

SECTION C

Performance Work Statement

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SECTION C

Performance Work Statement (PWS)

C. OVERVIEW

The Department of Energy, Portsmouth/Paducah Project Office (DOE-PPPO) is deactivating and remediating the Paducah Gaseous Diffusion Plant (PGDP). This scope of work defines requirements to be completed during the Period of Performance (POP). Activities required during the POP are detailed below and include activities to continue performing uranium removal, perform ⁹⁹Tc thermal treatment, and continue optimizing facility systems/structures to minimize short-term and long-term Surveillance and Maintenance (S&M) costs. In support of S&M cost reduction efforts, DOE is pursuing various alternatives for additional office space to permit deactivation of administrative facilities that have historically high S&M costs, such as C-100, C-720, and C-300. The Contractor shall fully support these efforts as part of this performance work statement (PWS). Additionally, the Contractor shall continue implementation of the Environmental Remediation Program as described in the Site Management Plan (SMP) under the Federal Facility Agreement (FFA) for the Paducah Site. The Contractor shall make every effort to optimize and reduce S&M costs. As the Contractor is able to optimize and drive down S&M costs, it is anticipated that additional stabilization and deactivation and remediation (D&R) activities may be requested as Technical Options. It is expected that these additional activities will be performed consistent with the available funding for each year. The goal of the additional D&R activities is to reduce risk and accelerate reduction in long-term S&M costs and future demolition costs.

C.1. INTRODUCTION

The PGDP is located on a Federal reservation in Western Kentucky, approximately 10 miles west of Paducah, Kentucky, and 3.5 miles south of the Ohio River. The plant is situated on approximately 3,423 acres divided as follows:

- Approximately 615 acres within a fenced limited security area;
- Approximately 822 acres of support area surrounding the limited security area; and
- 1,986 acres licensed to the Kentucky Department of Fish and Wildlife as part of the West Kentucky Wildlife Management Area.

Additionally, there are approximately one hundred thirty-three acres of off-site easements primarily associated with incoming raw water lines and pumps from the Ohio River, emergency notification sirens, and environmental sampling stations. Bordering the Paducah Site to the northeast, between the plant and the Ohio River, is the Tennessee Valley Authority Reservation where the Shawnee Steam Plant is located.

The PGDP is a Government-owned uranium enrichment plant that was constructed in the early 1950's and operated by the U. S. Department of Energy (DOE) and its predecessor agencies for manufacturing enriched uranium for the fabrication of fuel assemblies to

support commercial and military nuclear reactors and to support weapons development activities. Processing operations are currently terminated, and D&R activities are being conducted, but PGDP still includes Hazard Category 2 Nuclear Facilities primarily based on the uranium inventory. Other radioactive materials, such as transuranics, are present and contribute to the hazard categorization of the facilities.

The uranium enrichment program utilizing the gaseous diffusion process produced various hazardous, non-hazardous, and radioactive byproducts. These activities resulted in contamination of equipment, facilities, soil and groundwater with radioactive and hazardous constituents, and the generation of various wastes, including those regulated under the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), and the Atomic Energy Act (AEA). These wastes include construction debris; sanitary waste; Hazardous Waste (HW); radioactive Low-Level Waste (LLW); Mixed Low-Level Waste (MLLW); Transuranic Waste (TRU); and Mixed TRU (MTRU) Waste. The site was placed on the National Priorities List (NPL) in 1994. The most significant contaminants are Trichloroethene (TCE), radionuclides, and Polychlorinated Biphenyls (PCBs).

TCE and Technetium-99 (⁹⁹Tc) was discovered in residential wells north of the Paducah Site in 1988. There are two off-site groundwater contamination plumes, referred to as the Northwest and Northeast Plumes, and identified several potential on and off-site source areas requiring additional investigation and action. An additional on-site plume has been found to the southwest. A series of Remedial Investigation/Feasibility Studies (RI/FS) were conducted under the FFA, including the evaluation of all potential major contaminant sources impacting groundwater and surface water. The project continues to evaluate on-going potential sources of contamination. In accordance with these investigations, DOE implemented interim actions that focused on reducing potential risks associated with off-site contamination. Historically, the four primary areas that have been associated with the groundwater remediation initial response project are: the Northeast and Northwest Groundwater Plumes (Pump and Treat Project); C-400 Source Remediation; Southwest Plume Sources Remediation; and Burial Grounds Operable Unit.

As a result of the offsite groundwater contamination, the Paducah Site was placed on the NPL in 1994. DOE entered into an FFA with the U.S. Environmental Protection (EPA) and the Commonwealth of Kentucky on February 13, 1998. All site cleanup and remediation activities are conducted in compliance with applicable federal, state, and local laws and regulations. The principal regulating agencies are the EPA Region 4 and the Kentucky Department for Environmental Protection (KDEP).

The approach to site cleanup is outlined in the FFA, where the cleanup is divided into Operable Units (OUs). The OUs are composed of approximately 570 Solid Waste Management Units (SWMUs) which are listed in the Paducah FFA Site Management Plan (SMP) and the RCRA Permit. The active OUs are:

- a. Groundwater OU (GWOU);
- b. Surface Water OU (SWOU);
- c. Soils OU (SOU); and
- d. Burial Grounds OU (BGOU).

The *Community Relations Plan under the Federal Facility Agreement at the U.S. Department of Energy Paducah Gaseous Diffusion Plant* defines public involvement for the environmental remediation program. DOE entered into an FFA with the EPA and the Commonwealth of Kentucky on February 13, 1998. The FFA established one set of consistent requirements for achieving comprehensive site remediation in accordance with the RCRA and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), including stakeholder involvement. Remediation activities are performed in accordance with the requirements of this agreement.

The Paducah Citizens Advisory Board (CAB), a Site Specific Advisory Board chartered by DOE under the Federal Advisory Committee Act, is made up of individuals with diverse backgrounds and interests. It meets monthly to focus on early citizen participation in Environmental Management priorities and related issues at the PGDP. The CAB provides advice on on-going and planned projects at PGDP.

Section 3 155 of Public Law 103- 160, the National Defense Authorization Act for Fiscal Year 1994, authorized the Secretary of Energy to transfer, for consideration, all rights, title, and interest of the United States in and to personal property and equipment if the Secretary determined that such transfers will mitigate the adverse economic consequences that might otherwise arise from the restructuring of the Department of Energy (DOE) facility. The Paducah Economic Development (PED), formerly called the Paducah Area Community Reuse Organization, is the DOE locally designated entity for the receipt of excess DOE personal property.

PGDP facilities and its ancillary structures and systems are listed in Section J, Attachment J-18, PGDP D&R Facilities/Areas Assignment of Responsibility. In addition to the four (4) large process buildings (C-331, C-333, C-335, and C-337) and the smaller C-310 Purge and Product Withdrawal Building, the C-315 Tails Withdrawal buildings, the C-360 Toll and Transfer Facility, and C-337-A and C-333-A feed facilities, the remaining structures are support facilities such as steam systems, electrical switchyards, cooling towers, cleaning and deactivation facilities, water and wastewater treatment plants, maintenance and laboratory facilities, and office buildings. Finally, the buildings are served and connected by an extensive network of utilities, systems (such as security, safety, and nuclear criticality systems), roads, and sidewalks.

The Paducah site currently has three (3) prime contractors and a technical support services contractor that support DOE with ongoing activities. The contractors and their respective summary level of scope are described below:

- a. The D&R Contractor is responsible for ongoing deactivation, surveillance, maintenance, environmental remediation activities, and site-wide utilities at PGDP;
- b. The Infrastructure Contractor is responsible for site infrastructure, such as roads and grounds, janitorial services, and security/classification to include Site Officially Designated Security Authority (ODSA) for DOE interests;
- c. The DUF₆ Contractor is responsible for the operation of the Depleted Uranium Hexafluoride (DUF₆) Conversion Plant and management of DOE UF₆ cylinders; and
- d. The Environmental Technical Services (ETS) contractor provides environmental, technical, and administrative support services directly to DOE.

C.1.1. Project Purpose and Scope

The PGDP D&R Project encompasses managing over 650 structures, properties, or buildings (Section J, Attachment J-18) with approximately 7,500,000 ft² of floor space. The Contractor shall perform necessary Surveillance and Maintenance (S&M) of these facilities and prepare the facilities for future demolition. The Contractor shall provide utilities to itself and other site tenants as detailed in Section J, Attachment 12 Government Furnished Services and Interface. The Contractor shall perform deactivation and decommissioning in accordance with the PWS. The Contractor shall also assist in transfers/assignment of structures, property or buildings to new tenants for purposes of re-use or re-industrialization, as appropriate. The Contractor shall perform all site and facility environmental remediation, and waste management, as outlined in this PWS.

The scope of this Contract focuses on the continued deactivation of the PGDP facilities, preparing the facilities for future demolition, and environmental remediation activities required by the FFA and SMP.

C.1.2. Objectives and Programmatic Requirements

The Contractor shall achieve the objectives stated below while continuing to maintain compliance throughout performance of this Contract.

- Achieve continuous cost and process improvements and optimization for activities.
- Safely, securely, and cost effectively transition ongoing activities at the PGDP to minimize necessary S&M and utility O&M under DOE safety bases.
- While supporting continuity of on-going site cleanup operations, identify and eliminate systems, processes, etc. that are no longer necessary to maintain safe configuration of the facilities.

- Reduce systems not directly required to maintain safety and environmental compliance. Identify ways to further reduce requirements to perform the most cost effective approach for operations and S&M.
- Actively pursue activities to re-categorize facilities enabling a minimal level of S&M (e.g., Hazard Category 2 to Radiological Facility).
- Operate support facilities at the capacity necessary to safely support site needs.
- Develop, finalize and implement approved environmental remediation, demolition, and waste disposal facility CERCLA documents under the Paducah FFA.
- Maintain public and worker safety and health, and environmental protection.
- Reduce the overall DOE Paducah landlord costs.
- Comply with all applicable Federal, State, and local laws and regulations, Executive Orders, DOE Orders (and other types of Directives), and Regulatory Permits, Agreements, Orders and Milestones (both State and Federal) (See Section J, Attachment J-4, Requirements Sources And Implementing Documents (List A) And List Of Applicable DOE Directives (List B)).
- Provide all deliverables to DOE in accordance with all requirements of this Contract and those specifically identified in Section J, Attachment J-13, Deliverables.

The DOE and the Contractor recognize the Paducah D&R Project contract is a cooperative undertaking that requires both parties to seek innovative approaches to achieve the end objectives. The continuation of streamlining and optimizing processes that result in elimination of unnecessary requirements are critical to accomplishing the PWS objectives.

The Contractor shall remediate specific areas on the site, complete deactivation activities, and operate the site waste storage facilities to include waste disposition. The Contractor is responsible for implementation of the overall OU strategy in accordance with the SMP, document number DOE/LX/07-1301&D2/R1 and (its subsequent revisions) under the Paducah FFA. Regulatory milestone dates reflect agreement among DOE and the regulators [i.e., the Kentucky Environmental and Public Protection Cabinet (Kentucky) and the United States Environmental Protection Agency Region 4 (EPA)].

C.1.3. Contractor Performance and Key Requirements

The Contractor shall implement a project structure and shall sequence the work to optimize the project schedule to achieve safe, cost-effective work/cleanup of the site while meeting all regulatory milestone dates. The Contractor shall negotiate agreements with the regulators to facilitate site clean-up and minimize waste. No negotiation or agreement shall be made without prior DOE notification and consent. No communication with regulators is authorized without prior DOE notification. To achieve the objectives stated below, the Contractor shall use its best efforts and shall cooperate in seeking elimination of as many unnecessary requirements as possible while continuing to maintain compliance throughout performance of this Contract. Contractor Performance and Key Requirements.

The Contractor shall furnish all personnel, facilities, equipment, material, services and supplies (except as set forth in this Contract to be furnished by the Government), and otherwise do all things necessary to accomplish work in a safe, secure (pursuant to 10 Code of Federal Regulations [CFR] 824), integrated, effective and efficient manner. The Contractor shall operate and perform deactivation and S&M activities for the facilities, buildings, trailers, and other structures and facilities (OSF) assigned in Section J, Attachment J-18 transferred from other site contractors as directed by DOE. The Contractor shall continuously assess opportunities to eliminate systems and facilities, and pursue consolidation of operations and personnel work areas whenever/wherever a cost benefit is derived. The Contractor shall be responsible for planning, integrating, managing and executing the programs, projects, operations and other activities as described in this PWS. Concurrent with the deactivation process, the contractor shall remediate and disposition specific areas on the site, perform facility deactivation and decommissioning, and operate the site waste storage facilities to include waste disposition.

This contract reflects the application of performance-based contracting approaches and techniques that emphasize results/outcomes and minimize “how to” performance descriptions. The Contractor has the responsibility for total performance under this contract, including determining the specific methods for accomplishing the work.

The Contractor shall develop, implement and maintain a comprehensive, resource-loaded Final Contractor Performance Baseline (CPB) as required by Section H.68 and DOE Order (O) 413.3B, and DOE Office of Environmental Management Memorandum “Policy and Protocol for Office of Environmental Management Operations Activities,” where applicable. The Contractor shall develop a requirements definition for each subproject to allow for accurate cost estimating, realistic schedule development, and the development of subcontract procurement packages. The Contractor shall evaluate all projects to determine if they are operating activities, General Plant Projects, or Capital Asset projects.

