Office of Enterprise Assessments
Review of Radioactive Waste Management at the Portsmouth Gaseous Diffusion Plant

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Acronyms

ALARA	As Low As Reasonably Achievable
BZA	Breathing Zone Air Sampler
CRAD	Criteria, Review, and Approach Document
DAW	Dry Active Waste
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EA	Office of Enterprise Assessments
FBP	Fluor-B&W Portsmouth, LLC
FR	Facility Representative
FUEF	Former Uranium Enrichment Facilities
FY	Fiscal Year
GDP	Gaseous Diffusion Plant
IH	Industrial Hygiene
ISMS	Integrated Safety Management System
JHA	Job Hazards Analysis
LLRW	Low-Level Radioactive Waste
LSA	Low Specific Activity
MLLW	Mixed Low-Level Waste
MTS	Management Tracking System
NDA	Non-Destructive Assay
NNSS	Nevada National Security Site
NRR	Noise Reduction Rating
OFI	Opportunity for Improvement
OSWDF	On-Site Waste Disposal Facility
PORTS	Portsmouth Gaseous Diffusion Plant
PPE	Personal Protective Equipment
PPPO	Portsmouth/Paducah Project Office
QA	Quality Assurance
RCRA	Resource Conservation and Recovery Act
RCT	Radiation Control Technician
RSI	Restoration Services, Inc.
RWP	Radiation Work Permit
SSO	Safety System Oversight
WAC	Waste Acceptance Criteria
WCO	Waste Certification Official
WMG	Waste/Material Generation Form
WMP	Waste Management Plan
WPC	Waste Packaging Certifier
WP&C	Work Planning and Control

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EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE) Office of Nuclear Safety and Environmental Assessments, within the independent Office of Enterprise Assessments (EA), Office of Environment, Safety and Health Assessments, conducted an independent review of the Fluor-B&W Portsmouth, LLC (FBP) radioactive waste management program at the deactivated Portsmouth Gaseous Diffusion Plant (PORTS) in Piketon, Ohio. This was the first in a series of planned assessments of radioactive waste management at selected nuclear facilities within the DOE complex. The purpose of this review was to evaluate selected key elements of the radioactive waste management program and provide information to the site and responsible DOE line management organizations for improving the program's effectiveness. EA performed the onsite portions of this targeted review from May 4 to 7 and May 18 to 22, 2015.

The FBP radioactive waste management program at the PORTS site in most cases meets the requirements of DOE Order 435.1, *Radioactive Waste Management*. Waste management policies and procedures are generally comprehensive and well-written, and the appropriate FBP and DOE staff members have a good understanding of the requirements for tracking and documenting information on radioactive waste packages throughout the cycle, from generation of the waste to shipment off site for disposal. With some exceptions, the program is effective in controlling and managing radioactive wastes as they are generated, accumulated, staged, characterized, packaged, stored, monitored, and shipped off site for disposal. FBP performs appropriate planning at each stage where waste is handled. Programmatic requirements for waste minimization are integrated into the procedures. Waste management personnel are sufficiently trained and qualified, and they demonstrated competency in their jobs.

While waste management processes are generally effective, EA identified some concerns and potential vulnerabilities with low-level radioactive waste accumulation, storage, or staging, in the areas of hazard analysis and controls, and procedural compliance. EA also identified vulnerabilities in waste stored outside under adverse conditions, with degraded containers and labeling, and accumulated wastes stored well beyond the required one-year time limit.

The DOE Portsmouth/Paducah Project Office (PPPO) oversight program of radioactive waste management at PORTS is generally effective. PPPO conducts assessments and surveillances of the contractor's radioactive waste management program and identifies deficiencies where they exist. These deficiencies are tracked in the DOE issues management system until satisfactorily resolved. Both the Federal Project Manager for Waste and Nuclear Operations and the safety system oversight engineer have key roles in oversight and assessment of FBP's radioactive waste management program.

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1.0 PURPOSE

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) conducted an independent review of the radioactive waste management program at the deactivated Portsmouth Gaseous Diffusion Plant (PORTS) in Piketon, Ohio. The onsite portions of this assessment were performed at Portsmouth from May 4 to 7 and May 18 to 22, 2015.

This was the first in a series of targeted reviews of radioactive waste management that EA is planning for selected nuclear sites and facilities across the DOE complex. These targeted reviews will evaluate the implementation of program requirements and the adequacy of controls for managing radioactive wastes that are generated, sorted, accumulated, stored, shipped, or disposed of at the selected facilities. During this review, EA evaluated core elements of the radioactive waste management program to provide information to the PORTS site contractor and the responsible DOE line management organization on the program's effectiveness.

2.0 SCOPE

This review of radioactive waste management at the PORTS site focused on the former uranium enrichment facilities (FUEF) currently being decommissioned. EA reviewed selected elements of the radioactive waste management program at PORTS and independently assessed the program's effectiveness and implementation by the facility management and operations contractor, Fluor-B&W Portsmouth, LLC (FBP). EA also considered the results of FBP's self-assessments and the DOE field office's assessments, surveillances, and other oversight of activities involving radioactive waste. The EA team evaluated the implementation of ongoing radioactive waste management operations by observing work and reviewing program documentation at PORTS. The review did not evaluate any of the activities or operations at the co-located Depleted Uranium Hexafluoride Conversion Facility, or at the American Centrifuge Plant, which are managed under different contracts. Furthermore, the proposed On Site Waste Disposal Facility (OSWDF) was not included in this review since the design and permitting for the facility are still in process, and the OSWDF could be considered enough scope for an entirely separate review.

Specifically, this review focused on the following activities at PORTS involving radioactive waste:

- Cutting and capping of deactivated enrichment process equipment from the decontamination and decommissioning (D&D) of Building X-326, including radioactive waste handling, staging, identification and characterization, packaging, and preparation for offsite shipping
- Treatment of selected large process equipment by manual removal of internal residues of uranium compounds in building X-705
- Inspection, staging, monitoring, overpacking, labeling, and preparation for shipment of drums of radioactive waste uranium trioxide, more commonly called "Fernald Lot 14" materials currently stored in Building X-744G from the D&D of the Fernald Facility
- Handling, identification, characterization, packaging, labeling, and offsite shipment of excess radioactive materials and debris from Buildings X-326, X-700, X-720, and X-847

- Handling, packaging, labeling, and offsite shipment of miscellaneous low-level radioactive waste (LLRW) generated by the project, such as used personal protective equipment (PPE) and contaminated soils from remediation work across PORTS
- Non-destructive assay (NDA) of waste samples and containers for identification and characterization
- Shipment of the above described waste containers to either the Energy Solutions Disposal Facility in Clive, Utah or the Waste Control Specialists Federal Waste Disposal Facility in Andrews, Texas.

3.0 BACKGROUND

The Portsmouth Site, just south of Piketon, Ohio, is home to the shutdown and deactivated Portsmouth Gaseous Diffusion Plant (GDP). The plant has been undergoing D&D since 2011. Current efforts include demolition of legacy structures and removal and disposition of equipment from the large process buildings. These D&D efforts are expected to continue through 2024.

The Portsmouth/Paducah Project Office (PPPO), headquartered in Lexington, Kentucky, conducts oversight of work performed at PORTS according to DOE requirements and priorities. As one support services contractor that supports PPPO in conducting oversight at PORTS, Restoration Services, Inc. (RSI) provides technical staff and subject matter experts who conduct independent assessments and audits of FBP activities, including generating, staging, packaging, shipping, and disposing of radioactive waste.

4.0 METHODOLOGY

This EA review included detailed reviews of documents, interviews with personnel responsible for program implementation, and observation of ongoing waste management activities, including waste generation, packaging, storage, characterization, processing and treatment, and offsite shipping. EA assessed radioactive waste management operations by using selected objectives and criteria from EA's Criteria, Review, and Approach Document (CRAD) 31-11, *Radioactive Waste Management Criteria Review and Approach Document*, Revision 0. These criteria are based on program elements from DOE Orders 435.1, *Radioactive Waste Management* and 226.1B, *Implementation of DOE Oversight Policy* and were grouped together by similarity under an overall objective. The EA team looked at multiple elements of the radioactive waste management program during the review, including: planning; waste generation; accumulation, storage or staging; identification, characterization, and monitoring; processing, treatment, and packaging for certification for waste acceptance criteria (WAC) conformance; transportation; disposal; and oversight by the DOE field element, PPPO.

The members of the EA team and EA management responsible for this review are listed in Appendix A. Appendix B provides a detailed list of the documents and interviews relevant to the findings and conclusions of this report.

5.0 RESULTS

The EA team reviewed the effectiveness of radioactive waste management at PORTS and its implementation by site contractors. Results of this review are organized around the objectives and criteria from CRAD 31-11 that were applicable to the ongoing work observed by the EA team, as discussed in the following sections.

