exempt containers. This procedure applies to waste material regulated under NCSE-RM-FISSMAT-0015.

— CP3-WM-1036, latest approved version, *Nuclear Criticality Safety Implementation Requirements for Handling and Storage of Fissile and Potentially Fissile Waste*—This procedure implements the NCS requirements for generating, handling, and storing fissile/potentially fissile (PF) waste and to implement Nuclear Criticality Safety Approval requirements for areas with container restrictions at FRNP.

— CP3-WM-2100, latest approved revision, *Operation of Temporary Fissile Storage Areas*—This procedure establishes the requirements for handling, characterizing, and temporarily storing fissile and potentially fissile waste in temporary fissile storage areas.

— CP3-WM-2110, latest approved revision, *Waste Container Handling, Overpacking, and Transportation*—This procedure specifies the requirements for inspection, handling, overpacking, and transportation of containerized waste materials.

B.3. RADIOACTIVE WASTE CATEGORIES AND WASTE MANAGEMENT FACILITIES

Newly generated waste generated by ongoing and future activities will include LLW, MLLW, TSCA-LLW, and mixtures of MLLW and TSCA-LLW.

Table B.1 lists the existing Paducah Site Waste Management-operated facilities covered by the FRNP RWMB, based on use, for storing, staging, or treating radioactive wastes. In addition, the associated facility hazard category and hazard classification are listed, as well as the type of regulated wastes that can be managed in those facilities. During generation activities, the generating projects will be responsible for management of wastes temporarily accumulated and/or staged prior to transfer to one of the designated on-site facilities or to off-site TSDFs.

Closure of the DOE waste management facilities will be determined based on the progress and needs of current and future projects.

B.4. SAFETY BASIS DOCUMENTATION, EVALUATION, AND CONTROLS

The Integrated Safety Management System (latest version, CP2-HS-1000), and the Environmental Management System (latest version, CP2-ES-0101) establish a defined safety and environmental management system for integrating industrial safety management and environmental management requirements into work planning and execution processes to effectively protect employees, the public, and the natural environment.

The core requirements for identifying, evaluating, and controlling hazards associated with radioactive wastes are met using the FRNP Nuclear Safety Program. This FRNP Nuclear Safety Program provides for identification and the analysis of hazards and development of the appropriate SB documents and other associated documents for nuclear, radiological, and nonradiological facilities.

FRNP Nuclear Safety Program provides a structured, graded approach that complies with 10 *CFR* § 830, Subpart B, *Safety Basis Requirements.* The program structure is designed to ensure the maximum possible level of quality by establishing standards for the overall program and the program elements, including standards for measuring program effectiveness and provisions for process improvement. The Nuclear Safety Program is governed by the following:

Table B.1. FRNP Waste Management Facilities*

Facility ID	Authorization Basis Document	Facility Description	Regulated Waste Type	Active	SB Hazard Category	SB Hazard Classification
C-733	PHS-PH-RAD-0072 (currently R8)	Permitted RCRA Storage Facility/TSCA/LLW Flammable Liquid Storage Area	RCRA, RCRA/TSCA, LLW	X	Radiological	Low
C-746-B1	PHS-PH-RAD-0072 (currently R8)	Yard—Staging Area	LLW	X	Radiological	Low
C-746-H3	PHS-PH-RAD-0072 (currently R8)	(Concrete Pad)—processing/staging/loading area	RCRA/LLW	X	Radiological	Low
C-746-Q	CP1-NS-3000 (DSA) and CP1-NS-3001 (TSR)	Permitted RCRA Storage Facility/Fissile Storage Area	RCRA, RCRA/TSCA, TSCA, LLW	X	Category 2	High
C-746-Q1	CP1-NS-3000/R3 (DSA) & CP1-NS-3001/R2 (TSR)	LLW and Fissile Storage Facility	TSCA, LLW	X	Category 2	Moderate
C-746-V	PHS-PH-INDSTRL-0067 (currently R4)	Outdoor Storage, Waste Operations, etc.	LLW	X	Other Industrial	Other Industrial
C-752-A	PHS-PH-RAD-0072 (currently R8)	Environmental Restoration Waste Storage Facility	RCRA, RCRA/TSCA, TSCA, LLW	X	Radiological	Low
C-753-A	PHS-PH-RAD-0072 (currently R8)	Indoor Waste Operations—TSCA	TSCA, LLW	X	Radiological	Low
C-754	PHS/PGDP-C-754+/USEC (currently R1)	LLW Storage	LLW	X	Radiological	Low
C-757	PHS-PH-RAD-0072/R8	Solid and LLW Storage	LLW	X	Radiological	Low
C-759	PHS-PH-RAD-0072 (currently R8)	Scrap Metal Staging Area—temporary staging areas for waste prepared for shipment	LLW	X	Radiological	Low
C-760	PHS-PH-RAD-0072 (currently R8)	Laydown Gravel Pad—temporary staging areas for waste prepared for shipment	LLW	X	Radiological	Low
C-761	PHS-PH-RAD-0072 (currently R8)	Truck Shipping Staging Area (along site access road)—temporary staging areas for waste prepared for shipment	LLW	X	Radiological	Low