The Contractor shall provide general operations oversight and project management functions to enable the safe operation of the site. In addition, the Contractor shall be responsible for the operations, environment, safety, health and quality assurance within its own organization and its subcontractors' organizations. The Contractor shall provide site health and safety oversight for DOE, DOE technical support contractors and, at DOE's request, other personnel who are on-site in support of the DOE mission at PGDP (e.g., Kentucky Research Consortium for Energy and Environment (KRCEE) activities). The other major DOE contractors provide health and safety oversight for their activities. Furthermore, training program reciprocity/facility access between site contractors/tenants is required. The Contractor shall also ensure emergency response services are provided and available to all site tenants and shall be responsible for the Emergency Operations Center.

The Contractor shall ensure that its technical approach and execution of work is compliant with the applicable statutory and regulatory requirements and shall annually certify and provide to DOE its compliance with environmental requirements. The Contractor shall comply with and provide DOE with services necessary for its compliance with all applicable federal, state, and local requirements and agreements including the protection and preservation of cultural, historic, or archeological resources. The Contractor shall be responsible for all work necessary to obtain regulatory acceptance including legal/regulatory reviews and comment resolution. The Contractor shall recognize and work within the constraints imposed by this Contract and other regulatory agreements between DOE and regulatory agencies. Regulatory documents include, but are not limited to, all applicable laws, regulations, permits, plans, orders, and agreements.

The Contractor shall integrate all activities with other DOE contractors/tenants in areas of joint interface. The site contractors participate in a periodic coordination meeting called the Share Site Committee to address ongoing activities, reduce conflicts and coordinate schedules, and reinforce integration requirements. The Contractor shall lead the site's shared site committee and manage the shared site process.

The Contractor shall be the single point of accountability for the Paducah D&R Project activities, regulatory and DOE-EM interface, and project management in performance of this Contract.

If the Contractor submits a deliverable that DOE determines does not comply with the terms of the contract, the Contractor's revision or correction of the document/submittal shall be at no additional cost to DOE (See Section H.69 Unallowable Cost). This determination shall be at DOE's sole discretion. DOE notes that this compliance determination does not apply to the overall quality of the document (e.g. word processing) unless the errors impact the function and understanding of the document. If all of the contractual requirements are met such as timing of the submittal, inclusion of information required, factual

accuracy, etc. are provided, the document will be accepted. Further DOE requires that all submittals to DOE be final documents (even though the Contractor may expect comments from DOE) and shall be signed and certified when applicable so that DOE understands the approving Manager has read and agrees that the deliverable is technically correct, complies with the contract and applicable DOE Orders, and can be implemented without further action.

C.1.4. General End State Requirements

The applicable deliverables are provided in the PWS and Section J, Attachment 13 Deliverables. The Contractor shall comply with all deliverables dates and all regulatory milestone dates. Regulatory milestone dates can be found in documents such as the FFA, SMP, Agreed Orders, TCSA, Federal Facility Compliance Agreement (FFCA), and regulatory permits. Deliverables without specific dates identified shall be established by the Contractor during CPB development and throughout the Contract’s period of performance as approved by DOE. Changes to regulatory milestones do not alleviate Contractor responsibility to meet contractual or CPB milestone dates without specific approval by DOE.

C.1.5. Programmatic or Site Requirements Documents

Table C.1.5-1 General Project Programmatic or Site Requirements Documents*	
Document Number	Title
CP1-NS-3000, R2	Documented Safety Analysis for the Department of Energy Paducah Site Deactivation Project
CP1-NS-3001, R1	Technical Safety Requirements for the U.S. Department of Energy Paducah Site Deactivation Project
BJC/PAD-462/R10	Documented Safety Analysis for the C-746-Q Hazardous and Low-Level Waste Storage Facility, Paducah Gaseous Diffusion Plant, Paducah, Kentucky
BJC/PAD-498/R11	Technical Safety Requirements for the C-746-Q Hazardous and Low-Level Waste Storage Facility, Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/07-1707	Paducah Gaseous Diffusion Plant Federal Facility Agreement
DOE/OR/07-2099&D2R8	Community Relations Plan, June 2013
DOE/OR/07-1595&D2	Data and Documents Management and Quality Assurance Plan for Paducah Environmental Management and Enrichment Facilities, September 1998
Office of Environmental Management Memorandum	Policy and Protocol for Office of Environmental Management Operations Activities, March 15, 2012
No document number	Training Reciprocity Agreement Between Portsmouth/Paducah Project Office Prime Contractors (example)
BJC/PAD-688/R1	Cultural Resources Survey for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, March 2006

Table C.1.5-1 General Project Programmatic or Site Requirements Documents*	
Document Number	Title
DOE/OR/07-0107&D2/R5/V1	Methods for Conducting Risk Assessments and Risk Evaluations at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Volume 1. Human Health, June 2015
DOE/OR/07-0107&D2/R2/V2	Methods for Conducting Risk Assessments and Risk Evaluations at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Volume 2. Ecological, June 2015
DOE/LX/07-1269&D2/R2	Paducah Gaseous Diffusion Plant Programmatic Quality Assurance Project Plan, March 2015
DOE/LX/07-1301&D2/R1	Site Management Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Annual Revision-FY 2015, May 2015

**Table is not all inclusive applicable requirements documents. As documents are updated, the most current version will replace the versions identified in this table.*

C.2. WORK TO BE ACCOMPLISHED

EM.PA.0040.A001.06.DR PADUCAH CONTRACTOR TRANSITION

EM.PA.0040.A001.06.DR.01 Transition

Transition commences immediately upon issuance of Notice to Proceed (NTP) and shall not exceed 120 days. The NTP may occur simultaneously with the contract award date and the Contractor shall be prepared to fully mobilize when the NTP is issued.

Table C.2.EM.PA.0040.A001.06.DR.02-1 Contract Transition Implementation Milestones/Schedule	
Milestone	Date
Operational Responsibility Acceptance Declaration	Within 120 days after NTP

EM.PA.0040.A001.06.DR.02 Implementation

The Contractor shall perform all activities to support transition, including, but not limited to, facility walk-downs, engineering and design, procurement, review and acceptance or revision of safety authorization basis, programmatic and operational documents and procedures, and assisting DOE in verifying whether transition requirements have been met prior to the end of transition.

The Contractor shall perform a due diligence review of the facilities, systems, and environmental conditions within its assigned area of responsibility. The Contractor shall provide a written declaration to DOE, of its formal acceptance of responsibility for the assigned scope, facilities, and environmental/regulatory conditions.

The Contractor shall mobilize its Transition Management Team (comprised of the Program Manager, all other Key Position personnel identified in the Contract , and the Human Resource and Business Services personnel necessary to immediately begin transition activities) to site not later than 7 days after NTP. The Contractor shall determine the number of Human Resource and Business Services personnel necessary to support transition. The objective of the transition period is to establish

safety, operations, business, and human resources operations that will enable the Contractor to deliver requirements on time and within established funding. At a minimum, the Contractor shall complete:

- a. Transition of responsibility for all facilities, facility operations, and environmental permits,
- b. Due diligence walk downs and assessments of facilities and other areas,
- c. Modification of existing program documents (e.g., Worker Safety and Health Program Plan, Nuclear Critical Safety Program, ISMS Description, etc.),
- d. Acceptance of authorization basis documents,
- e. Hiring and training of all required staff,
- f. Establish procurement processes for materials, equipment, supplies, parts, and subcontractors for a seamless transition, and
- g. Any other actions necessary to enable the Contractor to formally accept responsibility for the entire PWS not later than 120 days after NTP.

Within 48 hours following the NTP, the Contractor shall release on its own website a brief Executive Summary of its offer and must meet the H.40 requirements. The purpose of this Executive Summary is to provide immediate release of relevant information to stakeholders and the public at large. It should include the following elements:

- a. Name of Contractor including the identification of any Teaming Partners and Major/Critical Subcontractors (if applicable) and a description of the experience that each brings to the project;
- b. Summary/Description of Contractor's Technical Approach (e.g., planned accomplishments, cost savings anticipated);
- c. Organizations Structure and Identification of Key Personnel;
- d. Commitments to the Community (if applicable);
- e. Total Contract Value Commitment to Small Business Subcontracting (if applicable); and
- f. Brief overview of Contractor's Past Performance (i.e., success stories).

The Contractor shall submit a Transition Plan for DOE approval within 15 days after NTP. The Transition Plan shall include a description of all activities necessary for the Contractor to assume full responsibility for the PWS not later than 120 days after NTP, including the following activities listed below. The Transition Plan shall include a detailed transition schedule with identified critical path.

The Contractor's Transition Plan shall include a description of the Contractor's implementation of human resource management consistent with Workforce Transition and Contractor Human Resources Management requirements as described in Section H, Clauses H.4 through H.7, including the Contractor's:

- (a) Assessment of expected workforce composition and any immediate or anticipated workforce restructuring;

- (b) Assessment of any existing issues under the National Labor Relations Act (NLRA) and its plan for engaging with any labor representatives;
- (c) Plan for preparation and submission of any bargaining parameters requests;
- (d) Assessment of any prevailing wage requirements, including any requirements under section 4(c) of the Service Contract Labor Standards statute as well as any NLRA requirements with respect to determination of wages and benefits;
- (e) Assessment of processes for handling labor standards determinations for work packages;
- (f) Assessment of any obligations with respect to pension and post-retirement benefit plans;
- (g) Plan for identification and resolution of any legal issues regarding any of the above, including the Contractor's plan for engaging outside counsel, if needed; and
- (h) Plan for communicating with DOE on these matters.

The Transition plan shall also include: all deliverables, documents, and items that the Contractor is required to submit to DOE (including DOE review periods); the planned submittal dates compliant with contract requirements; and the Contractor's responsible person(s) with his/her contact information. The Contractor is required to give DOE at least 2 weeks to review and comment on all documents submitted during the 120 day Transition Period. Any agreement that requires DOE consent will be subject to a 30 calendar-day review and approval period unless a longer review/approval period is warranted due to the size and complexity of the document. The Transition Plan shall also specifically address all actions necessary to complete items EM.PA.0040.A001.06.DR.02 a. through g. (transition plan requirements above). Coordination with other site contractors/tenants is required to ensure continuation of services by the Contractor as identified in the Section J, Attachment J-12, Government Furnished Services and Interface Requirements Matrix. The Plan must ensure there is no loss or degradation of the services that are provided to DOE and its contractors/tenants. Included in this plan, the Contractor shall resolve and gain DOE acceptance of their resolution for all gaps that exist between the Contractor's transition plan and the incumbent contractor's operations turn-over plan(s). The Contractor shall assume receipt of the incumbent contractor's Task Order Close-out Plan no later than 45 days after NTP.

The Contractor is responsible for ensuring that all necessary transition activities are identified and completed during the Contract Transition Period. The Contractor shall provide weekly Transition Status Reports to DOE until Contract transition is completed. The Contractor shall establish routine status meetings with DOE and affected contractors to review Implementation activities and issues.

The Contractor shall become a signatory to the existing co-generator agreement with DOE (referenced in Section J, Attachment J-19). The Contractor shall put into place any agreements it deems necessary between it and other site contractors or any subcontractors for provision of services. Any agreement that requires DOE consent

will be subject to a 30 calendar-day review and approval period unless a longer review/approval period is warranted due to the size and complexity of the document.

In accordance with Section H.68, the Contractor shall submit an Initial CPB that matches the Contractor’s proposed total contract value and provides work planning and costs for ALL PWS elements within seven days from the NTP (at the lowest level WBS for cost tracking and reporting and referenced to a CLIN level). Additionally, in accordance with Section H, the Contractor shall submit a Final CPB for DOE approval not later than 6 months from NTP, which provides work planning, measurement, and management details and must be resource loaded at the lowest level WBS for cost tracking and reporting. Where appropriate, information must be updated in FIMS to ensure consistency for facility maintenance cost projections.

Table C.2.EM.PA.0040.A001.06.DR.01-1 Contract Transition Milestones/Schedule	
Milestone	Date
Executive Summary Placed on Website	Within 48 hours after NTP
Complete mobilization of Transition Management Team	Within 7 days after NTP
Submit Contract Transition Plan	Within 15 days after NTP
Submit Initial CPB	Within 7 days after NTP
Modify all existing regulatory permits to reflect new Contractor	As stipulated by regulation, statute, law, or permit requirements AND prior to conclusion of Transition
Weekly Transition Status Reports	Weekly, through transition

EM.PA.0040.A001.06.DR.03 Environmental Compliance Review

The Contractor shall complete a comprehensive environmental compliance due diligence review, certify the results of the review and provide a copy of the report to DOE. At a minimum, this certification shall include, but is not limited to:

- a. List of site conditions that pose a potential compliance risk for DOE and/or the Contractor;
- b. Declarative statement, by the Contractor, of acceptance of site environmental, waste, and permit conditions, with noted exceptions; and
- c. Evidence that all existing site environmental permits have been modified to identify the Contractor as an operator.

Table C.2.EM.PA.0040.A001.06.DR.03-1 Environmental Compliance Review Milestones/Schedule	
Milestone	Date
Environmental Compliance Review	Within 60 days after NTP

EM.PA.0040.A001.06.DR.04 Material Differences

The Contractor shall identify any material differences in the systems, facilities, waste sites, property and services described in this PWS and actual conditions. The Contractor shall prepare and submit a Statement of Material Differences. The

material differences statement provided to DOE must include the contract section(s) that are impacted and specifically identify the sections of the Contractor’s proposal (Technical and Cost Volumes) that conflict with the site conditions and any/all reference material that the Contractor is relying on. Poor or inaccurate Contractor assumptions do not constitute a material difference.