5.1 Radioactive Waste Management Planning

Criteria:

Radioactive Waste Management Basis. Facilities, operations, and activities that generate, handle, process, store, package, transport or dispose of low-level waste shall have a radioactive waste management basis consisting of physical and administrative controls to ensure the protection of workers, the public, and the environment. (DOE Order 435.1; DOE Manual 435.1-1, Chapters I and IV) EA CRAD 31-11 Section 4.1 Criteria 1

Training and Qualification of Personnel. Training is provided to all personnel associated with the management of radioactive wastes, including planning, identification, characterization, monitoring, generation, storing, staging, processing, treating, packaging, transportation and disposal to ensure they are competent commensurate with their responsibilities for compliance with the requirements of applicable regulations and DOE programs. (DOE Order 435.1; DOE Manual 435.1-1, Chapters I and IV) EA CRAD 31-11 Section 4.1 Criteria 5

Quality Assurance Program. All radioactive waste facilities, operations, and activities have a quality assurance program (QAP) in accordance with applicable regulations and DOE programs. The QAP is implemented on a graded approach commensurate with the radiological hazards and risks to ensure the protection of workers, the public, and the environment. (DOE Order 435.1; DOE Manual 435.1-1, Chapters I and IV) EA CRAD 31-11 Section 4.1 Criteria 6

Integrated Safety Management. Appropriate safety management programs and practices including Radiation Control, Industrial Hygiene, Fire Protection and Emergency Management, Criticality Safety (as applicable), Maintenance, Industrial Safety, Training and Qualifications are established and implemented in effective procedures. (DOE Order 435.1; DOE Manual 435.1-1, Chapters I and IV) EA CRAD 31-11 Section 4.1 Criteria 8

Waste Minimization and Pollution Prevention. Radioactive waste management facilities, operations, and activities shall implement waste minimization and pollution prevention to meet the requirements of Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, and Executive Order 13101, Greening the Government through Waste Prevention, Recycling, and Federal Acquisition, and DOE Order 436.1, Departmental Sustainability. To the extent practical, processes should be analyzed and designed to minimize the generation of radioactive or hazardous wastes. (DOE Order 435.1; DOE Manual 435.1-1, Chapters I and IV) EA CRAD 31-11 Section 4.1 Criteria 9

Records Management. A program is in place to ensure that appropriate records are maintained to demonstrate that wastes are managed in an environmentally sound manner, and that recordkeeping-related activities are performed in accordance with all applicable DOE, Federal, state, and local requirements. (DOE Order 435.1; DOE Manual 435.1-1, Chapters I and IV) EA CRAD 31-11 Section 4.1 Criteria 11

Waste Management Plan

Waste management is an integral part of the site mission of safely decommissioning the FUEF at PORTS while protecting safety, health, and the environment and minimizing the amount of waste generated that will require treatment or disposal. FBP has a comprehensive plan, FBP-WM-PL-00001, *Waste Management Plan* that defines the overall strategy for managing radioactive, hazardous, and mixed waste at PORTS. The plan specifies the processes and systems for safely managing waste in accordance with the overarching Integrated Safety Management System (ISMS) and Environmental Management System to ensure the protection of workers, the public, and the environment. The Waste Management Plan

(WMP) specifies the roles and responsibilities of FBP's Waste Management Division and includes a matrix of key interfaces with other divisions and departments on site. The plan identifies the waste streams for which FBP is responsible, provides inventory volumes, and specifies the applicable treatment plan. The plan also includes information on staging and storage of various types of waste and transportation off site for treatment and/or disposal, and lists 89 documents that describe and implement FBP's waste management program. The EA team reviewed a sample of these documents, as discussed later in this report. However, as noted in Section 5.3, the WMP and subordinate procedures have not always been effective in ensuring container and labeling integrity for wastes in storage or the timeliness of offsite shipment for waste with identified paths for disposal, indicating some weaknesses in the overall waste management planning and procedures for compliance with DOE Manual 435.1-1, *Radioactive Waste Management Manual*.

The WMP identifies numerous documents that establish and define the radioactive waste management basis for the site, which primarily include the documented safety analysis, the basis for interim operations, the associated technical safety requirements for those two safety basis documents, and the safety management program.

Integrated Safety Management

FBP has established an effective policy for development and integration of an ISMS to ensure that work is conducted safely and efficiently and to protect workers, the public, and the environment. This policy is FBP-PM-POL-00002, *Integrated Safety Management System Policy*. Numerous FBP procedures implement elements of the ISMS throughout PORTS.

Training and Qualification of Personnel

FBP has a comprehensive program for training and qualification of waste management personnel and subcontractors as described in FBP-TRN-PL-00001, *Training Program Plan*. This plan describes the overall requirements for training and establishes a framework that adequately implements DOE Order 426.2, *Personnel Selection, Qualification, Training and Certification Requirements for DOE Nuclear Facilities*, for FBP. The plan is implemented through a suite of procedures, including FBP-TRN-PRO-00005, *Qualification and Certification*; FBP-TRN-PRO-00003, *Training Presentation and Evaluation*; FBP-TRN-PRO-00007, *Systematic Evaluation of Training Programs*; and FBP-TRN-PRO-00009, *Continuing Training*. Table 2 of the plan lists the necessary minimum education and experience and specifies certification and qualification requirements for each position, whether management, supervisor, operator, technician, or other. Certification and qualification programs for operators and their immediate supervisors are valid for a two-year period. Table 5 of the plan provides a training position implementation matrix, which lists the specific coursework required by job position. FBP-TRN-PL-00002, *Training Implementation Matrix*, describes FBP's method for implementing the requirements of DOE Order 426.2 and includes a requirements matrix that lists the requirements from the DOE order, identifies the specific compliance documents and references, and identifies any exceptions. Additional training requirements for personnel involved in waste management are listed in FBP-WM-PL-00045, *Matrix of Implementing Procedures and Training for Disposal of Waste at the NNSS*. FBP's training program is designed to ensure that the personnel who conduct the project activities and operate and maintain the facilities are qualified and competent. The training program's procedures and training elements include continuing/refresher training and the use of feedback and continuous improvement methods. EA found that the training program for waste operators and supervisors was comprehensive and satisfied the requirements of the DOE order.

Quality Assurance and Self-assessments

FBP's Environment, Safety, Health and Quality group has established a contractor assurance system to ensure quality and provide feedback on the effectiveness of site waste management programs. Procedure

FBP-QP-PRO-00020, *Problem Reporting and Issues Management*, discusses the quality assurance (QA) program description assessment process. FBP assessments include independent assessments, management self-assessments, surveillances, and observations. The assessments are scheduled to ensure that the whole program is assessed on a rolling three-year basis. Functional area managers provide input to the master schedule, which includes both required assessments and risk-based, discretionary assessments.

EA reviewed the list of independent assessments and management assessments FBP scheduled for fiscal year (FY) 2015 and found the scope of planned assessments covers a substantial portion of the waste management program. The list included 16 required and 15 discretionary assessments in the area of waste management, encompassing waste certification, waste operations, waste programs, waste minimization, NDA measurement and data reporting, NDA training and qualification, and transportation. In addition, ten QA assessments were listed to ensure compliance with various programs and procedures involving radioactive waste.

FBP's Environmental Protection group performs an oversight role for low-level radioactive waste (LLRW) handling and storage in accordance with procedure FBP-QP-PRO-00023, *Surveillances*. This group has a team of subject matter experts who look at waste management and address vulnerabilities, emphasizing areas where the Ohio Environmental Protection Agency has focused. EA reviewed two surveillances that the group had recently performed. The monthly surveillance of the universal, satellite, 90-day accumulation, and Resource Conservation and Recovery Act (RCRA) Part B storage areas for the month of April 2015 found all aspects to be acceptable, with no findings and only minor comments. The May 2015 monthly surveillance of LLRW areas throughout the site covered 12 facilities. This surveillance concluded that all aspects reviewed were acceptable, but also included numerous comments involving identification and signage of LLRW storage and staging areas and labeling of waste items. EA concluded that the contractor's oversight of LLRW operations is acceptable; however, FBP surveillances should have identified the waste drums with faded labels stored outside, and the waste staged in X-326 beyond a year, as discussed in section 5.3.

Waste Minimization and Pollution Prevention

Plan FBP-WM-PLN-00084, *Waste Minimization and Pollution Prevention*, identifies multiple methods by which the contractor can reduce the amount of waste being generated, such as purchasing only what is necessary, substituting non-hazardous chemicals, modifying behaviors to avoid the creation of waste, segregating clean materials from radioactively contaminated materials, and recycling or recovering materials. Concepts of waste minimization and pollution prevention are carried into FBP's procedures for implementation, as the EA team observed during numerous activities. For example, in Building XT-847, multiple waste streams containing recyclable materials are collected, sorted, packaged, and shipped to recycling centers. At PORTS, waste items such as clean cardboard, fluorescent tubes, lead-acid batteries, and pesticides are segregated for recycle or special disposal.

Records Management

Procedure FBP-BS-PRO-00062, *Records Management Process* requires FBP to maintain detailed records of all waste that is generated, packaged, stored, or shipped from PORTS. The procedure specifies that waste records will be maintained in a combination of electronic and paper formats. Electronic waste records are to be produced for each step and each process that the waste package undergoes. The procedure specifies that the software program eMWaste is used to collect and store these electronic records. However, as discussed in Section 5.3, operators in X-326 were using an unauthorized spreadsheet instead of eMWaste. Qualified records custodians handle the records in each step, and transportation specialists peer-review and audit the records to ensure completeness. Paper copies of all records relating to a specific shipment are reportedly collected and kept in a four-hour fire safe, then after three years, these records are submitted to FBP's centralized document control system and transferred

into a vault for long-term storage.

Waste with No Identified Path to Disposal

FBP inherited many types of waste when it became the primary contractor at PORTS, including waste that cannot be shipped off site without some level of in-house processing, for security or accountability reasons. One such waste stream involves a legacy waste material referred to as High Enriched Fluoride Solids (HEUFS) or informally as "gunk" that formed from an inadvertent leak of oil into the enrichment process gas. HEUFS contains enriched uranium, as well as hazardous elements, making it mixed low-level waste (MLLW). According to FBP management, HEUFS has been thoroughly tested and characterized, and various treatments have been attempted over the years. FBP has recently established a treatment technology for this MLLW designed to result in a path forward to dispose of HEUFS.