*Temporary generator staging areas set up to facility collection/accumulation of wastes are not included on this table.

- CP4-NS-2005, *Preliminary Hazard Screening Process*

- CP1-NS-1001, *Nuclear Criticality Safety Policy*

- CP3-NS-1031, *Nuclear Criticality Safety Program* and CP2-NS-1000, *Nuclear Criticality Safety Program Description Document*

- CP2-SS-3000, *Nuclear Materials Control and Accountability*

An approved list of SB documentation for each nuclear and radiological facility is maintained current, and is readily available to FRNP personnel requiring access to the information. The controlled list identifies specific nuclear facilities within the scope of the SB documentation and references the active SB documents, including the following:

- DSA
- Technical Safety Requirements
- SMP Description
- Preliminary Hazard Screening (PHS)
- Hazard Assessment Document
- DOE Safety Evaluation Report
- Hazard Analysis

An implementation matrix is maintained for each DSA to document flow down of DSA requirements into implementing performance documents. The implementation matrix shall be utilized by the Facility Manager to assure that requirements are implemented and that personnel involved in facility management are knowledgeable of the SB requirements that govern his/her facility, the limiting hazards and initiating events, and the associated controls. A graded approach shall be applied in documenting implementation flow down for radiological and nonnuclear facilities in accordance with CP3-QA-1001, *Graded Approach*.

CP2-WM-0006, *Facility Safety Basis Inventory Control Plan for Paducah Waste Storage Facilities*, documents the inventory control methodology for waste storage facilities at the Paducah Site. The goal of the inventory control methodology is to ensure compliance with chemical and radiological limits as stated both in this plan and in various facility safety basis documents. The Facility Manager must approve revisions to this plan prior to implementation. Approval by nuclear safety shall be obtained through the unreviewed safety question determination and unreviewed change determination process, as applicable.

B.5. RADIOACTIVE WASTE MANAGEMENT

The radioactive and hazardous waste management program, as described in this plan, establishes processes to generate, characterize, package, and control radiological and hazardous waste. 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 the project work authorization and approval documents and address sitewide and project-specific needs for the following:

(1) Pollution prevention and waste minimization (PP/WM) 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
(9) Waste with no disposal path conditions

B.6. NUCLEAR CRITICALITY

The primary mission of PGDP operations is deactivation of site facilities. As such, an uncontrolled nuclear fission chain reaction has been the greatest potential hazard associated with the management of radiological materials. Control of fissile materials is a major component of the Nuclear Safety Program. FRNP NCS activities to address risks identified in the facility SB documents are governed by CP1-NS-1001, *Nuclear Criticality Safety Policy*; CP3-NS-1031, *Nuclear Criticality Safety Program*; and CP2-NS-1000, *Nuclear Criticality Safety Program*.

B.7. MAINTAINING RECORDS AND RWMB DOCUMENTS

Consistent administrative controls and assigned responsibility, as well as definitions of protocols for the identification, control, and management of documents and records, are found in CP3-RD-0010, *Records Management Process.* This procedure also establishes the requirements for transmitting records to Records Management. This procedure applies to all FRNP personnel and subcontractor employees who create, process, or use records for DOE. This applies to all types of record media.

Radioactive waste management records generated during waste identification, characterization, treatment, and processing include a variety of forms, as specified in the applicable procedures (e.g., CP3-WM-0437, *Waste Characterization and Profiling*). The original working copies of the forms are maintained in project files under direct control of the functional organization, including transportation, waste operations, waste generating services, and NNSS waste certification.

In addition, a database management group is maintaining database access and data transfer using a project tracking system that meets Software Quality Assurance requirements, as applicable.