Table C.2.EM.PA.0040.A001.06.DR.04-1 Material Differences Milestones/Schedule	
Milestone	Date
Material Difference Statement	Within 60 days after NTP

EM.PA.0011.A001.01.DR POLYCHLORINATED BIPHENYLS (PCBs)

PCBs were used extensively in the uranium enrichment process. The lube oil system in the GDP facilities leaked oil that migrates into the ventilation systems and came into contact with PCB impregnated gaskets. Although the lube oil has been removed from the lube oil system, residual lube oil remains in the ventilation system and continues to leak. Additionally, as a result of the shutdown of enrichment operations, water in-leakage (primarily rain intrusion) has resulted in water entering the ventilation system and coming into contact with the PCB impregnated gaskets. These systems occasionally leak due to age, vibration, and thermal cycling. Troughs and a collection system have been installed under the areas that have a high potential to leak. There are over 16,000 PCB collection troughs (ranging from 4½ to 6 feet in length) installed inside the cascade buildings (e.g. C-310, C-315, C-331, C-333, C-335, and C-337). The cascade buildings cover approximately 6,400,000 square feet of floor space. Lube oils contaminated with PCBs from the gaskets are continuously collected and dispositioned; maintenance of the trough system is ongoing. PCB lube oils that leak or spill are collected, cleaned-up, sampled, and properly disposed.

EM.PA.0011.A001.01.DR.02 Polychlorinated Biphenyls (PCBs) Operations

The Contractor shall perform all activities below:

- a) Perform surveillance and maintenance of the PCB collection and containment trough system including disposition of the collected PCB lube oils/water to the extent necessary. As facilities are shutdown or deactivated the Contractor shall determine how to comply with the TSCA Federal Facilities Compliance Agreement (FFCA) requirements without daily/weekly/monthly access to the process buildings. Since the lube oil has been removed from the originally installed equipment (still present in lube oil skids supporting P&E pump operations for deposit/holdup removal), the only source of liquids is residual oils from leaks in the ventilation system or water in-leakage through the roofs.
- b) The Contractor shall develop and implement a process to mitigate the continued migration of liquids in the ventilation systems.
- c) The Contractor shall clean up, sample, and decontaminate PCB spills and leaks, sample and analyze spill sites (estimated to be 40 small spills per year), and properly disposition the PCBs and PCB contaminated material (e.g., absorbent

- pads and pigs). This volume is expected to decrease based on mitigating actions taken (see in b above).
- d) The Contractor shall collect quarterly air quality data throughout the process buildings, and submit quarterly and annual reports until this is no longer requirement by U.S. EPA. The Contractor shall successfully gain U.S. EPA approval to discontinue or reduce the frequency of sampling and reporting. For example - the Contractor shall collect and prepare the data needed to conduct the technical/scientific analysis; prepare draft permit or other regulatory document changes; and take any other necessary actions to support successfully obtaining a discontinuance or a reduction in the levels of PCB sampling and reporting to the U.S. EPA.
 - e) As the Contractor implements actions to deactivate and isolate facilities, the Contractor shall evaluate the requirements TSCA FFCA and determine how to comply with or modify the agreement in order to minimize cost to DOE and place the facilities in long-term S&M at minimal annual cost to DOE.

Table C.2.EM.PA.0011.A001.01.DR-1 PCB Requirements Documents	
Document Number	Title
NA	Compliance Agreement Between the US DOE and the United States Environmental Protection Agency, February 20, 1992
NA	Modification to the Compliance Agreement Between the US DOE and the United States Environmental Protection Agency, September 25, 1997
PPPO-01-3062289-15	TSCA FFCA PPPO's Proposal - Modification to the February 20, 1992, Toxic Substances Control Act Compliance Agreement

Table C.2.EM.PA.0011.A001.01.DR-2 PCB Milestones/Schedule	
Milestone	Date
Develop and implement a PCB mitigation plan	30 days after Transition is Complete
Gain U.S. EPA approval to discontinue quarterly air quality reporting or monitoring.	180 days after Transition is Complete
UE TSCA FFCA Annual Compliance Agreement Report to the EPA	Annually Initial Due Date: June 1 Final to DOE for signature: June 23 Due to regulators July 1
UE TSCA FFCA Quarterly Compliance Agreement Report	Initial Due: Feb 1, May 1, August 1, November 1 Final Due: Feb 15, May 15, August 15, November 15

EM.PA.0020.A001.03.DR SAFEGUARDS AND SECURITY

The Infrastructure Contractor is the Officially Designated Security Authority (ODSA) at the Paducah site and considered to be the ODSA pursuant to current DOE directives. As such, it has the primary role for security functions for DOE operations consistent with the

scope of the Infrastructure Contract. The ODSA develops and maintains the site security program including the Paducah Site Security Plan (SSP).

The ODSA has the primary responsibility for evaluation of the security posture of the DOE mission at the Paducah Site including, but not limited to asset identification, threat assessments, and risk assessments/vulnerability analyses. ODSA develops the protective strategy for DOE assets at the Paducah Site on a graded basis in accordance with DOE directives, with input and concurrence from the Contractor. ODSA documents the protective strategy in the SSP including, but are not limited to access control, the protection of classified matter, unclassified controlled information (UCI), nuclear material, protective force, personnel security, Security Condition (SECON) measures, and government property. ODSA provides protection requirements to the Protective Force Organization, with input and concurrence from the Contractor, for the protection of DOE assets including classified matter and nuclear materials in accordance with the DOE-approved SSP, Orders, regulations, and laws.

The Contractor is responsible for conducting operations in accordance with the approved security plans supporting their contract responsibilities consistent with the DEAR Clause 952.204-2, Security, of their contract and applicable DOE directives specified in their contracts.

Table C.2.EM.PA.0020.A001.03.DR-1 Security Programs Requirements Documents	
Document Number	Title
Addendum B of the 2014 Site Security Plan	<i>Interim Compensatory Measures for De-leased Non-Conforming Storage of Classified Matter at the Paducah Site, Paducah, Kentucky</i>
NA	Compliance Assessment for Non-Conforming Storage of Classified Matter at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
	Paducah Site Security Plan (SSP).

EM.PA.0020.A001.03.DR.01 Security Program

Security plans supporting work required by this Contract shall be prepared by the ODSA in consultation with the Contractor, who shall also be a signatory to the documents. The Contractor shall ensure that the Security Plans meet both near term and long term operational needs prior to signature and shall provide sufficient time and coordination with the ODSA to meet Contractor schedules.

The ODSA has the responsibility to develop, implement, and maintain an Incidents of Security Concern (IOSC) Program. The GDP D&R Contractor shall notify the ODSA of all IOSCs at the site or related to the implementation of this Contract. The ODSA is responsible for providing a site consolidated report on IOSCs to DOE Officially Designated Federal Security Authority (ODFSA). The ODSA provides personnel security (e.g., clearance processing) and badging services for DOE Contractors at the site.

The ODSA is responsible for DOE information security at the site including both classified and unclassified sensitive information. The ODSA maintains a Classification Officer and supporting staff for all DOE classification activities at the site. Derivative classifiers are trained and appointed by the ODSA Classification Officer. The Contractor is responsible for providing its own derivative classifiers, as necessary, to support implementation of this Contract.

The Contractor shall perform all activities to:

- a. Comply with site requirements to ensure appropriate levels of protection against: unauthorized access; theft, diversion, loss of custody of special nuclear material; espionage; loss or theft of classified matter or Government property; and other hostile acts that may cause unacceptable adverse impacts on national security or the health and safety of DOE and its Contractor employees, the public, or the environment.
- b. Coordinate all requests for security services from other site contractors through the ODSA.
- c. Ensure operations are fully consistent with all approved security plans applicable to the Contractor programs including, but not limited to facility security, physical security, cyber security, Operations Security (OPSEC), and information security.
- d. Promptly prepare and submit requests for DOE access authorizations for personnel access to classified matter consistent with the provisions of the Contract Security Classification Specification (CSCS) approved for work under this Contract. The ODSA performs the processing of the security clearance applications, and coordinates with the ODFSA.
- e. Provides an information security program commensurate with the ODSA Information Security Program to include types of information available on-site, such as, but not limited to, proprietary, Privacy Act, Unclassified Controlled Information (UCI), Personally Identifiable Information (PII), official use only (OUO), classified and Unclassified Controlled Nuclear Information (UCNI). The Contractor shall coordinate all information security programs with the ODSA who shall adjudicate classification issues.
- f. Notifies the ODSA of potential Incidents of Security concern.
- g. Ensure an adequate number of Contractor personnel are designated as derivative classifiers and/or UCNI/ECI (Export Controlled Information reviewers in support of the Contractor’s project needs.
- h. Comply with ODSA security plan. The Contractor has the responsibility to recognize situations in which it shall need to request or develop security plans and work with the ODSA as appropriate to get those plans in place.
- i. Comply with 10 CFR 824.

Table C.2.EM.PA.0020.A001.03.DR.01-1 Security Programs Milestones/Schedule	
Milestone	Date
Submit the Protective Force SSP section to the ODSA	90 days after NTP and Annually thereafter in a schedule agreed to by the ODSA

EM.PA.0020.A001.03.DR.02 Protective Force Services

The Contractor shall ensure a Protective Force program compliant with DOE Orders, regulations, and laws. Upon transition of the GDP facilities and associated realty he Contractor shall provide Protective Force services for protection of its DOE site property and projects in accordance with Site Security Plan.

The Contractor shall maintain a trained Protective Force and shall provide all necessary equipment for use by the workforce (e.g. weapons, body armor, and masks). The Contractor shall utilize and maintain site facilities, including training facilities, portals, gates, etc. to implement and maintain compliance with Site Security Plan. The Contractor shall develop, in consultation with the ODSA, the Protective Force Section of the SSP and provide it to the ODSA. The Contractor will conduct self-assessments of the Protective Force program and provide self-assessment reports and any resulting corrective action plans to the ODSA for inclusion in the Annual Comprehensive Site Assessment Report submitted to the DOE ODFSA.

The Contractor shall ensure that mitigating actions are in place for, any existing non-conforming storage, or any newly discovered non-compliant storage, until compliant storage can be achieved.

The Contractor shall develop and participate in annual force-on-force exercises. The Contractor shall ensure it is staffed to address the active shooter scenario, for all facilities and areas on the PGDP reservation. The Contractor shall provide routine access to the Infrastructure Contractor and the DUF6 Contractor into the Limited Area of the Plant in support of their operational needs.

Table C.2.EM.PA.0020.A001.03.DR.02-1 Security Programs Milestones/Schedule	
Milestone	Date
Self-assessments Report of Protective Force program and resulting corrective action plans	12 months after conclusion of Transition and Annually thereafter

EM.PA.0040.A001.01.DR ENVIRONMENTAL MONITORING PROGRAM

EM.PA.0040.A001.01.DR.01 Environmental Monitoring and Reporting

The Contractor shall perform programmatic Environmental Management System functions. This includes ongoing environmental monitoring of on-site and off-site air, soils, and water, and reporting the results to DOE and regulators. This activity also includes all activities to maintain, repair, or replace the equipment used in support of this work element.

In order to protect the health and safety of the on-site workforce, the public, and the environment, monitoring of on-site and off-site air, soils, and water is continuously performed. An environmental monitoring program has been established under previous contracts. Agreements with the regulators have been made on the scope of

the program. It is DOE's goal to continuously optimize the monitoring requirements through agreements with the regulators; however, the Contractor must obtain DOE and/or regulatory approval prior to reducing any monitoring activities.

The Contractor shall perform all activities to:

- a. Coordinate with other site contractors to prepare appropriate transmittals and applications for any new operating and environmental permits, agreements, licenses, contracts, etc. for DOE owned/contractor operated facilities, systems, or processes.
- b. Monitor and maintain the structural integrity of approximately 330 groundwater monitoring wells as identified in Appendix B of the current Environmental Monitoring Plan (EMP), CP2-ES-0006/R0. Well maintenance includes, but is not limited to, replacing broken concrete pads surrounding the wells; repairing, replacing, extending the outer protective steel casing; repairing, replacing, installing vehicle guard posts around the wells; repairing and replacing casing covers, lock hasps, and hinges on outer protective casings; drilling weep holes in the outer protective casing; and painting the outside of the outer protective casings, including well rehabilitation or replacement, and abandonment as required.
- c. Monitor all of the site's outfalls, seeps, in-stream surface water locations, and sediment monitoring locations. Perform outfall maintenance (except mowing which will be provided by the Infrastructure Contractor).
- d. Conduct thermoluminescent dosimeter (TLD) monitoring at an estimated 40 locations; aquatic and other biological monitoring; and landfill surface water and leachate monitoring.
- e. Manage the C-746-K and C-404 burial grounds in accordance with their O&M/Permit requirements, including collecting and analyzing leachate, conducting monthly inspections and providing corrective maintenance as required. This includes cap maintenance and management of the leachate collection sump at C-404. Additionally, the Contractor shall ensure the surface water OU O&M plans are met (e.g., interim corrective measure activities).
- f. Execute the Water Policy (interim control measure) to include management of license agreements (an estimated 101) with local residents and businesses to supply municipal water and license agreements (an estimated 10) to allow DOE to access and sample off-site monitoring and residential wells.
- g. Evaluate the available groundwater data and establish the technical and regulatory basis to reduce the size of the Water Policy Box, while maintaining the same level of protectiveness to members of the public. The Contractor shall collect any additional data required to support its technical position. The Contractor shall develop and submit all required regulatory documents for reducing the size of the Water Policy Box. Additionally, upon regulator approval, the Contractor shall implement the reduction, including working with the licensees and the West McCracken Water District to eliminate DOE costs for water services (e.g., both the licenses, as well as the applicable

ratio/portion of the bleed line costs). The Contractor shall ensure that all stakeholders are provided sufficient notice and informed of all changes at least 1 year prior to implementation and that DOE reviews all communications to stakeholders. The Contractor shall gain DOE approval of the technical basis and regulatory submittals prior to submittal of any required regulatory documents to the regulatory agencies.