5.2 Radioactive Waste Generation

Criteria:

The waste generation facility has established processes that assure hazardous and radioactive waste streams are properly identified and characterized. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.3 Criteria 1

Hazards associated with the generation and handling of wastes are identified. Processes are developed, designed, and implemented for the safe collection, segregation, and analysis of generated wastes. Appropriate control sets are developed and implemented to address these hazards. Control sets include engineered controls, administrative process controls, training, and monitoring. Where applicable, these hazards and controls are documented and addressed in the facility safety basis, technical safety requirements, and implementing procedures. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.3 Criteria 2

Waste treatment or disposal paths are identified for each waste stream. Waste Acceptance Criteria for treatment, storage, or disposal facilities are identified, incorporated into procedures and practices, and communicated to applicable personnel. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.3 Criteria 4

Waste packaging procedures are developed and implemented that conform to the WAC and applicable transportation regulations. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.3 Criteria 5

As a D&D site, FBP is currently generating, managing, and dispositioning large amounts of LLRW, including process components (project wastes) from ongoing D&D of Building X-326, waste generated at other onsite facilities, and legacy waste materials from former operations. Building X-326 process component waste includes converters, compressors, and coolers that are being removed from the cell floor after undergoing a cut and cap process. These large, contaminated components are lowered by crane to the operating floor, where each component is placed into LLRW storage and managed according to subordinate FBP plans and procedures governing disposition, followed by ultimate transfer to the Nevada National Security Site (NNSS) for disposal. Interim steps before transfer for disposal may include various movements, storage, NDA, processing or treatment, and preparation for shipment. Most of the LLRW currently being generated or stored at PORTS, including X-326 wastes and other dry active waste (DAW) from around the site, are being shipped offsite for disposal at NNSS. Once the new PORTS onsite disposal cell is completed, the LLRW created by D&D activities will be disposed of onsite.

FBP has established a waste certification process for wastes destined for NNSS to ensure that waste packages are appropriately monitored and that documentation is reviewed to certify conformance with the

NNSS WAC before transfer. A series of operating procedures outlines the steps in the process for packaging, characterizing, marking, labeling, and certifying these wastes prior to transport, including specific documentation of all waste within each shipment and acceptance of these shipments from the disposal site before their release from PORTS.

Although NNSS is the preferred disposal path for most LLRW from current D&D operations at PORTS, FBP recognizes that offsite disposal will not be suitable or feasible for the D&D waste from the remaining process buildings X-330 and X-333, where process components are much larger than those at X-326, making movement, handling, and transportation to NNSS impractical. As such, FBP is working toward an appropriate path for onsite disposal of these and other wastes. FBP is in the process of securing regulatory approval for construction of an onsite disposal cell to disposition these D&D wastes safely while minimizing the handling and transportation hazards and the costs associated with offsite disposal. This project is only at DOE Critical Decision level 0 to 1, but construction of the onsite disposal cell is expected to begin later this year, pending the necessary regulatory approvals.

5.3 Radioactive Waste Accumulation, Storage, or Staging

Criteria:

Hazards associated with the accumulation, storage, and staging of wastes have been identified, analyzed, and documented. An appropriate set of controls have been identified in the facility safety basis and implementing procedures. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.4 Criteria 1

Facilities shall be designed to accommodate the projected volume of waste to be received. Engineering controls shall be incorporated in the design to monitor volume inventory data and to prevent spills, leaks, and overflows from tanks or confinement systems. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.4 Criteria 2

Processes are established and implemented to assure inventory controls, WAC conformance, and documentation of wastes container constituents. Facility inventory records are maintained to accurately reflect receipt, effluent release, transformation, and transfer of wastes and hazardous materials. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.4 Criteria 3

Low-level waste shall be stored in a location and manner that protects the integrity of waste for the expected time of storage. Storage facilities are designed and maintained with environmental controls appropriate for conditions to maintain waste container integrity for the duration of the storage period, i.e. temperature, humidity. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.4 Criteria 5

Waste treatment or disposal paths are identified for each waste type in storage. WAC for subsequent treatment or disposal facilities are identified, incorporated into procedures and practices, and communicated to applicable staff. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.4 Criteria 7

LLRW generated during cut and cap operations on the cell floor is stored and managed on the operating floor of the same building. The X-326 building structure is in overall good condition and offers sufficient space and protection for storage of LLRW awaiting disposition. EA observed robust criticality safety controls in X-326, including effective postings and adherence to spacing requirements for wastes and other radioactive materials in storage. FBP work planning and control (WP&C) processes for identifying and controlling hazards associated with LLRW activities were generally effective, including the existence of governing work packages and procedures that contain appropriate work scope definition, hazard identification, and specification of required controls.

FBP documents the generation and movement of all LLRW using eMWaste, which tracks all radioactive waste generated, treated, stored, transported, and disposed. In X-326, each process component removed from the cell floor is assigned and labeled with a unique eMWaste barcode that is affixed to the component and also to the outer waste package when the component is packaged. Issuance of an eMWaste barcode label also generates an eMWaste Waste/Material Generation form (WMG), which is intended to document all relevant identifying information for the specific component, such as its origin location, waste container type, waste characteristics, and specific waste contents (including component type, weight, etc.). The barcode label and WMG follow the specific waste through all interim steps, such as NDA, movement, and processing, before and during transportation to the disposal site. EA found that eMWaste and subordinate waste tracking systems at X-326 are effective in tracking specific interim locations of components and their associated movements from inception to disposal. The eMWaste system similarly is intended to be used to track all other PORTS LLRW generated, stored, and shipped, including legacy wastes and other LLRW generated across the site.

While WP&C processes are generally effective, EA identified some concerns and potential vulnerabilities with LLRW accumulation, storage, or staging, in the areas of hazard analysis and controls, procedural compliance, outdoor storage and protection, and timely disposal of accumulated wastes.

With respect to identification and control of hazards, EA noted some hazards and/or hazardous conditions, such as an improperly functioning door knob/lockset that could cause an egress issue from a hazardous waste storage area, an unlabeled flammable storage cabinet with flammable materials inside, a labeled class 3 container that was empty, and red asbestos tape marking an area that had previously had all asbestos-containing material removed. In addition, the job hazards analysis (JHA) for waste movement and handling activities identified a number of hazards appropriately but did not consider the potential for heat stress in workers who are dressed out in hot conditions. Although site management took decisive actions to address these concerns as they were raised, these concerns suggest some inattention to detail.

Procedural deviations that EA observed at X-326 were associated with waste tracking and labeling, including tracking waste movement in a manner inconsistent with FBP-WM-PRO-00046, *Waste/Recyclables Tracking*, and neglecting to record container weights on the waste information label as required by FBP-WM-PRO-00295, *Waste Container Labeling and Marking Requirements for Storage*. Workers in X-326 use an Excel spreadsheet to track container movements and specific container locations, rather than the site-wide eMWaste program, as required byFBP-WM-PRO-00046, Section 6.5. Although the Excel spreadsheet is effective, it is a deviation from the approved procedure. In a related procedure compliance matter, workers affix the waste information labels required by FBP-WM-PRO-00295 to the waste containers but do not record the container weight on the label as required by the procedure. (EA noted that most waste information labels had "N/A" in the weight field.) FBP stated that a separate waste ticket with the container weight is affixed to the component or waste package immediately after weighing, so recording the weight on the label is unnecessary. However, EA found that the separate weight ticket is difficult to read due to the small font size and the low lighting conditions in X-326. Using a separate weight ticket does not obviate the need to fill out the waste labels as required, or to revise the procedure if appropriate. (See **OFI-FBP-01**.)

DOE Manual 435.1-1, Chapter IV N (2) imposes a storage limit of one year on LLRW that has an identified path to disposal, unless otherwise authorized by the field element manager. Chapter IV N (3) of the manual also requires LLRW to be stored in a location and manner that protects the integrity of waste for the expected time of storage and minimizes worker exposure. DOE Guide 435.1-1, Chapter IV N (2) and (3) provide additional information on acceptable methods for meeting these requirements.

EA observed that while FPB is effective in generating, managing, and dispositioning most D&D waste at X-326, some waste containers across the site are stored outside for long periods of time, unprotected from

the environment. These include wastes primarily packaged in low specific activity (LSA) type metal boxes, as well as legacy containers at locations including X710, X847, X720, and X747A. The dates on the legible waste container labels range from 2010 to the present, but many labels are degraded, and some boxes pre-date FBP. Many of the containers are rusted from long-term exposure to the elements. FBP has no formal plan or schedule for relocating these containers into facilities and/or transferring them for treatment or disposal. In addition, while many process components cut from the cell floor are characterized, packaged, and shipped within several months, FBP still has a large inventory of process component wastes that were generated several years ago but are still in storage, with no priority for disposition, and the one-year storage limit is not factored into the eMWaste database or waste/recyclables tracking procedure. With regard to the one-year time limit, DOE Guide 435.1-1 explains that the intent of the DOE Manual 435.1-1 requirement is not to focus unduly on compliance or noncompliance, but to focus managers' attention on managing waste to ensure disposal in a reasonable time frame. Further, DOE Guide 435.1-1 states that if it appears that the storage limits will be exceeded, managers should evaluate the conditions of storage and determine a proper and safe course of action, with DOE field element concurrence. FBP has not taken this approach for the large amounts of waste stored outside under adverse conditions or the process wastes that could reasonably be shipped off site within the specified one-year time period from generation. (See **Finding F-FBP-01**.)

5.4 Radioactive Waste Identification, Characterization, and Monitoring

Criteria:

Waste Stream Identification and Characterization. The facility has established processes that assure hazardous and radioactive waste streams are properly identified and characterized. Waste stream characterization and analysis processes and capabilities are designed and implemented to verify conformance with the WAC. Processes incorporate appropriate levels of documentation and clearly defined data quality objectives and limiting conditions. (DOE Order 435.1; DOE Manual 435.1-1, Chapters I and IV) EA CRAD 31-11 Section 4.2 Criteria 1

Data Quality: Data quality objectives process, or a comparable process, shall be used for identifying characterization parameters and acceptable uncertainty in characterization data. Measurement and analysis procedures shall clearly define acceptance criteria and response actions for non-conforming results. Measurement and analysis shall be conducted using established, documented, and effective calibration, instrument maintenance, and measurement quality control processes. (DOE Order 435.1; DOE Manual 435.1-1, Chapters I and IV) EA CRAD 31-11 Section 4.2 Criteria 4

Characterizations and Waste Product Analysis. Waste product characterization and analysis processes and capabilities are designed and implemented to verify conformance with all aspects of the WAC. Processes incorporate clearly defined data quality objectives, limiting conditions, and acceptance criteria, and specify appropriate levels of documentation. Measurement and analysis equipment is verified to perform the intended function and an appropriate calibration and measurement data quality control and review process is implemented. (DOE Order 435.1; DOE Manual 435.1-1, Chapters I and IV) EA CRAD 31-11 Section 4.5 Criteria 9

A comprehensive set of processes and procedures has been developed and implemented for identification, characterization, and certification of wastes generated, processed, packaged, and shipped as part of the PORTS D&D project. Radioactive waste management at PORTS is governed at a high level by the WMP. Wastes generated by the D&D project are defined under four separate categories: project wastes, process wastes, legacy wastes, and spill cleanup wastes. Project wastes consist primarily of equipment, building debris and rubble, concrete, and residual soils. Process wastes are those produced by ongoing routine site activities, such as maintenance, laboratory operations, water treatment, and uranium transfer operations, as well as used supplies such as disposable PPE. Legacy wastes were generated, conglomerated, and packaged by previous contractors other than FBP or brought from offsite locations.

As currently packaged, these legacy wastes may not conform to current disposal waste profiles and historical records of their source, as well as characterization data may not be clearly documented. Spill cleanup wastes result from maintenance or D&D activities that open process lines or equipment and may include various hazardous material constituents, such as hydraulic fluids, transformer compounds, lubricants, fuels, and mercury switch residuals, as well as radiological constituents.

Procedure FBP-WM-PRO-0007 *Waste Characterization and Classification*, defines the roles, responsibilities, authorities, and accountabilities of the various positions and personnel involved in the waste characterization and disposition process; provides a flow chart of the data collection process; and sets out instructions regarding data quality objectives and usability. FBP-WM-PL-00083, *Waste Characterization Plan*, defines the operational data evaluation and collection activities for identifying, monitoring, and characterizing the waste constituents. Other relevant procedures address data quality objectives, instrument calibrations, QA/quality control, and records archiving.

Use of Historical and Process Knowledge

The initial phase is to identify the waste stream and eventual transport and disposition pathways. Most of the currently generated waste is packaged for shipment and eventual disposal at NNSS and has been identified with one of the established waste profiles approved by the NNSS Waste Acceptance Review Panel. FBP-WM-PL-0008, *Qualifying Waste Streams for Nevada*, outlines the process to determine acceptability under one of the established waste profiles. The selection of the intended waste profile determines the necessary characterization data. Historical and process knowledge is used to provide as much of the characterization information as possible. Significant historical process knowledge is available for the process components in X-326 and is used effectively to focus the sample analysis plans for this waste stream. Drawing on lessons learned from the termination of production activities at other GDPs, the PORTS facility shutdown was methodically planned to allow for safe standby with controlled removal of product material from the equipment. As a result of this careful process, the records for characterizing the status of residual material in the process components are available and reasonably well archived. While some components are transferred to X-705 for further processing, there is relatively little need for invasive action to mine the residual product out of the components when compared with D&D activities at other GDPs. Gaps in the available data are identified to determine the types of monitoring or assays needed to fully characterize the waste for conformance to the waste profile. The identified monitoring and assays then become the basis for the sample analysis plan, which may include grab samples or swipes from inside process equipment for radiological and chemical laboratory analysis, direct radiation survey instrument-based measurements outside the equipment or containers, NDA gamma spectroscopy, or NDA gross neutron counts. Before removal of any component from the process stream, it undergoes a direct measurement survey to verify assumptions for criticality and worker safety. More invasive sampling and laboratory analysis are typically performed on a selection of components or items from a class or grouping of equipment to provide scaling factors or ratios to apply to the NDA measurements performed on each individual component.

Data Quality and Anomalies

The defined process for characterizing radiological constituents in the waste is generally sound for evaluating components for which the historical and process knowledge is accurate; the vast majority of the process equipment currently being removed from Building X-326 of the GDP meets this criterion. However, the characterization process contains some vulnerabilities that are most apparent for legacy or spill wastes, which contain materials that may not be clearly identified or lack historical or process knowledge, or wastes packaged by previous site contractors lacking accurate characterization records.

The waste disposition specialists, in coordination with the waste characterization specialists, develop the sample request and the sample analysis plans based on the available historical data. The data collection forms provide very specific instructions to the assay technicians and laboratory technicians regarding

what samples to collect, tests to perform, and analytic results to report. The analysis process is managed by a cost code accounting system to ensure performance of only the analyses that the waste characterization specialist finds necessary based on historical knowledge. The laboratory and assay technicians are instructed to analyze and document specifically what was requested. The system is intended to support productive, efficient waste disposition activities and prevent an open-ended, continual analysis process. To the extent that the analyses encompass the critical characteristics for WAC conformance, this process is sufficient. However, the process does not include a mechanism for the laboratories to identify outliers in the data, and the documentation forms that summarize the laboratory instrument printouts generally do not provide for reporting indications of additional constituents or potentially anomalous results. Consequently, the data that is reported back to the waste characterization or certification specialist is biased toward the expected result, and some pertinent information may not be fully analyzed or reported. This process is sufficient when historical and process knowledge is accurate, but it could miss anomalies or hidden hazards. This limited, narrow-range questioning and analysis process is less likely to adequately address hazards or anomalies associated with legacy wastes, spill wastes, construction debris, and contaminated soils, particularly considering the lower certainty and confidence in historical process knowledge associated with these waste streams. (See **OFI-FBP-02**.)

EA observed a sampling of processes and practices for calibration and QA testing of the field gamma spectroscopy, neutron NDA measurement, and laboratory sample counting equipment, and found the practices to be well implemented and capable of ensuring reliable and accurate measurement results. Further, all major process components removed for disposal are individually checked by some form of NDA. EA noted this direct confirmatory measurement of all components as a positive practice.

However, some field measurement data sheets lacked recorded measurement units. Others indicated multiple components with identical results or "less than" threshold numbers. While these results may have been artifacts of the instrument counting statistics, counting efficiency calculations, background, or minimum detectable activity, EA could not determine any basis from the available data sheets. The written data did not provide the pertinent counting parameters for such interpretations, and as a result the recorded data record provided little information of use for trending or individual component characterizations. Further, many data sheets did not provide guidance to the measurement technicians with respect to acceptable ranges of the measurement or response to outlier data. The measurement technicians may observe differences in measurement results, but they are not assigned responsibility for evaluating the acceptance of the data or specifically noting anomalies. The process assumes that the waste characterization specialists will review the data for acceptance. (See **OFI-FBP-03**.)

Other Waste Streams

As the focus moves to characterization, disposition, and shipment of other legacy waste streams, the historical records, previous characterization, and conformance of the packaging to current waste profiles or shipping regulations may not be sufficient for direct shipment for disposal. Many of the containers must be opened, visually inspected, assayed, sorted, and re-packaged. Waste certification technicians observe the assay and re-packaging process to ensure conformance with the physical aspects of the WAC and waste profiles that cannot be measured by external NDA monitoring, such as restrictions on vials of free liquids, pressurized gas cylinders, certain metals, potentially hazardous chemicals, leaking sealed sources, or combinations of specific incompatible materials (organics and acids). During EA's interviews and observations, FBP and DOE PPPO oversight support contractors identified a potential vulnerability in the waste certification process for non-radiological characteristics for WAC conformance: waste package certification technicians need training to recognize anomalies and must be vigilant during observations, but there has been substantial and regular turnover in the staff trained to perform these responsibilities. (See **OFI-FBP-04**.)

5.5 Processing, Treatment, and Packaging Operations

Criteria:

Hazards associated with the generation and handling of wastes are identified. Processes are developed, designed, and implemented for the safe collection, segregation, and analysis of generated wastes. Appropriate control sets are developed and implemented to address these hazards. Control sets include engineered controls, administrative process controls, training, and monitoring. Where applicable, these hazards and controls are documented and addressed in the facility safety basis, technical safety requirements, and implementing procedures. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.3 Criteria 2

Waste treatment or disposal paths are identified for each waste stream. Waste Acceptance Criteria for subsequent treatment, storage, or disposal facilities are identified, incorporated into procedures and practices, and communicated to applicable personnel. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.3 Criteria 6

Waste packaging procedures are developed and implemented that conform to the WAC and applicable transportation regulations. Packaging processes must ensure compatibility with waste constituents. Change control and review processes are implemented to assure material compatibility and conformance to the WAC. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.3 Criteria 7

LLRW processing, treatment, and packaging take place at various facilities across PORTS. EA observed waste processing at X-705; container inspection, overpacking, and preparation for shipment in X-744G; and inspection and re-packaging of DAW into B-25 boxes in XT-847. As in X-326, criticality safety controls at all these locations include effective postings and strict adherence to spacing requirements for wastes and other radioactive materials held for storage. In addition, the governing work packages and procedures generally provide clearly defined scopes of work, identify hazards, and specify the required controls.

LLRW processing operations at PORTS are performed primarily in the X-705 building, which contains processes and equipment necessary for disassembly and decontamination of equipment. The X-705 facility supports waste management processing for wastes generated through ongoing D&D activities across the site, such as the barter transfer project, the cut & cap project, laboratory waste operations, and the flame tower ash project. Contaminated equipment and waste materials that do not meet shipping and/or disposal site acceptance criteria normally undergo processing at X-705, based on the results of characterization. These activities include decontamination (removal of deposits) and/or chemical processing to generate acceptable waste solutions or solids.