- h. Maintain the license agreement with Kentucky Fish and Wildlife for management of the approximately 1,986 acres of DOE property not in the industrialized portion or buffer area of the plant. (REEMCBCDOE-03-12-0701)
- i. Operate and maintain the Paducah Data Warehouse. Provide a web-based version for access by regulators, Citizens Advisory Board members, and the public.
- j. Perform all environmental monitoring tasks necessary to support all site activities, including but not limited to sample collection, and analysis as necessary to prepare and submit reports.
- k. Monitor all SWMUs in accordance with the RCRA permit.
- l. Maintain, input, create reports on, and complete all other activities necessary to manage environmental data generated by the Contractor's activities and data provided by other site Contractors. Ensure the data is current, complete, and compliant with Contract requirements. This includes management of databases (e.g., Oak Ridge Environmental Information System (OREIS), Geographical Information System (GIS), Paducah Project Environmental Measurement System (Paducah PEMS)) transitioned to the Contractor or included as part of any regulatory agreement(s). This also includes maintaining the site groundwater modeling program(s) and support of routine groundwater modeling meetings with EPA and KDEP.
- m. Provide SWMU notifications for work in all SWMUs at PGDP in compliance with all legal requirements.
- n. Conduct CERCLA Five Year Reviews in accordance with the Federal Facility Agreement.
- o. Update, maintain, and comply with the existing Paducah Site Treatment Plan (STP) and obtain DOE approval of the STP prior to submittal to the regulators;
- p. Perform site-wide environmental regulatory management for all site-wide permits, permit applications; site-wide NEPA documents; site-wide environmental reports, etc.). The Contractor shall administer the site program, provide required environmental information to support regulatory compliance, and comply in areas under its cognizance, including NEPA. The Contractor shall provide required air and liquid effluents and near facility environmental monitoring; and collect, compile, and/or integrate air and liquid effluent monitoring data from operations and activities under its control. The Contractor shall collect and submit environmental data to support the Annual Paducah Environmental Report and integrate its environmental permitting and regulatory compliance activities with the Paducah-wide permitting and compliance framework.

- q. Collect ambient air monitoring data to verify radionuclide levels in off-site ambient air in accordance with the current Paducah Gaseous Diffusion Plant Department of Energy NESHAP Management Plan. The Contractor shall collect radionuclide samples surrounding the plant to capture airborne radionuclides emitted from all sources including fugitive and diffuse sources.
- r. Manage the C-613 Sedimentation Basin in accordance with the Operations and Maintenance Plan, including all required sampling and analysis.
- s. Perform any CAA Title V or associated permit sampling/monitoring and analysis and complete required reports. The current CAA Title V is between the Commonwealth of Kentucky and the current deactivation contractor. These activities are only required if the permit is determined to be necessary and transferred to the Contractor.
- t. Support DOE in the NEPA evaluation process as appropriate.

Submit to DOE the Contractor’s reviews all required environmental monitoring and reports. Reference Section J, Attachment J-13, Summary of Contract Deliverables, Deliverable Reference EM.PA.0040.A001.01.DR.01.

Table C.2.EM.PA.0040.A001.01.DR.01-1 Environmental Monitoring and Reporting¹ (per Fiscal Year)					
Type	Runoff from waste facilities ²	LLW	TSCA	MLLW	Other
QTY	900,000 ft ³	25,000 ft ³	1500 ft ³	2000 ft ³	1000 ft ³

¹The quantities identified in this PWS are based upon current approximations; actual quantities may vary. Runoff volumes include volumes from the sedimentation collection basins and the landfill sedimentation basin. Leachate volumes are not included in the Runoff volume. Leachate volumes are presented in EM.PA.0040.A002.05.DR.01. Any material differences identified by the contractor shall be reported to DOE. DOE will only consider requests for equitable adjustment (REA) for deltas of plus or minus 15% of quantities presented in this table.

²This includes runoff from the C-746-U Landfill Sedimentation Basin.

Table C.2.EM.PA.0040.A001.01.DR.01-2 Environmental Monitoring and Reporting Requirements Documents	
Document Number	Title
CP2-ES-0006/R0	Environmental Monitoring Plan, Fiscal Year 2016, Paducah Gaseous Diffusion Plant, Paducah, Kentucky, January 2016
Commonwealth of Kentucky Permit Numbers KY0004049 and KY0102083	Kentucky Pollutant Discharge Elimination System Permit Number KY0004049 for the Paducah Gaseous Diffusion Plant/U.S. Department of Energy Outfalls Under, McCracken County, Kentucky Kentucky Pollutant Discharge Elimination System Permit Number KY0102083 for the Paducah Gaseous Diffusion Plant/United States Enrichment Corporation Outfalls Under, McCracken County, Kentucky
Commonwealth of Kentucky Permit Numbers 073-00045, 073-00014, 073-00015	C-746-U, C-746-S and C-746-T Landfills Solid Waste Permits
REEMCBCDOE-03-12-0701	License Agreements between DOE and the Kentucky Department of Fish & Wildlife Resources for Paducah Gaseous Diffusion Plant
Permit Number KY8-890-008-982	Kentucky Division of Waste Management Hazardous Waste Management Facilities Permit, includes the Hazardous and Solid Waste Amendments permit issued by U.S. EPA
REEMCBCDOE-7-08-0xxx (example)	License (Single Purpose: Groundwater Monitoring Wells, Sampling, Furnishing Municipal Water to Grantor)
Dated March 13, 2006; signed by DOE May 9, 2006	Tennessee Valley Authority – Shawnee Fossil Plant – Paducah Gaseous Diffusion Plant Letter of Agreement
PRS-ENM-0031/R2	C-404 Landfill Source Demonstration Paducah Gaseous Diffusion Plant, Paducah, Kentucky, August 2007
DOE/OR/06-1201&D2	Action Memorandum for the Water Policy at the Paducah Gaseous Diffusion Plant Paducah, Kentucky, June 1994
BJC/PAD-691/R1	Cultural Resource Management Plan for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, March 2006

Table C.2.EM.PA.0040.A001.01.DR.01-3 Environmental Monitoring and Reporting Milestones/Schedule	
Due to the extensive number of deliverables/milestones, to avoid discrepancies, the full list is only included in Section J, Attachment J-13 identified as EM.PA.0040.A001.01.DR.01	
Milestone	Date
See Section J, Attachment J-13, Summary of Contract Deliverables, Deliverable References for EM.PA.0040.A001.01.DR.01	Per Section J, Attachment J-13,

EM.PA.0040.A001.02.DR PUMP AND TREAT OPERATIONS

TCE and ⁹⁹Tc were discovered in residential wells north of the Paducah Site in 1988. DOE, the EPA and Kentucky entered into an Administrative Consent Order under Sections 104 and 106 of CERCLA that required an Investigation of the nature and extent of off-site contamination.

The site investigation delineated two off-site groundwater contamination plumes, referred to as the Northwest and Northeast Plumes, and identified several potential on and off-site source areas requiring additional investigation and action.

Interim remedial actions were developed to mitigate and control the spread of the highest concentration portion of the Northwest and Northeast plumes. To implement these two interim remedial actions, two pump-and-treat facilities have been installed. The Northwest Interim Record of Decision was signed in 1993, and the Northeast Interim Record of Decision was signed in 1995. Both of these systems have been optimized and/or upgraded since the original RODs and both have a subsequent Explanation of Significant Differences.

Table C.2.EM.PA.0040.A001.02.DR-1 Pump and Treat Operations Requirements Documents	
Document Number	Title
DOE/OR/06-1201&D2	Action Memorandum for the Water Policy at the Paducah Gaseous Diffusion Plant Paducah, Kentucky, June 1994
DOE/LX/07-0359&D1	Post-construction Report for the Northwest Plume Optimization at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, January 2011
DOE/LX/07-1280&D2/R2	Remedial Action Work Plan for Optimization of the Northeast Plume Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, February 2016
DOE/OR/06-1143&D4	Record of Decision for Interim Remedial Action of the Northwest Plume, July 1993
DOE/LX/07-0343&D2	Explanation of Significant Differences to the Record of Decision for the Interim Remedial Action of the Northwest Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1356&D2	Record of Decision for Interim Remedial Action at the Northeast Plume, June 1995
DOE/LX/07-1291&D2/R2	Explanation of Significant Differences to the Record of Decision for the Northeast Plume Interim Remedial Action, November 2015
DOE/OR/07-1253&D4/R5	Operation and Maintenance Plan for the Northwest Plume Groundwater System Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, September 2010
DOE/OR/07-1535&D3/R4	Operation and Maintenance Plan for the Northeast Plume Containment System Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, August 2013

EM.PA.0040.A001.02.DR.01 Pump and Treat Operations

The Contractor shall perform all activities to:

- a. Operate and maintain the two installed groundwater pump-and-treat facilities in accordance with the approved operations and maintenance plans to control the highest concentration portion of the Northeast and Northwest Groundwater Plumes until regulatory approval is attained to cease operations,

including preparation, completion and submittal of any applicable regulatory documents;

- b. Sample and monitor the three plumes, and conduct analyses to determine the effectiveness of and the need for continued operation of the pump-and-treat system;
- c. Continue and complete the optimization of the Northeast Plume Pump and Treat System consistent with regulatory agencies negotiated agreements and strategies, as specified in the 2015 Dispute Resolution on the Northeast Plume Pump and Treat System Optimization. The Contractor shall develop and issue a report and develop a presentation for the regulators on any existing transect wells findings. The Contractor shall revise the RAWP, if necessary, and issue to DOE for internal review, and then submit to the regulators for review and approval of the 2 extraction wells, additional monitoring wells (up to 14), and all associated field work required to optimize the NE Plume Pump and Treat System. If necessary, the Contractor shall drill and install/construct the 2 extraction wells and additional monitoring wells consistent with the approved RAWP. Additionally, the Contractor shall install and operate a second treatment unit provided as GFE similar in size and capacity to the existing unit. Installation shall include all components necessary for the operation of the optimized NE Plume Pump and Treat System, such as the piping, control boxes, logic systems, assembled programming, and electrical wiring. The Contractor shall develop and submit an O&M Plan for both DOE review and regulatory review. The Contractor shall develop all necessary procedures, conduct all necessary training, as-built drawing completion, and perform system testing to ensure the optimized system is fully operational. The Contractor shall develop a Post-Construction Report, both D0 and D1, for submittal to the regulators. The Contractor shall operate the system with less than 5% downtime. The Contractor shall prepare all CERCLA documents, including RAWP, Technical Reports, and Operations and Maintenance Plan needed to implement the optimization, and shall actively assist DOE in obtaining regulatory approval. This includes all applicable field work and analytical work necessary to support development or implementation of CERCLA documents; and
- d. Prepare an updated TCE and ⁹⁹Tc plume map with current data every two years (currently odd years), including documentation showing how the map has changed and the data/information used to generate the maps.

Table C.2.EM.PA.0040.A001.02.DR.01-1 Pump and Treat Operations Milestones/Schedule	
Milestone	Date
Update TCE and ⁹⁹ Tc plume map	To DOE: April 15, 2019 To the Regulators: June 15, 2019
Update TCE and ⁹⁹ Tc plume map	To DOE: April 15, 2021 To the Regulators: June 15, 2021

Table C.2.EM.PA.0040.A001.02.DR.01-1 Pump and Treat Operations Milestones/Schedule	
Milestone	Date
Submit Transect Well Data to Regulators for the NE Plume	Consistent with the SMP and the approved CPB
Complete all Field Work (including construction, testing, waste disposal, and demobilization) and begin full scale operation	Consistent with the SMP and the approved CPB
Submit D1 O&M Plan for the NE Plume Optimization to Regulators	Consistent with the SMP and the approved CPB
Submit D1 Post-Construction Report for NE Plume Optimization to Regulators	Consistent with the SMP and the approved CPB
Update TCE and ⁹⁹ Tc plume map	To DOE: April 15, 2023 To the Regulators: June 15, 2023
Update TCE and ⁹⁹ Tc plume map	To DOE: April 15, 2025 To the Regulators: June 15, 2025
Update TCE and ⁹⁹ Tc plume map	To DOE: April 15, 2027 To the Regulators: June 15, 2027

EM.PA.0040.A001.07.DR PROJECT MANAGEMENT SUPPORT

The Contractor shall provide all project support activities and resources on-site necessary during the entire POP of this Contract. These support resources include, but are not limited to, the Program Manager, the project management team, and associated support office (e.g., Administrative, QA, HR, Business, Project Controls, Safety, Nuclear Safety, etc.).

EM.PA.0040.A001.07.DR.02 Project Planning & Integration Support

EM.PA.0040.A001.07.DR.02.01 Project Planning, Integration and Interface

The Contractor shall be responsible for assisting DOE in the planning and integration of the ongoing and planned PGDP D&R activities. The Contractor shall establish, manage and host routine standing integration meetings, with representatives of all Contractors listed in Section C.1, to address common issues and de-conflict issues. An example process is the “Shared Site Process” prepared and managed by the incumbent Contractor.