EA observed two X-705 waste recovery operations governed by work packages and operations procedures. The first EA observation included activities conducted in the X-705 South Annex under FBP-NO-PRO-00092, *South Annex Operations.* This is an engineered room at the south side of the facility used to contain contamination; the room has its own ventilation and fire suppression system and is isolated from the rest of the building during operations. EA observed inspection and repackaging of waste material into smaller containers in this room and noted no problems. A second observed activity was handtable (open-faced chemical hood) operations, governed by FBP-NO-PRO-00051, *Operation of Batching Handtable and B-38 Measurement System.* In this work, uranium-bearing liquids generated at the site were processed in the recovery handtable and transferred into the facility liquid safe storage system. The liquids processed by the handtable included solutions, generated through cylinder cleaning operations, laboratory wastes, and field decontaminations. The EA team noted several potential worker safety concerns related to use of sharps while working with airline bubble hoods and chemical resistant PPE, the potential for hydrogen fluoride generation, and workers' lack of confirmation of local ventilation

before beginning work. These concerns resulted from actions contrary to controls stipulated in the JHA and the procedure. Facility and FBP health and safety management promptly responded to these observations by changing equipment or PPE and/or clarifying the procedure.

The EA team also observed waste container inspection, overpacking, and preparation for shipment in X-744G in accordance with Integrated Work Document (work control document No. 1414644), *UMC Lot #14 Overpackaging and Preparation for Shipping*. The scope of these activities included un-palletizing drums, overpacking drums into 85-gallon U.S. Department of Transportation (DOT) 7A Type A fissile rated vented drums, labeling the exterior of the overpack, palletizing the overpacked drums, and preparing the packages of material for shipment to NNSS. EA observed appropriate use of hoisting and rigging, including inspections of equipment and completion of required checklists. However, the initial pre-job briefing observed for this activity did not discuss the hazards and controls as required by FBP-NSF-PRP-00002, *Pre-Job Briefing and Post-Job Review* (even though the briefing checklist indicated this item as completed); subsequent briefings included a more complete discussion of hazards and requisite controls. Additionally, EA identified a concern about the use of hearing protection. Workers could exceed the eight-hour time-weighted average exposure when working ten-hour days, given the noise reduction rating (NRR) of the hearing protection in use. The FBP Industrial Hygiene (IH) staff had not collected any noise dosimetry data for this activity. FBP safety and health management and IH staff promptly responded by collecting additional data showing that workers were below the prescribed limits when taking the NRR into account. However, even with hearing protection, worker exposure could approach the limits. Facility and IH management stated that they are investigating additional sound deadening methods/materials to apply to surfaces.

The week before EA's onsite observations, an "open and inspect" operation in Building X-847 resulted in a precursor contamination event that highlighted some hazards that had not been fully recognized and controlled in accordance with established procedures. In this incident, a "legacy waste" barrel containing older industrial smoke detector sources was opened for visual inspection, sorting, and re-packaging. Previous barrels had all contained fully intact smoke detector heads. Based on this previous experience, the barrel was opened with a lower level of precaution and preparation than the procedures required for unknown legacy wastes. However, this particular barrel contained americium-241 (alpha emitting) sources that had been removed from the heads, and some were leaking. The opening and handling process resulted in contamination of the localized area and personnel (though no significant personnel uptakes were identified). In response, management appropriately initiated a stand-down of the process to allow analysis of causal factors and development of lessons learned and corrective actions. The incident highlighted some potential vulnerability in the established characterization and certification processes for legacy wastes with respect to the protection of facility workers:

- Assumptions about the contents and conditions of specific legacy waste containers may not be consistent with past experience with similar containers.
- Hazard recognition and WP&C processes must be fully applied every time to accommodate uncertainties and contingencies.
- Containment enclosures and localized ventilation controls may be necessary for opening some containers.
- Real-time radiological and environment, safety, and health monitoring may be needed when opening legacy containers for which the conditions or contents are not fully known.

Many of the process buildings that are part of the PORTS D&D project are considered hazard category 2 facilities because the hazard analyses identify criticality safety concerns. The principal credited safety systems are criticality alarm systems. Other potential credited systems, such as containment, ventilation, and fire detection and suppression, were not included during the original production mission. As a result, fire detection and suppression systems in the facilities are mostly considered as defense in depth and are limited in some areas due to potential criticality concerns. Similarly, most of the buildings did not need and do not have negative pressure confinement or credited effluent ventilation filters, and truck bay

access doors are routinely kept open. While the Am 241 smoke detector incident did not result in detectable personnel uptakes, it highlighted a need to consider establishing engineered controls, such as localized containment structures and ventilation systems for opening and inspecting legacy waste containers. (See **OFI-FBP-05**.)

EA also observed inspection and re-packaging of DAW into B-25 boxes at XT-847 in accordance with FBP-WM-PRO-00116, *Separation of Dry Active Waste*. Use of PPE and operation of forklift equipment were appropriately performed in accordance with FBP-OS-PRO-00057, *Powered Industrial Trucks*. The radiation work permit (RWP) for this activity required the use of respiratory protection (full face air-purifying or powered air-purifying respirator) and assignment of a breathing zone air sampler (BZA) to a member of the work crew. However, the radiation control technician (RCT) assigned the BZA to the waste packaging certifier (WPC), who was not representative of the worker with the highest potential for exposure. The other two team members (operators/waste handlers) had a greater potential for exposure to airborne contaminants, as they were opening bags and disturbing waste contents, while the WPC observed at a distance. FBP safety and health management and Radiological Operations staff promptly responded with instruction to the assigned RCT and a review of the RWP.

The observed packaging activities did not include compaction or super-compaction to reduce the volume and/or void space when the material was emplaced in the B-25 containers. DOE Manual 435.1-1 and the NNSS WAC both refer to waste minimization, waste form stability, and void space limitations to support efficient use of disposal cell volumes and ensure the long-term performance of the disposal cells by minimizing the potential for slumping or subsidence. This includes treatment of waste to reduce volume and provide a more stable waste form, as well as the use of techniques such as crushing, shredding, or placing smaller pieces inside the openings of larger pieces, such as pipes, to increase structural stability. Current packaging practices observed at PORTS did not ensure that the interior volume of waste containers were packaged efficiently and compactly with a goal of minimizing void spaces. Volume reduction and stabilization techniques such as compaction, supercompaction, and/or grouting are also not used. Although the NNSS radioactive waste acceptance program has reviewed and approved the waste profiles used at PORTS, the practices at PORTS do not ensure minimization of the potential for slumping or subsidence as expected by the DOE Order and NNSS WAC. (See **OFI-FBP-06**.)

5.6 Waste Transportation

Criteria:

A documented waste certification process has been established and implemented. Waste packages are appropriately certified prior to transfer. Documentation of the package contents and characteristics is transferred to receiving facilities and appropriately archived. The waste certification program shall designate the officials who have the authority to certify and release waste for shipment; and specify what documentation is required for waste generation, characterization, shipment, and certification. The program shall provide requirements for auditability, retrievability, and storage of required documentation and specify the records retention period. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.3 Criteria 8

Acceptance by the receiving facility is verified prior to transfer of wastes. Shipping or transfer to other facilities is performed and documented in accordance with applicable transportation regulations, implemented in accordance with appropriate local procedures, and performed by trained and knowledgeable personnel. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.3 Criteria 9

Hazards associated with the accumulation, storage, and staging of wastes have been identified, analyzed, and documented. An appropriate set of controls have been identified in the facility safety basis and implementing procedures. Hazard analysis and controls consider: Material at Risk inventory limits;

potential emergency situations such as fires, or natural phenomenon hazards; criticality if applicable; container degradation process such as corrosion, chemical reactivity, pressurization, flammable gas generation, radiolytic processes; off gassing and facility ventilation controls; and biological intrusion. (DOE Order 435.1, DOE Manual 435.1-1 Chapters I and IV.) EA CRAD 31-11 Section 4.4 Criteria 4

EA observed waste packaging activities at X-326, X-744G, and X-847, performed under FBP procedures that include FBP-WM-PRO-00062, *Waste Packaging Requirement for Disposal at the NNSS*; FBP-WM-PRO-00043, *Waste Package Marking and Labeling Requirements for Shipment and Disposal at the NNSS*; FBP-WM-PRO-0004, *Off-Site Shipment of Hazardous (Including Radioactive Material(s)/ Waste(s)*; FBP-WM-PRO-00090, *Waste Generation*; and FBP-SM-PRO-00890, *NCS Requirements for Container Handling and Storage*. FBP packaged wastes for transportation in accordance with applicable DOT or site transportation requirements and used appropriate packaging designed to contain waste materials in a manner that would prevent release or distribution under conditions reasonably anticipated during transportation. The observed waste shipments were appropriately designated as Class 7 radioactive materials, and the waste containers were labeled in accordance with the applicable DOT and site/disposal site requirements based on the classifications, package types, specific activities, dose rates, waste forms, and other contents. The FBP WPC and RCTs monitored waste containers and transport vehicles for accessible contamination several times during the staging and before shipment, as required by procedures. Contamination levels were verified by FBP RCTs to conform to DOT limits. All transport vehicles were monitored by FBP RCTs for radiation levels and contamination upon receipt, and empty vehicles were also monitored for radiation levels and contamination before being released. Also, prior to staging of vehicles for shipment at the X-747K yard, trailers were appropriately placarded with the DOT Class 7 Radioactive placard. Shipment manifests accurately reflected the package labeling and markings, and FBP requires copies of all shipment records be maintained in storage for retrieval if necessary.

EA reviewed FBP waste shipment manifests and documentation for several waste shipments destined for NNSS. These were contained in a package entitled "NNSS Carrier's Driver Packet," which included the following elements:

- Notification/response process in the event of an incident
- Requirements to maintain exclusive use shipment
- Vehicle placarding requirements
- Highway routing requirements
- NNSS site access requirements.