The Contractor shall establish, appropriately document, and manage the interfaces listed in Section J, Attachment J-12, Government Furnished Services and Interface Requirements Matrix.

The Contractor shall ensure that Long-Term Stewardship (LTS) issues are considered in the planning and execution of the activities described in this PWS to:

- a. Ensure the site’s successful transition to future LTS; and

- b. Assist DOE with LTS planning, transition coordination, and communication with all involved parties, including local stakeholders and regulators.

The Contractor shall ensure that issues associated with the transfer or leasing of land, facilities, and other assets from DOE to other parties are considered in the planning and execution of the PWS.

The Contractor shall coordinate and interface with other site contractors listed in Section J Attachment J-12, Government Furnished Services and Interface Requirements Matrix, in the performance of this PWS. The attachment identifies the key specific tasks and services that require interface and coordination with other site entities.

EM.PA.0040.A001.07.DR.02.02 Regulatory Planning

The Contractor shall provide support to DOE relating to regulatory documents and agreements, in the form of technical experts and site specific knowledge of operations, for regulator interactions, independent facilitation services, the development and implementation of regulatory strategies, and the public comment process.

The Contractor shall provide regulatory strategies/planning for re-aligning the site's deactivation and decommissioning activities with currently planned and completed remediation activities, logically sequencing and integrating that work to be protective of safety, health, and the environment while maintaining an overall effective approach. The Contractor shall also consider developing innovative and unique regulatory approaches to executing the work in this PWS and in the out-years, in order to achieve the same levels of clean-up in a more cost effective manner.

EM.PA.0040.A001.07.DR.02.03 Support to DOE

The Contractor shall provide on-site services including management, public affairs including Paducah Site Citizens Advisory Board (CAB) support, business administration (e.g. Contracting, procurement, financial and accounting), legal, human resources, training, and program management. Additionally, the Contractor shall perform all activities to:

- a. Support DOE in responding to Congressional, regulatory and other requests for documents and information; examples of such include: Freedom of Information Act requests; Privacy Act requests; and litigation document requests served upon DOE and its current and former prime contractors. Support shall include, but not be limited to, preparation for briefings, public presentations, and search, review, and reproduction of documents. The Contractor shall ensure all external briefing materials and public presentations are of the highest

- professional quality to present the current and planned project achievements. The Contractor shall ensure that sufficient time is allotted for DOE (including Headquarters) to review and comment on any external briefing materials and public presentations. External briefing materials and public materials shall first be approved by DOE.
- b. Support DOE in the development of internal presentations, budgets, staff development, and other related services.
 - c. Provide and support routine (monthly) public site tours of the PGDP facilities and projects, including busing U.S. citizens into the site/limited area, providing presentation/handout materials and communicating the status of the project.
 - d. Host public/stakeholder meetings and working sessions, as needed, to support high interest topics and to educate the community about the work at the site.
 - e. Support DOE in preparation of presentations and conducting presentations to the Paducah CAB's monthly meetings as directed.
 - f. Provide administrative services pertaining to public affairs. These shall include, but not be limited to, development of a project/site external communication strategy to present the current and planned project achievements to DOE's stakeholders, including local and state government and congressional representatives.
 - g. Ensure that all environmental regulatory documents have received adequate legal review for sufficiency, accuracy and strategic impacts before being submitted to DOE and then to the regulatory agencies.
 - h. Support DOE efforts in site real property transfer, site reindustrialization/reutilization activities, and in Natural Resource Damage Assessments.
 - i. Provide joint legal support to DOE in connection with legal or regulatory proceedings at DOE's request.
 - j. Support Contract Implementation at the beginning and transition at the end of the Contract.
 - k. Provide central locations and receptacles for the collection and delivery of site mail by the Infrastructure Contractor.
 - l. Provide external review and support to DOE by providing support during audits and assessments by entities having oversight responsibility for PGDP D&R Project and its contractors. These entities include:
 - i. Defense Nuclear Facilities Safety Board (DNFSB);
 - ii. Government Accountability Office (GAO);
 - iii. DOE Office of Inspector General (OIG); and
 - iv. Other governmental and DOE organizations.
 - m. The Contractor shall support the DOE, and the DOE Environmental Technical Services (ETS) Contractor in hosting staff from auditing and assessing organizations, providing required presentations, responding

- to information requests, and providing required subject matter experts to respond to questions and information requests.
- n. The Contractor shall support DOE in interfacing with DNFSB, as needed, by:
 - i. providing support for the preparation of DOE responses to DNFSB issues and recommendations that affect this Contract,
 - ii. cooperating with the DNFSB and providing access to work areas, personnel, and information, as necessary, and
 - iii. maintaining a document process in accordance with the CRD M 140.1-1B, Interface with the DNFSB (or current version).
 - o. Support DOE in interfacing with GAO, OIG, and other governmental and DOE oversight organizations by:
 - i. cooperating with assessors and auditors, and providing access to work areas, personnel, and information and
 - ii. providing support during audits and assessments, including delivering information within a specified time, arranging briefings, preparing presentation materials, maintaining a record of documents provided in response to requests, and making this record available to DOE as requested.
 - p. Provide knowledgeable single points-of-contact for each of the following: DNFSB; OIG, GAO, and other assessing governmental and DOE oversight organizations (including the DOE Office of Enforcement).
 - q. Support efforts to evaluate various alternatives for additional office space at the site. Efforts may include the use of third party financing or Energy Savings Performance Contracts (ESPC).
 - r. The Contractor shall provide training to DOE and other site contractors required to access/enter its facilities, including respirator training, asbestos awareness, and other specialized training.

EM.PA.0040.A001.07.DR.03 Project Management

The Contractor shall perform all activities to develop and maintain a project management work control system compliant with Integrated Contractor Work Control Systems and Reporting Requirements (July 2012), Section H.68 and FAR 52.234-4, Earned Value Management System (May 2014). Additionally, the Contractor shall prepare, submit and maintain a life-cycle plan (scope, cost and schedule) representing planned site work scope from the beginning of the work scope through final site cleanup and when the site is transferred to the DOE Office of Legacy Management. The Contractor shall be aware of and manage changes to the life-cycle baseline.

The Contractor shall ensure the CPB remains aligned with the Contract terms to include scope, cost and schedule. The Contractor shall ensure timely response to

Contract modifications and declaration of changed conditions, through the submission of Contract change proposals and/or baseline change requests to maintain alignment of the CPB with the Contract. The Contractor shall provide all management and technical information to:

- a. Support the budget formulation activities including, but not limited to, emerging work items list, budget formulation inputs (including Integrated Priority List), budget update submissions, budget scenario development, and budget presentations (such as public and regulatory briefings, etc.);
- b. Develop and submit Annual Spend Plans, Monthly Spend Plan Reports, Full Time Equivalent (FTE) staffing projections, and other similar reporting information;
- c. Meet the data requirements of the DOE Integrated Planning, Accountability and Budgeting System;
- d. Support audits, evaluations, and external technical reviews; and
- e. Support other DOE project performance assessments and information needs.

All project management information developed under this contract shall be provided electronically or be electronically accessible by DOE. In support of the Paducah Integrated Site-wide Federal Lifecycle Baseline, the Contractor shall also provide the Initial and Final CPB information to the ETS Contractor, or other DOE prime contractor, as designated.

Table C.2.EM.PA.0040.A001.07.DR.03-1 Project Management Milestones/Schedule	
Milestone	Date
Final CPB aligned to contract value	Within 6 months after NTP
Life Cycle Plan	9 months after NTP

EM.PA.0040.A001.07.DR.04 Environment, Safety, Security, Health & Quality

EM.PA.0040.A001.07.DR.04.01 Safety Programs

The Contractor shall perform all activities to:

- a. Conduct all activities required for compliance with applicable laws, regulations, permits, agreements and Orders, and DOE Directives including those listed in Section J, Attachment J-4. In accordance with Section H.43, the Contractor’s programs shall be operated as an integral, and visible, part of how the Contractor conducts business. This includes, but is not limited to: prioritizing work planning and execution; establishing clear ES&H priorities; allocating resources to address programmatic and operational considerations; and correcting non-compliances and addressing all hazards for all facilities, operations, and work. The Contractor shall ensure that cost reduction efforts and efficiency efforts are fully compatible with ES&H performance.

- b. Take all actions necessary to preclude serious injuries and/or fatalities; keep worker exposures and environmental releases as low as reasonably achievable and below established limits; minimize the generation of waste; maintain or increase protection to the environment; and maintain or increase public and worker safety and health.
- c. Submit a Chronic Beryllium Disease Prevention Program consistent with 10 CFR 850 for DOE review and approval. A study has been completed characterizing the levels of Beryllium within the site (BJC/PAD-581) and shall be considered by the Contractor in the development and implementation of a Chronic Beryllium Disease Prevention Program. This program shall encompass DOE personnel and PGDP Contractors. The Contractor shall be the Site Chronic Beryllium Coordinator.
- d. Ensure adequate access to health programs/ambulatory care, and beryllium and radiation worker health surveillance programs. These services are required to assess, monitor, record data, and provide medical support for current site workers who are or may be exposed to radiological and hazardous materials.
- e. Maintain a trained workforce necessary for performance of this Contract. The Contractor shall accept other training modules as equivalent to their own and assure reciprocity for, at a minimum, all PGDP Contractors. The Contractor shall also complete site-specific training (provided by the Infrastructure Contractor) necessary for site access, including but not limited to, Consolidated Annual Training, Radiation Worker I and II, General Employee Training, Annual Security Refresher, Workplace Violence Prevention, Diversity Awareness, Employee Conduct Training, Business Ethics/Standards of Conduct, and Fire Extinguisher Training, DOE Orders/Work Smart Standards and ISMS. The Contractor shall be responsible for any job specific training necessary to implement the PWS activities.
- f. Establish a training program for implementation of a compliant program in accordance with DOE Order 426.2 requirements and all applicable laws and regulations in support of the work performed under this Contract. The Contractor shall track its employees training status and notify employees of training needs (this includes training provided by other site contractors). Training records shall be maintained and retrievable for current employees. The Contractor shall coordinate with other site contractors to consolidate training modules, where practicable. The Contractor shall ensure that its training program is configured/managed so the personnel who do not have the necessary training (e.g., not trained, not requalified, etc.) are prohibited from performing the work that requires the training.
- g. Perform work in accordance with 10 CFR 851. The Contractor's safety program requirements shall include hazard analyses, work permits (as applicable), industrial hygiene monitoring, and trained safety professionals. The Contractor shall manage and perform work in accordance with a documented worker safety and health plan approved by DOE prior to commencement of work.

- h. Prepare an Activity Specific Health and Safety Plan and Job Hazards Analysis as needed as part of the overall project safety program. Copies of these documents will be provided to DOE for information.
- i. Provide safety and health Personal Protective Equipment for the Contractor, DOE employees, and DOE's ETS Contractor. The Contractor shall be responsible for the subsequent decontamination and disposal of such PPE.
- j. The Contractor shall develop and implement a process to ensure site personnel adhere to policies, procedures and.
- k. Provide investigations and support for ES&H issues/effects resulting from the historical "Work for Others Program" (work for non-DOE entities (sponsors) on a fully reimbursable basis in accordance with DEAR 970.5217-1). The Contractor may encounter materials and historical information that references a "Work for Others Program"; these materials may include classified information. The potential implications shall be addressed consistent with the PWS security requirements.
- l. Provide non-emergency spill contamination, clean-up, and other post-emergency response activities. Spills could include, but not be limited to, diesel fuel, oils containing PCBs, and radioactive contamination.
- m. Provide programmatic and oversight support to other DOE support personnel/contractors (e.g., technical support contractors, Kentucky Research Consortium for Energy and Environment demonstration projects on DOE property) as requested by DOE.
- n. Manage the Site-wide Integrated Lockout & Tagout Program and ensure lock-out/tag-out is properly coordinated with other site contractors. The Contractor shall implement a compliant lock-out/tag-out program in accordance with DOE-STD-1030-96 and all applicable regulations. Each of the site's contractors is required to participate in this Site-wide Integrated Lockout & Tagout Program.
- o. Provide medical screening of the DOE employees and DOE's ETS Contractor if required to enter the work areas and meet the requirements of the Worker Safety and Health Program (10 CFR 851), or Radiological Protection Program (10 CFR 835).
- p. The Nuclear Safety Program shall be described in safety basis documents in accordance with 10 CFR 830, Nuclear Safety Management. The Contractor shall be responsible for implementing and maintaining any necessary safety basis documents. The Contractor shall develop and implement a Nuclear Criticality Safety (NCS) Program/Procedure compliant with DOE O 420.1C. The Contractor shall ensure proper implementation of its Nuclear Criticality Safety Program by performing annual surveillances as required by ANSI/ANS-8.19, *Administrative Practices for Nuclear Criticality Safety* (required by DOE O 420.1C).
- q. The Contractor shall comply with 10 CFR 830 and have programs and procedures that implement the requirements. The Contractor shall review the existing safety basis documents, and accept, modify, or develop, as necessary, for compliance performance per DOE Order requirements and

all applicable laws and regulations. To support new or changed operations, the Contractor shall revise or develop documented safety analysis and safety basis documentation compliant with 10 CFR 830 and DOE STD 1027. The Contractor shall obtain DOE approval of the safety basis documents prior to implementation. The Contractor shall update and maintain the safety basis documents in a manner that supports the work required by the Contract and consistent with DOE Orders and applicable requirements. The Contractor shall perform and document a Natural Phenomenon Hazard (NPH) analysis for the entire site, in accordance with DOE Standard 3009 and revise its Authorization Basis (AB) to reflect the results of the analysis. The Contractor shall transmit the results of the NPH analysis to DOE and all of the other site contractors. Additionally, the Contractor shall comply with and implement all actions specified in DOE Office of Health, Safety, and Security (HSS) Operating Experience memo OE-1: 2013-01, April 2013. The Contractor shall assume that no actions have been taken to comply with OE-1: 2013-01.