During the FBP process for driver acceptance, each driver was required to produce his/her commercial driver's license and medical card to confirm that the individual met the Federal motor carrier requirements. In advance of shipment, the following items are required to be confirmed in place and acceptable by FBP. For the shipments reviewed by EA each of the following required elements were observed to be met:

- Visual inspection to ensure the integrity of all packages
- Review of DOT specification markings (e.g., gross weight, Radioactive LSA)
- Confirmation of placards being present (as indicated on shipment summary)
- Pictures taken of all four sides of the conveyance and the packages as appropriate
- Driver receipt of completed truck/trailer checklist
- DOE/Nuclear Regulatory Commission (NRC) 741 form reviewed and approved by FBP Nuclear Material Control and Accounting
- Confirmation that inbound and outbound radiological surveys have been received and were within limits.

5.7 Waste Disposal

Criteria:

Low level radioactive waste disposal facilities are sited, designed, operated, and closed in a manner that protects site workers, current and future public health and safety, and the environment by ensuring that waste will be properly managed in accordance with applicable regulations and DOE programs. Specifically, there should be a reasonable expectation that the following performance objectives will be met:

- *(a) Dose (total effective dose equivalent from all exposure pathways, excluding the dose from radon and its progeny in air) to representative members of the public shall not exceed 25 mrem in a year.*
- *(b) Dose (total effective dose equivalent, excluding the dose from radon and its progeny) to representative members of the public via the air pathway shall not exceed 10 mrem in a year.*
- *(c) Release of radon shall be less than an average flux of 20 pCi/m^2/s at the surface of the disposal facility. Alternatively, a limit of 0.5 pCi/L of air may be applied at the boundary of the facility.*

(DOE Order 435.1; DOE Manual 435.1-1, Chapters I and IV) EA CRAD 31-11 Section 4.7

The existing radioactive waste disposal areas at PORTS are closed and capped and are monitored under the site environmental monitoring program, which was not within the scope of this EA review.

Although NNSS is the preferred disposal path for most LLRW from current D&D operations at PORTS, FBP recognizes that offsite disposal will not be suitable or feasible for the remaining process wastes to be generated once the X-326 D&D is complete. These will include D&D waste from the remaining process buildings X-330 and X-333, where process components are much larger than those at X-326, so moving, handling, and transporting those wastes to NNSS will be impractical. Waste management planning at PORTS has considered these obstacles, and FBP is working toward an appropriate path for onsite disposal of these and other wastes.

Accordingly, FBP is in the process of securing regulatory approval for constructing an On-Site Waste Disposal Facility (OSWDF) for dispositioning the remaining D&D wastes safely while minimizing the handling and transportation hazards and costs associated with offsite disposal. The OSWDF project is currently at the Critical Decision 0/1 project level, and construction is expected to begin later this year, pending the necessary regulatory approvals.

5.8 DOE Field Element Oversight

Criteria:

DOE line management has established and implemented effective oversight processes that evaluate the adequacy and effectiveness of the contractor's radioactive waste management program. (DOE Order 226.1B) EA CRAD 31-11 Section 4.8

DOE line management maintains sufficient technical capability and knowledge of site and contractor activities to make informed decisions about hazards, risks, and resource allocation; provide direction to contractors; and evaluate contractor performance. (DOE Order 226.1B) EA CRAD 31-11 Section 4.8

PPPO provides DOE oversight of radioactive waste management for the deactivated FUEF at PORTS as required by DOE Manual 435.1-1 Chapter 1, Section 2.F (10). Most of this oversight is conducted by Facility Representatives (FRs) and support service contractors, who augment the PPPO oversight staff at PORTS. In addition, the safety system oversight (SSO) engineer and other qualified PPPO staff periodically perform oversight, with supplemental support from the Environmental Management Consolidated Business Center for review areas needing special expertise.

PPPO has established a set of internal processes and procedures to oversee the contractors at PORTS and the Paducah GDP. Plan PPPO-M-413.1-1, *Management Plan*, describes the PPPO organization and identifies the functions, responsibilities, and authorities of PPPO management and staff. Similarly, PPPO-M-226.1-2, *Oversight Program Plan*, describes PPPO's implementation of DOE Order 226.1B for conducting oversight and developing an accurate assessment of the contractor's performance. PPPO-M-420.1-3, *Safety Systems Oversight Program Plan*, establishes the framework for the PPPO SSO program and defines the roles and responsibilities for implementing the program, while the recently updated PPPO-2691323, *Facility Representative Program Plan*, defines the roles, responsibilities, and performance requirements for the FRs.

Assessments and surveillances of the contractor are scheduled, conducted, and reported in accordance with procedure PPPO-2533131, *Assessment and Surveillance Process*. The scope and frequency of assessments and surveillances at PORTS are based on several factors, including past weaknesses in the contractor's safety performance; specific hazards at the facility; the level of risk and potential consequences in the operation; upcoming contract changes or transitions; and resource limitations.

A team of four to six people conducts each assessment, depending on the subject and complexity, and each assessment is led by a PPPO staff member who has completed NQA-1 training. In FY 2013 and 2014, there were 22 assessments and 49 surveillances conducted at PORTS. Since waste management is a key part of nearly all work performed at PORTS, most of these assessments touched on some element of the FBP radioactive waste management program. Formal assessment of this program is part of the annual ISMS Phase II verification review, and additional aspects of the program are assessed as needed. For example, in FY 2013, supplemental surveillances or independent reviews were performed on the NDA program and the work control requirements for the cut and cap activities. FY 2014 saw an assessment of the NDA program, along with assessments of the environmental management system and environmental radiation protection program. Similarly, in FY 2015, assessments are planned or have been conducted for FBP WP&C, the FBP transportation and packaging management program, and FBP NDA measurement and quality control. Based on the broad scope of assessments and surveillances related to Radioactive Waste Management, EA found this aspect of PPPO's oversight to be sufficient.

PPPO tracks each assessment it conducts to ensure that the contractor responds to the assessment findings and completes appropriate corrective actions. For deficiencies that fall within PPPO's responsibility, procedure PPPO-M-414.1-1, *Corrective Action Program*, establishes responsibilities and methods for initiating, documenting, and completing measures to correct the problems. The assessment findings are tracked in a computer-based DOE Management Tracking System (MTS). Issues identified during PPPO assessments are also tracked in the FBP corrective action program for appropriate follow-up. EA reviewed a listing of issues in MTS related to either radiation protection or waste for a six-month period in 2014. Of the 60 identified issues, most relate to missing or improper radiation area postings and incomplete boundaries or failure to maintain materials within the boundaries. EA judged only nine to be "rad-waste" related, most of which were minor instances of improper labeling or material not being stored within a designated radioactive material area. Many of these items are residual issues from USEC operations. For the items reviewed, EA found PPPO's issues tracking system to be effective.

The PPPO *Annual Workforce Analysis and Staffing Plan Report for Calendar Year 2014* summarizes the combined technical staff needs for the Paducah GDP and PORTS. This report indicated that 26 technical staff full-time equivalents were on board, but identified a need for 37. PPPO indicated that most of the staffing gaps are at Paducah, although PORTS also has some vacancies. PPPO has been working to fill these vacancies, and because upcoming retirements at both sites may compound the shortage of technical staff, PPPO is appropriately and proactively taking steps to address the staffing issue.

Oversight of waste management operations is the responsibility of the PPPO D&D Project Manager for Waste and Nuclear Operations, who coordinates the triennial transportation compliance assessment

program review conducted by Office of Environmental Management staff from DOE Headquarters and also directs a review of FBP's waste management program annually. The project manager acknowledged that he must keep aware of continually changing conditions in the FUEF buildings and ensure that FBP evaluates these conditions and implements appropriate safety measures. He also must maintain awareness and provide input on development of disposal pathways for complicated legacy waste, such as the high-enriched uranium "gunk" and ash. The project manager added that when possible, he provides suggestions for improving processes for maintaining exposures ALARA or for reducing waste generation. EA notes that the PPPO project manager should have questioned FBP on the extended storage of waste (beyond the one year limit), and inappropriate outdoor storage. With these exceptions, EA concluded that the PPPO project manager's oversight of waste management operations is generally adequate.

PPPO has one qualified SSO engineer, who spends considerable time overseeing FBP's NDA, nuclear safety, and criticality safety programs. The SSO engineer typically conducts six assessments per year, depending on the contractor's activities. While this is an adequate level of assessment, with only one SSO engineer, PPPO lacks depth in this key area.

FRs, augmented by technical support from RSI, provide most of the daily oversight of the various operations and D&D efforts at PORTS. The three qualified FRs divide up the responsibilities for conducting oversight by facility, although they also have sufficient familiarity with the entire site to cover other facilities as needed. EA accompanied one of the qualified FRs on a walkthrough of the X-744G facility, where the Fernald Lot 14 materials are being overpacked. The FR was knowledgeable of the facility and the work being performed there. During the walkthrough, the FR checked for correct labeling on drums, control of combustibles, illuminated exit signs, up-to-date tags on fire extinguishers, properly signed logbooks, workers in the proper PPE, general housekeeping, and other appropriate items. Neither the FR nor EA noted any radiological waste issues during the walkthrough, but there was a fire protection issue that the FR appropriately documented on a field observation report and entered into the MTS.

Overall, the DOE assessment program and its implementation are adequate in evaluating the adequacy and effectiveness of the contractor's radioactive waste management program. As with most sites undergoing decommissioning, the conditions in the process buildings are subject to change and require frequent monitoring. The PPPO staff and support contractors demonstrated in-depth knowledge of the PORTS site and the contractor's primary radioactive waste activities in each facility, and they seem capable of making informed decisions about hazards, risks, and resource allocation; providing direction to contractors; and evaluating contractor performance related to the management of radioactive waste.