- r. The Contractor shall review the existing procedures, program and performance documents, and accept, modify, or develop, as necessary, for compliance performance per DOE Order requirements and all applicable laws and regulations. The Contractor shall also develop and implement a work planning and control process in accordance with DOE O 412.1A, Work Authorization System, for Contract activities in support of acceptance of turnover of the GDP Facility. The Contractor shall eliminate all blue-sheeted (i.e. revised or adopted) procedures and performance documents and implement procedures and performance documents in compliance with DOE Orders, no later than 90 days after transition is completed.

Table C.2.EM.PA.0040.A001.07.DR.04.01-1 Safety Programs Requirements Documents	
DOE HSS memo OE-1: 2013-01, April 2013	DOE Health, Safety, and Security (HSS) Operating Experience memo, Improving Department of Energy Capabilities for Mitigating Beyond Design Basis Events

Table C.2.EM.PA.0040.A001.07.DR.04.01-2 Safety Programs Milestones/Schedule	
Milestone	Date
Submit a Chronic Beryllium Disease Prevention Program consistent with 10 CFR 850	90 days after NTP
Worker Safety and Health Program Plan	90 days after NTP
Submittal of Nuclear Criticality Safety Program	75 days after NTP
Submit revised Safety Basis documents	90 days after NTP
Annual Safety Basis document submittal to DOE for approval	Annually from date of initial DOE approval
Perform and document a Natural Phenomenon Hazard (NPH) analysis for the entire site	In accordance with revised Safety Basis requirement

Eliminate all blue-sheeted procedures and performance documents	90 days after conclusion of transition
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EM.PA.0040.A001.07.DR.04.02 Integrated Safety Management

The Contractor shall develop and implement an ISMS Program that complies with the Section I Clause DEAR 970.5223-1, Integration of Environment, Safety, and Health into Work Planning and Execution. The Contractor’s ISMS program shall ensure all work is performed safely and in a compliant manner that protects the workers, public, and environment from adverse consequences. The Contractor shall also establish performance measures, objectives, and commitments (PMOC’s) as required by DEAR 970.5223-1. PMOC’s shall be submitted annually for DOE approval.

The ISMS program shall include an Operating Experience (e.g., lessons learned) program that is compliant with DOE Orders. The Operating Experience program shall be structured to identify and apply available lessons in safety, quality and performance to this project as well as to capture, document, and provide lessons learned from this project for future application by others.

The Contractor shall prepare an ISMS Description; including PMOC’s to implement the Contractor’s ISMS within 90 days after NTP. The ISMS Description shall identify how the Contractor will maintain compliant and safe operations by integrating safety, health, and environmental compliance into all. The initial ISMS Description must be approved by DOE prior to the end of transition.

The ISMS program shall integrate DOE O 436.1, Departmental Sustainability. In accordance with DOE O 436.1, the Contractor shall develop and implement Site Sustainability Plans (SSP) and an Environmental Management System (EMS). These plans shall include recycling and pollution prevention. The Contractor shall be the Environmental Management Systems designated site coordinator.

To continuously improve the ISMS, the Contractor shall perform an initial, and subsequently, annual ISMS effectiveness reviews and submit a report documenting the status of the ISMS program to DOE along with any changes needed to the ISMS Description. In addition, the ISMS program shall be subject to a verification review and approval by a DOE chartered ISMS verification team within 120 days of the NTP.

Table C.2.EM.PA.0040.A001.07.DR.04.02-1 Integrated Safety Management Milestones/Schedule	
Milestone	Date
Submit ISMS Description	90 days after NTP
Submit SSP and EMS	90 days after NTP

Table C.2.EM.PA.0040.A001.07.DR.04.02-1 Integrated Safety Management Milestones/Schedule	
Milestone	Date
Contractor’s ISMS Verification Review and Report	120 days after NTP
ISMS Annual Effectiveness Review and Report	Annually after the Contractor’s ISMS Verifications Review and Report
PMOCs	120 days after NTP, Annually thereafter

EM.PA.0040.A001.07.DR.04.03 Radiological Protection Program

The Contractor shall develop and implement a Radiation Protection Program (RPP) compliant with the requirements specified in 10 CFR 835 and DOE Order 458.1 (the Environmental Radiation Protection Program (ERPP) is addressed in EM.PA.0040.A001.01.DR.01). The confirmation of the program review and any changes shall be submitted to DOE for approval. Management of radioactive sources onsite the Contractor is responsible for shall be fully compliant with the RPP and DOE requirements upon possession or management of the sources.

The Contractor shall implement and maintain a radiological program that includes all dosimetry, data, and records necessary to demonstrate compliance with the required radiological monitoring and to verify the adequacy of the site radiological control program in protecting the health and safety of workers, the public, and the environment. The Contractor shall provide and distribute radiation dosimetry (e.g., Thermoluminescent Dosimeters/Personal Nuclear Accident Dosimeters) and bioassays as required by 10 CFR 835 for its employees and site visitors including radiological surveys as needed for its work.

The Infrastructure Contractor shall perform calibration and maintenance of all field monitoring and surveying equipment as required by 10 CFR 835. This does not include laboratory or laboratory-like equipment that would be used to measure swipes or samples. The Infrastructure Contractor shall maintain the Paducah External Dosimetry Program, Paducah Internal Dosimetry Program, Paducah Radiological Instrumentation Program, and the Paducah Radiological Records Program and provide dosimetry and bioassay sampling as a Government Furnished Service. Determinations of dosimetry requirements and evaluation of dosimetry or radiological data is not a GFSI and shall be performed by the Contractor. The Contractor’s RPP shall be consistent with the Paducah site programs.

Table C.2.EM.PA.0040.A001.07.DR.04.03-1 Radiation Protection Program Milestones/Schedule	
Milestone	Date
Submittal of the Radiation Protection Program	60 days after NTP

EM.PA.0040.A001.07.DR.04.04 Emergency Management & Fire Protection Program

The Contractor shall maintain and manage the Paducah Site Emergency Management Program Plan in compliance with the DOE order requirements. Per DOE O 151.1D, Comprehensive Emergency Management System, the Contractor shall implement comprehensive emergency management requirements, as they apply to the site/facility/activity, commensurate with the hazards present. General requirements shall include the implementation of a Comprehensive Emergency Management System designed to:

- a. Minimize the consequences of all emergencies involving or affecting facilities and activities (including transportation operations/activities);
- b. Protect the health and safety of all workers and the public from hazards associated with site operations and those associated with decontamination, decommissioning, and environmental restoration;
- c. Prevent damage to the environment; and
- d. Promote effective and efficient integration of all applicable policies, recommendations, and requirements, including Federal interagency emergency plans. An exemption for two-level (site area emergency and alert) emergency classification (versus a three-level required by DOE O 151.1D) was generated by DOE in 2014. The Contractor shall modify the program to come into full compliance with the three levels required by DOE Order 151.1D, eliminating the exemption 24 months after transition is completed. All procedures, Authorization Basis documents, program documents, and other implementing documents shall be modified.

Activities shall include, but are not limited to the following:

- a. Provide initial and refresher Emergency Operations Center (EOC) and Joint Public Information Center (JPIC) training for DOE and DOE Prime Contractors/Subcontractors as needed. Develop and implement a site wide emergency exercise/drill program in compliance with DOE Orders, with support from other DOE Prime Contractors/Subcontractors as needed.
- b. Ensure sufficient resources are available to provide emergency response compliant with DOE Orders for the entire site, (Fire Operations, Emergency Squad, Emergency Operations Center, & Joint Public Information Center) including capabilities of: fire, rescue, technical rescue, HAZMAT, medical response at the Advanced Life Support (ALS) level, and the capability to notify employees and offsite personnel of an emergency to facilitate safe protective actions. Ensure the proper identification, categorization/classification, notification, and reporting of emergencies to the DOE Paducah office, PPPO Manager, the Headquarters Emergency Operations Center and other organizations in accordance with applicable DOE policies and requirements.

- c. Ensure recovery procedures are available that include termination of emergency, and the dissemination of information to Federal, State, and local organizations regarding the emergency and possible relaxation of public protective actions; planning for decontamination actions; establishment of a recovery organization; development of reporting requirements; and establishment of criteria for resumption of normal operations.

The Contractor shall maintain and update documentation establishing an Emergency Planning Zone; Hazard Surveys, Emergency Planning Hazard Assessments (EPHA), and Emergency Plans that document comprehensive emergency management programs; and Emergency Readiness Assurance Plans. The Contractor shall also maintain and update Emergency Action Levels (EALs) and protective actions, review and implement EALs and protective actions from other contractors/subcontractors.

The Contractor shall integrate emergency public information planning with the maintenance of the Paducah Site Emergency Plan. The Contractor shall maintain a coordinated off-site emergency management interface with state and local organizations responsible for off-site emergency response and protection of the public and submit copies of all Mutual Aid Agreements and contracts for offsite assistance annually to DOE-PPPO. The Contractor shall gain DOE concurrence prior to entering into or modifying any Mutual Aid Agreements (e.g., Letters of Agreement, or Memorandums of Understanding) and contracts. The Contractor shall contract for hospital services instead of relying on Mutual Aid Agreements.

Maintain an Emergency Readiness Assurance Program that meets the requirements of DOE Order 151.1D and provides assurances that emergency plans, implementing procedures, and resources are adequate and sufficiently maintained, exercised, and evaluated, and that improvements are made in response to identified needs.

The Contractor shall implement and manage a site-wide (covering the other site tenants/contractors) Fire Protection Program that complies with the Contractor Requirements Document (CRD) of DOE O 420.1C; National Fire Protection Association (NFPA); and OSHA 1910.146.

The Contractor shall provide site-wide (involving site tenants/contractors) active fire protection system inspections, testing and maintenance, fire investigations, and fire department and emergency response. Fire protection system inspection, testing and maintenance shall include a fire protection system impairment strategy. Fire protection systems in facilities shall be inspected, tested and maintained in accordance with National Fire Protection Standards until the facility is shutdown, does not have routine occupancy, and has the fire load eliminated or reduced to minimum possible levels.

The Contractor shall be responsible for providing a Fire Protection Plan and Fire Hazard Analyses (FHA) for approval. A Baseline Needs Assessment (BNA) shall be prepared including details regarding Contractor emergency response capabilities including mission responsibilities, personnel, apparatus, equipment, facilities, programs, incident reporting, etc.

It is recognized that the size and capability of emergency response, including fire protection, programs and facilities are dependent on operational activities at the site. The Contractor shall develop these programs/documents with automatic triggers that eliminate requirements as the status of the GDP facilities moves toward shutdown and isolated status.

When necessary to use medical, fire, and emergency responses, the Contractor shall maximize the use of local community medical, fire/emergency response where overall cost-effective to respond in a timely and effective manner.

Table C.2.EM.PA.0040.A001.07.DR.04.04-1 Current Emergency Management & Fire Protection Program Agreements	
<i>Letters of Assistance</i>	
City Of Paducah	
McCracken County	
Paducah-McCracken County Office Of Emergency Management	
McCracken County Sheriff's Department	
Federal Bureau Of Investigation	
Kentucky State Police	
Mercy Regional Emergency Medical Services	
PHI Air Medical	
St. Mary's Hospital Lifeflight	
Vanderbilt University Medical Center Lifeflight	
Purchase District Health Department	
United States Department Of The Army Explosive Ordnance Disposal	
West McCracken County Fire District	
<i>Memorandum Of Understandings</i>	
Lourdes Hospital	
Western Baptist Hospital	
<i>Mutual Aid Agreements</i>	
Lone Oak Fire Department	
Paducah Fire Department	
<i>Memoranda of Agreements</i>	
Coroner (No existing agreement)(Required by DOE G 151.1-4)	

Table C.2.EM.PA.0040.A001.07.DR.04.04-2 Emergency Management & Fire Protection Program Milestones/Schedule	
Milestone	Date
Fire and Emergency Services Off-Site Support Implementation Plan	1 year after NTP

Table C.2.EM.PA.0040.A001.07.DR.04.04-2 Emergency Management & Fire Protection Program Milestones/Schedule	
Milestone	Date
Completion of Contractor Readiness Assessment for Emergency Management Program	105 days after NTP
Submittal of the Emergency Readiness Assurance Plan	Annually Before September 30 th
Submittal of Paducah Site Emergency Management Program Plan and other required secondary documentation such as EALs, EPHAs, Hazard Surveys, etc.	60 days after NTP
Submittal of Fire Protection Plan and Fire Hazard Analysis	90 days after NTP
Submittal of Emergency Management and Fire Protection Baseline Needs Assessment	60 days after NTP
Mutual Aid Agreements and Contracts	120 days after NTP and Annually or as changed thereafter

EM.PA.0040.A001.07.DR.04.05 Quality Programs

The Contractor shall comply with 10 CFR 830, other regulations affecting Quality Assurance (QA) and DOE O 414.1D and implement a DOE-approved Quality Assurance Program (QAP) in accordance with the EM Quality Assurance Program, EM-QA-001, Revision 1 dated June 11, 2012, prior to commencement of work affecting nuclear safety. The Contractor shall, at a minimum, annually review and update the QAP as appropriate. The confirmation of the review and any changes shall be submitted to DOE for approval.

The Contractor’s QAP shall describe the overall implementation of the EM QA requirements and shall be applied to all work performed by the Contractor (e.g., research, design/engineering, construction, operation, budget, mission, safety, and health). The Contractor shall ensure it maintains a robust Suspect/Counterfeit Items Program.

American Society of Mechanical Engineers NQA-1, 2015, *Quality Assurance Requirements for Nuclear Facility Applications*, shall be implemented as part of the Contractor’s QA Program for work affecting nuclear safety, consistent with EM-QA-001, Rev.1. The required portions of NQA-1 to be implemented include: Introduction, Part I, and as applicable portions of Part II. NQA-1 Parts III and IV are to be used as guidance for the Contractor’s QAP and implementing documents.

In accordance with H.64, the Contractor shall develop and implement a comprehensive Issues Management System for the identification, assignment of significance category, and processing of safety-related issues identified within the Contractor’s organization.

Table C.2.EM.PA.0040.A001.07.DR.04.05-1 Quality Programs Milestones/Schedule	
Milestone	Date
Submittal of the Quality Assurance Plan	90 days after NTP
QAP Review and Update	Initial update due 1 year after conclusion of transition, and annually thereafter

EM.PA.0040.A001.07.DR.04.06 Quality System for Nondestructive Assay Characterization (QSNDA)

The Contractor shall accept or complete if not yet final/approved and implement the Paducah Site Nondestructive Assay (NDA) Program that is compliant with DOE Order 414.1D, Quality Assurance. Prior to acceptance, the Contractor shall perform its own compliance verification of the program. Any identified non-compliances shall be brought to the attention of DOE. The Contractor shall comply with QSNDA requirements *DOE/PPPO/03-0235&D0, U.S Department of Energy Portsmouth/Paducah Project Office Quality System for Nondestructive Assay Characterization*. This program is capable of measuring waste drums of trapping media generated from the deposit/holdup removal program (5.5 weight % U²³⁵) and characterizing cells/piping and identifying deposits/hold-up to a level that supports the implementation of the NCS crit-incredible limits for the process equipment following in-situ chemical deposit/holdup removal (20 weight % U²³⁵).

The Contractor shall ensure that all NDA programs comply with DOE Order 414.1D, not just those performing the NDA of trapping material, piping, and cells.

The Contractor shall review these programs for acceptance and continue implementation of the programs during the performance of this PWS. This includes submitting changes to DOE for approval.

Table C.2.EM.PA.0040.A001.07.DR.04.06-1 QSNDA Requirements Documents	
Document Number	Title
DOE/PPPO/03-0235&D0	U.S Department of Energy Portsmouth/Paducah Project Office Quality System for Nondestructive Assay Characterization

EM.PA.0040.A001.07.DR.11 Real and Personal Property Management

Administration of the real and personal property program is the responsibility of the Infrastructure Contractor including managing an automated database of all personal property actions related to acquisition, use and disposition. The Infrastructure Contractor is also responsible for managing the property inventory, databases, disposition operations, and providing input to FIMS and the Property Information Database System.

The Contractor shall provide new or updated data to the Infrastructure Contractor for input into FIMS for all facilities assigned under this Contract. The Contractor shall be responsible for ensuring FIMS data is accurate and up to date throughout Contract period of performance for assigned facilities. The Contractor shall provide FIMS data to the Infrastructure Contractor and shall support the annual FIMS data verification, including correcting any findings.

The Contractor shall provide annual updates to the information contained in the PPPO Ten Year Site Plan, and provide support for review and resolution of comments. The Contractor is expected to be the information source authority for the facilities as assigned under this contract, and able to respond to DOE requests for information on real property under its control.

The Contractor shall interface with the PED to transfer eligible excess personal property per the PED/DOE Property Transition Agreement.

The Contractor shall develop and implement a Property Transfer Plan to transfer real property to another party prior to the end of the Base POP. The Contractor should target at least 500 acres for transfer. The Contractor shall support additional property transfers as requested.

The Contractor shall manage all assigned Government-owned accountable and non-accountable personal property in accordance with the requirements listed below and 41CFR101 and 41CFR109:

- a. Control classified equipment and material in accordance with DOE O 471.6, "Information Security,"
- b. Control high risk property in accordance with DOE Personal Property Letter 970-3, Rev.1, dated February 3, 1998, and
- c. Destruction or "rendering useless" of any component, equipment, and material, which are both surplus to the DOE and identified in the Nuclear Suppliers Group Trigger List or are nuclear weapon components or weapon-like components.

This includes establishing a system to track the assignment and status of high risk property specifically assigned to the Contractor. Prior to providing property to the Infrastructure Contractor for disposition, the Contractor shall characterize the property, maintain characterization records and provide those records at the time of property transfer to the Infrastructure Contractor.

The Contractor shall work with the Realty Officer or other assigned real estate personnel and receive concurrence or approval prior to executing any real property actions on behalf of this Contract. All Contractor real estate actions shall be accomplished in accordance with the DOE O 430.1B, Real Property and Asset Management.

The Contractor shall work with DOE Property Manager, Fleet Manager and Realty Officer and shall provide the property and vehicle reports in accordance with Section J, Attachment J-4, and Section J, Attachment J-13.

Table C.2.EM.PA.0040.A001.07.DR.11-1 Real and Personal Property Management Milestones/Schedule	
Milestone	Date
Submit the FIMS data for site facilities to the Infrastructure Contractor	August 15 and annually thereafter
Property Transfer Plan	90 days after transition is complete
Reports of loss, damage, periodic physical inventory data and inventory, & final inventory for Contract completion	1 year after transition is complete and annually thereafter
Motor Vehicle Fleet Reports (FAST)	1 year after transition is complete and annually thereafter
Transfer excess acreage to the community	End of Base POP

EM.PA.0040.A001.07.DR.12 Automated Supply Pilot Project

Historically, projects at PGDP manage large inventories of consumables and parts. Cost and efficiency, however, are not optimized because inventory is often lost; costs have not been adequately allocated to users/projects costs, and large volumes of inventory is warehoused (which requires operational costs of facility management and maintenance) instead of receiving items “just-in-time” for users. In an effort to improve efficiency and reduce logistical cost, the Contractor shall plan and implement a Pilot Project to automatically distribute consumables and parts in support of field activities, (e.g., facility maintenance, vehicle maintenance, operations, and/or small construction projects) from one primary equipment distribution center. The common terminology for this commercially available technology is “Industrial Vending”.

The Contractor shall select one equipment distribution center to install “Industrial Vending System(s)”. The period for performance of this pilot project begins on day one after transition is complete and continues for 39 (thirty-nine) months. The pilot study shall be divided into three phases.

Phase 1 starts at day one after the Transition Period is complete and concludes after 18 months. The Phase 1 scope includes planning, data collection relative to conventional distribution methods in the planned pilot study area(s) (for comparative analysis of automated distribution data), training/familiarization of site personnel with the “Industrial Vending” equipment and procedures procurement of an “Industrial Vending” technology provider, and deployment of the equipment to provide the automated distribution capability at the beginning of Phase 2.

Phase 2 begins immediately after Phase 1 for a period of 18 months. The Contractor shall use the Phase 2 period to gather cost data and efficiencies to

compare the “Industrial Vending” performance of the automated equipment against conventional distribution systems currently in use at the PGDP.

Phase 3 is 90 days in duration and begins immediately following Phase 2. At the end of Phase 3, the Contractor shall deliver, to DOE, a detailed report, comparing conventional equipment/parts distribution methods and “Industrial Vending”, including efficiencies (if any), cost benefits (if any), and recommendation(s) for future application of the Industrial Vending technology/process.

Table C.2.EM.PA.0040.A001.07.DR.12-1 Automated Supply Pilot Project Milestones/Schedule	
Milestone	Date
Complete Phase 1 of Automated Supply Pilot Project	18 months after completion of Transition
Complete Phase 2 of Automated Supply Pilot Project	36 months after completion of Transition
Complete Phase 3 of Automated Supply Pilot Project	39 months after completion of Transition

EM.PA.0040.A001.07.DR.13 Asset Recovery and Recycling

EM.PA.0040.A001.07.DR.13.01 Asset Recovery and Recycling

For all activities, the Contractor shall maximize use of recycling excess materials and equipment to reduce project costs in accordance with DOE O 436.1. The Contractor shall support DOE’s reindustrialization and asset re-utilization activities at the site.

The Contractor shall actively recycle all non-contaminated recyclables: batteries, rubber, paper, glass, plastics, and metals and work with local and regional recyclers and with PED to maximize cost effectiveness. The Contractor shall also establish recycling collection points on-site for other site. The Contractor shall not release, for unrestricted use, any scrap metal from DOE radiological areas into commerce (Memorandum of “Release of Surplus and Scrap Materials”, from Secretary Bill Richardson, dated July 13, 2000). Also, the Contractor shall not release, for unrestricted use, volumetrically-contaminated metal into commerce (Press Release “Energy Secretary Richardson Blocks Nickel Recycling at Oak Ridge”, dated January 12, 2000). The Contractor shall comply with DOE policies that are developed to address or update the suspension or the moratorium. The Contractor shall provide a Recycling Program Plan within 180 days after NTP. The plan shall include volumes of regulated materials.

Table C.2.EM.PA.0040.A001.07.DR.13.01-1 Asset Recovery and Recycling Milestones/Schedule	
Milestone	Date
Asset Recovery and Recycling Program Plan	180 days after transition is complete, then updated annually

EM.PA.0040.A001.07.DR.14 Energy Efficiency

The Contractor shall assist DOE through direct participation and other support in achieving DOE's energy efficiency goals and objectives in electricity, water, thermal consumption, conservation, greenhouse gas reduction, climate control, and savings, including goals and objectives contained in Executive Order 13693, Planning for Federal Sustainability in the Next Decade. The Contractor shall maintain and update, as appropriate, its documents to include detailed plans and milestones for achieving site-specific energy efficiency goals and objectives. The Contractor shall maximize the use of Energy Savings Performance Contracts and Utility Energy Services Contracts. The Contractor will implement the Transformation Energy Action Management (TEAM) Goals and Initiatives and report the progress on achieving these goals and initiatives in the Ten Year Site Plan, semi-annually to EM HQ, and upon request. At a minimum, the following initiatives shall be pursued:

- a. All purchases of office equipment shall be ENERGY STAR or DOE Federal Energy Management Program top 25th percentile. All new construction and major renovations shall be evaluated to achieve Leadership in Energy and Environmental Design (LEED) Gold certification.
- b. Decrease water consumption where practical, in all applicable buildings, trailers, and other structures and facilities.
- c. Develop Green purchasing program and incorporate Executive Order 13693 into new subcontracts.
- d. Increase energy efficiency by adding meters to buildings that meet the Department's cost-benefit analysis guidelines. Even on non-metered buildings, pursue energy savings opportunities such as fluorescent lighting, low flow shower heads, programmable thermostats, more efficient insulation, and other energy saving projects.
- e. Transition all fleet vehicles to alternative fuel as vehicles are replaced. Pursue plug-in hybrid electric vehicles where economically and operationally practical.
- f. Develop a Toxicity Reduction Plan. Develop toxicity reduction objectives and targets. Monitor ozone depletion substances, recovery, and recycling.
- g. Develop a plan to continually reduce greenhouse gas emissions by reducing energy use and cost, then finding renewable or alternative energy solutions.

Table C.2.EM.PA.0040.A001.07.DR.14-1 Energy Efficiency Milestones/Schedule	
Milestone	Date
Develop and implement an Energy Efficiency Plan that incorporates all requirements of Executive Order 13693	90 days after conclusion of Transition

EM.PA.0040.A001.07.DR.15 Records Management

The Contractor shall manage all records (regardless of media) generated/received in the performance of the Contract, including records obtained from a predecessor contractor (if applicable), in accordance with the Paducah Infrastructure Contractors Records Management Program, 44 U.S.C. 21; 44 U.S.C. 29; 44 U.S.C. 31; 44 U.S.C. 33; 44 U.S.C. 36; 36 CFR Chapter XII, Subchapter B, *Records Management*; DOE Order 243.1B, *Records Management Program*; and any other DOE requirements as directed by the CO. The Contractor shall gain the approval of the Infrastructure Contractor for any of its Record Storage Areas (active records) and the methodology and process for handling records. These functions include, but are not limited to, tasks associated with creating, receiving, maintaining, storing, protecting, scheduling and dispositioning inactive records (including emails) to the Infrastructure Contractor; managing classified records (if applicable); records management data calls by NARA and DOE-HQ; and responses to requests related to the Freedom of Information Act (FOIA), the Privacy Act, the Energy Employee Occupational Illness Compensation Program (EEOICPA), the former worker medical screening program, the Chronic Beryllium Disease Prevention program, congressional inquiries and legal discoveries.

The Contractor shall ensure records classified as Quality Assurance records under American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME) National Quality Assurance (NQA)-1 are categorized appropriately and managed in accordance with NQA-1 and 36 CFR Chapter XII, Subchapter B, and are maintained for traceability to the applicable item, activity or facility.

The Contractor shall ensure that records that contain personal information retrieved by name or another personal identifier are categorized and maintained in Privacy Act Systems of Records, in accordance with FAR 52.224-2, "Privacy Act" and DOE Order 206.1, "DOE Privacy Program".