6.0 CONCLUSIONS

Overall, FBP has established a comprehensive radioactive waste management program at the PORTS site. The program generally meets the requirements of DOE Order 435.1, but has not effectively ensured integrity of some waste containers and labeling for wastes being stored outdoors, or in meeting one year storage limitations for some waste streams with paths for disposal. The program is implemented through plans and procedures to control and manage radioactive wastes as they are generated, accumulated, staged, characterized, packaged, stored, monitored, and shipped off site for disposal. However these plans and procedures may need enhancement to correct identified weaknesses in container integrity and storage limitations. Waste tracking and documentation was generally effective, however FBP was not following institutional procedures for tracking all container movements with FBPs eMWaste software, indicating a weakness in conduct of operations for a nuclear facility. EA also noted a few concerns in hazard analysis and controls. Waste management procedures generally include programmatic requirements for waste minimization and the waste management personnel who were interviewed were sufficiently trained and qualified, and demonstrated competency in their jobs.

The PPPO oversight program at PORTS with respect to radioactive waste management is generally

effective. PPPO conducts assessments and surveillances of various aspects of the contractor's radioactive waste management, including a formal assessment of the waste management program as part of the ISMS Phase II verification review. FRs are trained and qualified, and they identify deficiencies in FBP's handling of radioactive waste, which are entered into the MTS issue management system and communicated to FBP. The Federal Project Manager for Waste and Nuclear Operations and the SSO engineer both have key roles in oversight and assessment of FBP's radioactive waste management program in such areas as nuclear criticality safety, NDA, and transportation.

7.0 FINDINGS

As defined in DOE Order 227.1, *Independent Oversight Program*, findings are significant deficiencies or safety issues that warrant a high level of management attention. If left uncorrected, findings could adversely affect the DOE mission, the environment, the safety or health of workers or the public, or national security. Findings may identify aspects of a program that do not meet the intent of DOE policy or Federal regulation. Corrective action plans must be developed and implemented for findings identified by EA. Cognizant DOE managers must use site- and program-specific issues management processes and systems developed in accordance with DOE Order 227.1 to manage these corrective action plans and track them to completion.

Finding F-FBP-01: FBP has not ensured that all LLRW with identified paths for disposal at PORTS are stored in appropriate facilities protected from the elements and/or are disposed of in a timely manner, consistent with the requirements of DOE Manual 435.1-1.

8.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified the following opportunities for improvement (OFIs) for FBP. These recommendations are not intended to be mandatory. Rather, they are suggestions that may assist site management in implementing best practices or provide potential solutions to minor issues identified during the review. It is anticipated that these OFIs will be reviewed and evaluated by the responsible line management organization and accepted, rejected, or modified as appropriate in accordance with site-specific program objectives and priorities.

OFI-FBP-01: Consider improving conduct of operations with respect to waste management procedure compliance and recognition of deviations and need for procedure revisions. Specific actions could include:

- Provide additional conduct-of-operations training to supervisors and staff to recognize the need for strict procedure compliance or initiate procedure revisions to reflect actual or intended practices.
- Determine root cause for failing to use eMWaste database for interim movement of container locations in X-326, as required by FBP-WM-PRO-00046, *Waste/Recyclables Tracking*, or otherwise identifying this discrepancy as a possible indicator of a conduct of operations weakness. Evaluate current practices and pedigree regarding use of an informal excel spreadsheet to determine if this is acceptable practice and ensure procedures accurately reflect conduct of operations.
- Ensure compliance with the weight labeling requirements of FBP-WM-PRO-00295, *Waste Container Labeling and Marking Requirements for Storage*, which does not allow the use of N/A for container weight. Evaluate possible conduct of operations weaknesses in relation to procedure compliance.

OFI-FBP-02: Consider reviewing and, if appropriate, modifying the sample analysis plans and monitoring documentation to ensure that anomalies or additional identified constituents are analyzed and communicated to the waste certification specialists.

OFI-FBP-03: Consider providing guidance on the waste characterization data sheets to remind the field technicians to 1. record the measurement units; 2. indicate the general background radiation levels; and 3. identify laboratory instrument capabilities that may influence data interpretation. Also, consider providing instructions for technicians on the expected range for the data, so that they will be able to recognize whether the data is reasonable or should be re-counted or noted as being anomalous.

OFI-FBP-04: Consider evaluating the factors that influence WCT staff turnover and evaluating methods to ensure that adequate trained staff are available to meet workload expectations.

OFI-FBP-05: Consider establishing areas and acquiring equipment to support use of localized engineering controls, such as confinement; filtered ventilation; environment, safety, and health monitoring; and fire suppression for open-and-inspect activities to compensate for uncertainties in the historical records and process knowledge.

OFI-FBP-06: Consider reconciling the current waste packaging practices with the DOE manual and NNSS long term performance criteria for void space and stability. As appropriate, consider establishing volume reduction or compaction capabilities for specific waste profiles that are intended for direct disposal.

9.0 ITEMS FOR FOLLOW-UP

None.

Appendix A
Supplemental Information

Dates of Review

Onsite Review: May 4-7 and May 18-22, 2015

Office of Enterprise Assessments (EA) Management

Glenn S. Podonsky, Director, Office of Enterprise Assessments
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Thomas R. Staker, Director, Office of Environment, Safety and Health Assessments
William E. Miller, Director, Office of Nuclear Safety and Environmental Assessments
Patricia Williams, Director, Office of Worker Safety and Health Assessments
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Appendix B
Key Documents Reviewed and Interviews

FBP Documents Reviewed

- FBP Waste Management Organizational Charts, dated 2/15/2015
- FBP-NSE-AA-00001/R1, *Authorization Agreement for the Portsmouth Former Uranium Enrichment Facilities for Fluor-B&W Portsmouth LLC, Piketon, Ohio*, Rev 1, February 2014
- FBP-NSE-PRO-00002, *Pre-Job Briefing and Post-Job Review*, Rev. 11, 3/16/2015
- FBP-WM-PL-00001, *Waste Management Plan*, Rev. 3, December 2013
- FBP-WM-PL-00008, *Qualifying Waste Streams for Disposal at the Nevada National Security Site*, Rev. 4, October 2013
- FBP-WM-PL-00045, *Matrix of Implementing Procedures and Training for Disposal of Waste at the Nevada National Security Site*, Rev. 4, January 2014
- FBP-WM-PL-00083, *Waste Characterization Plan*, Rev. 1, 4/14/2014
- FBP-WM-PL-00084, *Waste Minimization and Pollution Prevention*, Rev. 0, 5/21/2013
- FBP-WM-PRO-00007, *Waste Characterization and Classification*, Rev. 2, 12/19/2013
- FBP-WM-PRO-00012, *Management of Waste Storage Areas*, Rev. 3, 9/2/2014
- FBP-WM-PRO-00017, *Waste Storage*, Rev. 4, 4/7/2014
- FBP-WM-PRO-00018, *Management of the RCRA Part B Storage Area*, Rev. 2, 10/15/2013
- FBP-WM-PRO-00036, *Radiologically Contaminated Materials and Equipment*, Rev. 2, 5/19/2014
- FBP-WM-PRO-00039, *Waste Container Operations*, Rev. 5, 2/4/2014
- FBP-WM-PRO-00043, *Waste Package Marking and Labeling Requirements for Shipment and Disposal at the NNSS*, Rev. 3, 9/3/2013
- FBP-WM-PRO-00046, *Waste/Recyclables Tracking*, Rev. 5, 10/20/2014
- FBP-WM-PRO-00047, *WCO Procurement and Inspection of Items Critical to the Portsmouth Waste Certification Program*, Rev. 3, 2/20/2013
- FBP-WM-PRO-00050, *Profiling Waste for Disposal at the Nevada National Security Site*, Rev. 3, 10/17/2013
- FBP-WM-PRO-00051, *Motor Carrier Evaluation Program (MCEP) Carriers*, Rev. 4, 1/29/2013
- FBP-WM-PRO-00052, *PORTS Motor Carrier Operations*, Rev. 7, 10/30/2014
- FBP-WM-PRO-00054, *NDA Data Flow and Review Process*, Rev. 7, 11/5/2013
- FBP-WM-PRO-00062, *Waste Packaging Requirement for Disposal at the NNSS*, Rev. 4, 8/29/2013
- FBP-WM-PRO-00063, *Certification of PORTS Waste for Disposal at the Nevada National Security Site*, Rev. 4, 2/18/2014
- FBP-WM-PRO-00090, *Waste Generation*, Rev. 4, 5/19/2014
- FBP-WM-PRO-00103, *Repackaging Containers of Process Waste in FUEFs*, Rev. 3, 12/1/2014
- FBP-WM-PRO-00116, *Separation of Dry Active Waste*, Rev. 2, 5/29/2014
- FBP-WM-PRO-00122, *DOE Material Storage Areas*, Rev. 0, 3/15/2012
- FBP-WM-PRO-00131, *Quantitative Neutron Measurements for Miscellaneous Items*, Rev. 5, 8/14/2014
- FBP-WM-PRO-00134, *Gamma-Ray Detector Calibration*, Rev. 1, 10/10/2013
- FBP-WM-PRO-00135, *MCC Operation of the Uranium-Plutonium System (UPu)*, Rev. 0, 1/22/2013
- FBP-WM-PRO-00136, *Quantitative Measurement of Boxed Waste Using NDA 2000*, Rev. 2, 12/29/2014
- FBP-WM-PRO-00137, *Neutron Slab Calibration*, Rev. 3, 11/20/2014
- FBP-WM-PRO-00138, *Operation of the Uranium Quantitative System (UQUANT)*, Rev. 0, 10/10/2013
- FBP-WM-PRO-00139, *Gamma Scanning*, Rev. 7, 6/18/2014

- FBP-WM-PRO-00141, *Calibrating the Low Density Waste Assay Monitor (LDWAM) System Using NDA 2000*, Rev. 2, 3/11/2015
- FBP-WM-PRO-00142, *Operating the Low Density Waste Assay Monitor (LDWAM) Using NDA 2000*, Rev.2, 3/11/2015
- FBP-WM-PRO-00143, *MCC Calibration/Verification of the UPu*, Rev. 0, 1/22/2013
- FBP-WM-PRO-00164, *Batching Contaminated Solids Utilizing NDA Results*, Rev. 3, 6/9/2014
- FBP-WM-PRO-00175, *Contaminated Liquids Sampling and Batching*, Rev. 3, 5/27/2014
- FBP-WM-PRO-00254, *Waste Handling*, Rev. 4, 6/30/2014
- FBP-WM-PRO-00260, *NDA Source Control*, Rev. 4, 2/26/2015
- FBP-WM-PRO-00262, *Managing Empty Containers*, Rev. 2, 10/28/2013
- FBP-WM-PRO-00264, *Waste Disposition*, Rev. 2, 1/2/2014
- FBP-WM-PRO-00274, *Calibration/Calibration Confirmation for Gamma Detector*, Rev. 6, 11/9/2014
- FBP-WM-PRO-00275, *Operation of the Uranium Quantitative System (UQUANT)*, Rev. 11, 11/18/2014
- FBP-WM-PRO-00278, *Filling Dewars with Liquid Nitrogen*, Rev. 3, 8/25/2014
- FBP-WM-PRO-00279, *HMS4 Measurements and Analysis*, Rev. 6, 7/22/2014
- FBP-WM-PRO-00280, *HMS4 Instrument Setup*, Rev. 2, 8/7/2013
- FBP-WM-PRO-00281, *HMS4 System Calibration and Confirmation*, Rev. 3, 8/7/2013
- FBP-WM-PRO-00282, *HMS4 Detector System Acceptance Testing*, Rev. 3, 8/7/2013
- FBP-WM-PRO-00288, *Calibration/Calibration Confirmation of the InSpector Multi-Channel Analyzer and Germanium Detector (IMCG)*, Rev. 2, 6/27/2013
- FBP-WM-PRO-00290, *Operation of the InSpector Multi-Channel Analyzer and Germanium Detector (IMCG)*, Rev. 5, 12/17/2014
- FBP-WM-PRO-00292, *Loading and Transporting X-326 Process Gas Component Containers for Off-Site Shipments*, Rev. 2, 12/16/2014
- FBP-WM-PRO-00294, *Preparation, Staging, and Loading of Off-Site Waste Shipments*, Rev. 2, 11/11/2014
- FBP-WM-PRO-00295, *Waste Container Labeling and Marking Requirements*, Rev. 0, 8/26/2013
- FBP-WM-PRO-00296, *Inspection of Previously Packaged Waste*, Rev. 0, 9/30/2013
- FBP-WM-PRO-00297, *Palletizing Waste and Waste Containers*, Rev. 0, 9/30/2013
- FBP-WM-PRO-00304, *Non-Destructive Assay Data Integrity Process*, Rev. 0, 5/12/2014
- FBP-WM-PRO-00305, *Nondestructive Assay Assurance Administration*, Rev. 0, 5/8/2014
- FBP-WM-PRO-00309, *Operation of the Neutron Slab Counter Array System (NSCAS)*, Rev. 1, 8/27/2014
- FBP-WM-PRO-00310, *NDA Surrogate Converter Operations*, Rev. 0, 6/26/2014
- FBP-WM-PRO-00311, *NDA Total Measurement Uncertainty (TMU) Activities*, Rev.0, 2/5/2015
- FBP-WM-PRO-00312, *NDA Environmental Factors*, Rev. 0, 5/21/2014
- FBP-BS-PRO-00024, *Developing and Maintaining Technical Procedures*, Rev. 10, 10/9/2014
- FBP-BS-PRO-00062, *Records Management Process*, Rev. 9, 11/12/2014
- FBP-RP-PRO-00033, *Radiological Surveys to Support Waste Shipments to the Nevada National Security Site*, Rev. 4, 1/31/2013
- FBP-RP-PRO-00036, *Radiological Surveys for the Receipt, Transport, and Movement of Radioactive Materials*, Rev 3, 1/31/2013
- FBP-TRN-PL-00001, *Training Program Plan*, Rev. 4, March 2015
- FBP-TRN-PL-00002, *Training Implementation Matrix*, Rev. 1, November 2014
- FBP-TRN-PRO-00003, *Training Presentation and Evaluation*, Rev. 2, 3/7/2013
- FBP-TRN-PRO-00005, *Qualification and Certification*, Rev. 2, 3/5/2015
- FBP-TRN-PRO-00007, *Systematic Evaluation of Training Programs*, Rev. 1, 5/22/2013
- FBP-TRN-PRO-00009, *Continuing Training*, Rev. 1, 5/16/2013
- FBP-QP-PRO-00020, *Problem Reporting and Issues Management*, Rev. 10, 2/4/2015

- FBP-QP-PRO-00023, *Surveillances*, Rev. 3, 9/30/2014
- FBP-PM-POL-00002, *Integrated Safety Management System Policy*, Rev. 1, 12/19/2013

- Work Control Document No. 1414829, *Receipt, Movement, Bagging, Wrapping of Components to Support D&D Operations and associated JHA*, Rev. 0, Date 11-12-2014
- Work Control Document No. 1414688-01, *Move, Clean, Spray and Lower Compressors, Coolers, and Converters to Operating Floor, and associated JHA*, Rev. 1

PPPO Documents Reviewed

- PPPO-M-226.1-2, *Oversight Program Plan*, Rev 1, March 2010
- PPPO-M-413.1-1, *Management Plan*, Rev. 2, January 2007
- PPPO-M-414.1, *Corrective Action Program*, Rev. 1, March 2010
- PPPO-M-420.1-3, *Safety Systems Oversight Program Plan*, Rev. 0, October 2009
- PPPO Observation Custom Report (Sample of MTS Data - Third Quarter FY2014), 7-8-14
- PPPO-2533131, *Assessment and Surveillance Process*, Rev. 2, October 2014
- PPPO-2691323, *Facility Representatives Program Plan*, Rev. 3, March 2015
- DOE/PPPO/03-0235&D0, *Quality System for Nondestructive Assay Characterization*, Rev. 0, May 2011
- DOE/PPPO/03-0032&D7, *Integrated Groundwater Monitoring Plan for the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio*, Rev. 0, May 2014
- DOE/PPPO/03-0084&D3, *Integrated Surveillance and Maintenance Plan for the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio*, Rev. 2, October 2013
- PPPO-01-Contract DE-AC30-10CC40017, Section J – Modification 130, Attachment 2: Lists A & B of Contract No. DE-AC30-10CC40017, Portsmouth D&D Project
- *FY 2012 PPPO Assessment & Surveillance Plan (PORTS)*, 2-21-12
- *FY 2013 PORTS Assessment & Surveillance Plan*, 11-4-13
- *FY 2014 PORTS Assessment & Surveillance Plan*, 7-10-14
- *FY 2015 PORTS Assessment & Surveillance Plan*, 4-29-15
- PPPO-03-2741247-15, "DE-AC30-10CC40017: Final Report for the Independent Assessment of the Fluor-B&W Portsmouth, LLC Transportation and Packaging Program (PORT-15-IA-100762)," 1-23-15
- PPPO-03-2798133-15, "DE-AC-10CC40017: U.S. Department of Energy Acceptance of Fluor-B&W Portsmouth, LLC Corrective Action Plan for the Independent Assessment of Transportation and Packaging Program (PORT-15-IA-100762)," 03-09-15
- PPPO-03-1615386-12, Letter from W. Murphie to S. O'Connor, "Request For Authorization From The U.S. Department Of Energy Headquarters Certifying Official To Transport Lot 14 Material From The Portsmouth Site To The Nevada National Security Site," 10-10-12
- Field Observation Report 2720, *Two Fire Extinguishers Not Mounted in X-744G*, 5-19-15
- Printout from MTS Listing Various Radiation and Waste Items from April 2013 to April 2015

Interviews

FBP Personnel
- Environmental, Safety, Health and Quality Director
- Waste Management Director
- Waste Management Program Manager
- Waste Management Program Supervisors
- Nuclear Safety Manager
- Operations & Maintenance Manager

- Performance Assurance Manager
- QA Manager (Acting)
- Nondestructive Analysis Operations Manager (Acting)
- Nondestructive Analysis Data QA/QC Personnel
- Waste Characterization Supervisor
- Waste Characterization Specialists
- Waste Disposition Specialists
- Waste Certification Manager
- Waste Certification Lab Technicians - Gamma Spectroscopy
- Waste Operations Managers
- Waste Operations Supervisors
- Waste Operations Personnel
- Transportation Manager
- Transportation Coordinator
- Transportation Personnel
- Waste Engineering Manager
- Radiation Protection Manager
- Radiation Protection Supervisors
- Radiation Protection Technician(s)
- Measurements Laboratory Personnel
- Sample Management Manager
- Records Management Coordinator
- Records Custodian
- Environmental Protection Manager
- Environmental Monitoring Specialists and Technicians
- Industrial Hygienists
- Permitting and MOU Coordinators
- Work Planning and Control Coordinator
- Pollution Prevention Coordinator
- Training Coordinator

PPPO Personnel

- PPPO Federal Project Manager, Waste & Nuclear Operations
- PPPO Waste Management Subject Matter Expert
- PPPO Radiological Protection Subject Matter Expert
- PPPO Radiation Protection Oversight Support Contractor
- PPPO Environmental Monitoring Subject Matter Expert
- PPPO SSO Engineer
- PPPO Facility Representatives
- PPPO Facility Oversight Support Contractors