Except for those defined as contractor-owned (in accordance with Department of Energy Acquisition Regulation (DEAR) 970.5204-3, "Access to and Ownership of Records," see Section I), all records (see 44 U.S.C. 3301 for the statutory definition of a record) acquired or generated by the Contractor in the performance of this Contract including, but not limited to, records from a predecessor contractor (if applicable) and records described by the Contract as being maintained in Privacy Act Systems of Records shall be the property of the Government.

The Contractor shall turn over inactive records within 30 days of going from active to inactive (in all formats, including email) to the Paducah Infrastructure Contractor in electronic format in accordance with the Paducah Infrastructure Contractor's Records Management Program. The process shall include, but is not limited to, the following activities:

- a. Schedule records in accordance with the NARA-approved DOE Records Disposition Schedules,
- b. Transmit record(s) in acceptable format. Transfer shall include back-up data and drafts (if applicable) to adequately document the work performed,
- c. Perform 100 percent validation of all transfers to ensure:
 - i. Optical character recognition for text-based and text-mixed files to allow for digital indexing,
 - ii. All text and markings are clear and legible,
 - iii. All pages are machine-readable, or marked as "poor quality original,"
 - iv. Pages are oriented/aligned, without scanning offsets,
 - v. Classification markings are clear and legible, and
 - vi. No security settings (e.g., encryption, passwords, and/or permissions) are included/embedded that would prevent opening, viewing, or printing a record.
- d. For permanent records, ensure lossless file compression technique is used,
- e. All embedded fonts are identified publically as being legally embeddable in a file,
- f. Classified documents may be processed electronically only if computer systems meeting classified security requirements are available to properly process them.
- g. Incorporate controls into electronic information systems and integrate them into the Infrastructure Contractor's electronic recordkeeping system that is external to the information system itself in accordance with 36 CFR Part 1236, Electronic Records Management, and
- h. Photographs and audio/video shall be processed and digitally captured compliant with the requirements of 36 CFR Part 1237.

The Contractor shall ensure all records identified for inclusion in the administrative record are turned over to the Infrastructure Contractor for the inclusion in the Paducah Environmental Information Center in both hard copy and electronic format within 30 days of generation. The Contractor shall review any existing open administrative record project files and ensure the documents are appropriate and take necessary actions to correct any omissions or remove items that have been included in error.

The Contractor shall prepare, revise, submit for DOE approval, and execute an approved Records Management Plan, Vital Records Inventory, and Records Management Close-out/Transition Plan consistent with the Paducah Infrastructure Contractor's Records Management Program, and records management regulations.

The Contractor shall not transfer any inactive records to the subsequent Paducah D&R Project Contractor. The Contractor shall certify to DOE that all documents transferred to the subsequent Contractor contain no records, unless they are active records managed and stored in an approved records storage area.

Table C.2.EM.PA.0040.A001.07.DR.15-1 Records Management Milestones/Schedule	
Milestone	Date
Records Management Plan	60 days after NTP
Vital Records Plan and Inventory	120 days after NTP
Records Management Close-out/Transition Plan	180 days prior to end of the POP
Contractor Document Certification	14 days prior to end of the POP

EM.PA.0040.A001.07.DR.16 Continuity Program

The Contractor shall develop implement, and update, as necessary, a Site Wide Continuity of Operations (COOP) Program per DOE Order 150.1. The Contractor shall develop and implement a COOP Implementation Plan or Business Recovery Plan that documents the COOP Program. DOE approval of the Plan is required. The COOP program is designed to:

- a. Assist the Department in continuing to accomplish Departmental mission essential functions (MEFs), primary mission essential functions (PMEFs), and essential supporting activities (ESAs);
- b. Be integrated with other Paducah contractor organizations and the Emergency Management Program; and
- c. Address preparedness and response to epidemic and pandemic events.

Table C.2.EM.PA.0040.A001.07.DR.16-1 Continuity Program Milestones/Schedule	
Milestone	Date
Site Wide COOP Program Implementation Plan and updates as necessary	60 days after completion of Transition

EM.PA.0040.A001.07.DR.17 DOE Consolidated Audit Program

The DOECAP is a consolidated audit program with DOE complex-wide participation that conducts annual audits of analytical environmental laboratories and commercial treatment, storage, and disposal facilities (TSDFs) that have contracts or agreements to provide services to DOE. DOECAP audits are performed on behalf of, and with the participation of, sites throughout the DOE complex. The six DOECAP laboratory audit areas include Quality Assurance Management Systems and General Laboratory Practices, Data Quality for Organic Analyses, Data Quality for Inorganic and Wet Chemistry Analyses, Data Quality for Radiochemistry Analyses, Laboratory Information Management Systems and Electronic Data Management, and Hazardous and Radioactive Materials Management. The seven DOECAP TSDF audit areas include Quality Assurance Management Systems, Sampling and Analytical Data Quality, Waste Operations, Environmental Compliance/Permitting, Radiological Control, Industrial and Chemical Safety, and Transportation Management.

The Contractor shall perform all activities to:

- a. Provide at least one qualified candidate to participate as an audit team member in as many as four TSDf and five Lab DOECAP audits each year, (a total of nine candidates maximum, but that may also be the same individual(s) so long as no audit schedule is impacted), as requested by DOE.
- b. Perform pre-audit activities, including but not limited to, requesting and reviewing pre-audit information from the audited facilities and participating in conference calls.
- c. Perform audit activities, including lead auditor activities during laboratory audits.
- d. Perform post-audit activities, including but not limited to, completing and issuing audit reports and notifying the audited facility of acceptance of the proposed CAP.
- e. Perform work in accordance with applicable DOECAP policies and procedures

EM.PA.0040.A001.07.DR.18 Project Close-out and Completion

The Contractor shall provide all necessary support for a smooth transition/turnover at the end of the Contract. Six (6) months prior to the expiration of the Contract, the Contractor shall submit the Contract Close-out Plan for DOE approval. The Contract Close-out Plan shall include all remaining administrative matters necessary to close out the Contract after the POP, including, but not limited to: resolution of remaining and open agreements, resolution of remaining and open litigation; audit of indirect costs; remaining records disposition required by the Government; or any other activities required by the Contract. The Plan shall identify if the costs are direct or indirect and how they will be charged. Contract closeout activities shall be completed within 180 days after the end of the POP, with the exception of the required accounting and auditing functions.

Ninety days prior to the end of the POP, the Contractor shall submit to DOE, a comprehensive environmental compliance report demonstrating compliance with all applicable environmental regulatory requirements.

One hundred and twenty (120) days prior to the expiration of the contract, the Contractor shall submit a detailed Contract Completion Transition Plan. The Contract Completion Transition Plan shall include the approach the Contractor will take to ensure the successful transfer of responsibility in the following areas, to a follow-on Contractor at the end of the POP:

- a. transition of all facilities, facility operations, and environmental permits to the follow-on contractor;
- b. support due diligence walk downs of facilities and other areas;
- c. transfer of existing program documents to include deactivation and environmental remediation services;

- d. transfer of authorization basis documents;
- e. transitioning of staff;
- f. transferring procurement activities for materials, equipment, supplies, parts, and subcontractors required for a seamless transition;
- g. destruction of all non-records that are not desired by the incoming Contractor; and
- h. transfer of all records to the Infrastructure Contractor Records Management Center, in accordance with this contract.

The Contractor shall work with the incoming D&R Project Contractor to align transition activities and to support a smooth transition. Any areas that the Contractor believes are being missed shall be brought to DOE’s attention

Table C.2.EM.PA.0040.A001.07.DR.18-1 End of Contract Performance Milestones/Schedule	
Milestone	Date
Contract Close-out Plan	180 days before end of POP
Contract Completion Transition Plan	120 days before end of POP
Environmental Compliance Report	90 days before end of POP

EM.PA.0040.A001.07.DR.19 Worker Pensions & Retirement Health Benefits

The Contractor shall become a sponsor/participating employer in the East Tennessee Technology Park Pension Plan for Grandfathered Employees (ETTP MEPP), the East Tennessee Technology Park Multiple Employer Welfare Arrangement (ETTP MEWA). The requirements associated with this responsibility are set forth in Section H.

The Contractor shall perform the premium remittance (employer cost share) and employer reporting duties for the inactive population of eligible former Remediation Contractor employees (e.g. Retirees, Displaced Workers, COBRA, and Long-Term Disability). Under the UCOR's prime contract with the DOE, UCOR has the responsibility to administer MEPP/MEWA Pad/Ports benefits, however, the funds will be provided to UCOR through this contract. There will be no fee associated with the pass-through costs paid to UCOR.

EM.PA.0040.A001.07.DR.20 Nuclear Materials Control and Accountability

The Contractor shall manage and implement the site’s Nuclear Materials Control and Accountability (NMC&A) Program. The Contractor shall comply with DOE Orders and optimize the cost-effectiveness of the program for all accountable quantities of nuclear material on the Paducah site, and for use by other site contractors. The Contractor shall, in consultation with the ODSA, ensure the NMC&A Section of the SSP is correct and provide changes to the ODSA.

The Contractor shall:

- a. Provide a single, integrated NMC&A Plan for use by Paducah site contractors performing NMC&A activities;

- b. Manage and conduct a centralized NMC&A Program for all accountable quantities of nuclear material on the Paducah site;
- c. Perform NMC&A activities include warehousing, surveillance, characterization, planning, brokering, packaging, consolidation, preparation, and shipping of the inventory of depleted, normal and enriched Nuclear Materials;
- d. Be responsible for the final disposition, as directed by DOE, of all remaining Nuclear Material inventory including product and waste. The dispositioning of the Nuclear Material Product includes, but is not limited to, relocation to other DOE sites or DOE contractors for storage/programmatic use and/or sale to the private sector and/or disposal; and
- e. Provide necessary reports and information to support DOE-HQ Nuclear Materials Management and Safeguard System.

Table C.2.EM.PA.0040.A001.07.DR.20-1 NMC&A Milestones/Schedule	
Milestone	Date
Submittal of NMC&A Program Plan	90 days after NTP and Annually thereafter
Submit the NMC&A SSP Section to the ODSA	90 days after NTP and Annually thereafter in a schedule agreed to by the ODSA

EM.PA.0040.A001.07.DR.21 Communications and Information Technology

A Local Area Network (LAN), Wide Area Network (WAN), and Wireless Local Area Network (WLAN) configured to allow multiple users will be provided for the Contractor’s use at Paducah. The Contractor will have to furnish secured connectivity to any off-site facilities. The Infrastructure Contractor will perform maintenance and repair of all installed external connectivity. The system will be configured to allow separation of multiple users and provide basic operating software sufficient to allow input into DOE data systems. Computer support will be provided by the Infrastructure Contractor and will include network administration, customer service support, help desk support, servers for the Paducah Data Warehouse, computer repairs, and cyber security and basic security such as SPAM, adware, and spyware protection. Customer service support includes unpacking, installation, testing and removal of Personal Computers (PCs) and related components and software installation, removal, or upgrades as necessary; ensuring operability between PCs and peripheral devices, the LAN, WAN, and WLAN; and providing personal interface in assessing user needs through personal visits and telephone.

The Contractor shall install any additional ports necessary to support its own activities if a sufficient number of ports are not available in the work location. If additional facilities are brought on to house personnel (e.g. trailers) that are not sufficiently equipped, the Contractor is responsible to run lines, wire trailers, install ports and to perform any necessary preliminary work for connection to the site LAN or WAN. Any requests for additional computing resources either hardware or

software must be submitted to DOE for approval including justification and detailed explanation of costs.

The Contractor is responsible to provide only peripheral activities related to the telephone system for its own personnel (i.e. individual phone unit replacements, and working with the Infrastructure Contractor for moving office phone numbers). If additional facilities are brought on to house personnel (e.g. trailers) that are not sufficiently equipped, the Contractor is responsible to run lines, wire the facilities, install phone systems and to perform any necessary preliminary work for connection to the site phone system.

The Infrastructure Contractor holds the license for the Federal Communications Commission (FCC) digital narrow band radio frequencies being used. The Infrastructure Contractor provides the narrow band radio frequency, the tower, transmission and radio repair services. At Paducah most of the radios are Enhanced Access Communication Systems (LPE-200) portable 800 MHz compliant with the narrow band frequency. Approximately 350 narrow band frequency radios are available for use by the Contractor. Additional radios may be available upon request. Cell phones and other communication devices will not be provided and are the responsibility of the Contractor. Subcontractors are responsible for providing their own radios meeting the narrow band frequencies and subject to the Infrastructure Contractor's guidelines and oversight.

EM.PA.0040.A002.04.DR WASTE OPERATIONS

EM.PA.0040.A002.04.DR.01 Waste Operations

The Contractor, to the extent necessary to comply with regulatory and DOE requirements, shall operate and maintain a compliant Waste Management Program. Waste is considered disposed of when it has been shipped to, and accepted for final disposition at, a properly licensed and permitted disposal site. The Contractor shall avoid generating waste from any operations within the PWS with no pathway for disposal. The Contractor shall take all reasonable actions to minimize waste generation and to preclude the generation of TRU and MTRU wastes from any operations within the PWS. The Contractor shall obtain DOE approval prior to generation of TRU or MTRU waste. The Contractor shall assist DOE in evaluating disposal site alternatives (e.g., cost/benefit analyses, NEPA documentation).

The Contractor shall utilize any facilities available for cost-effective storage and processing to comply with nuclear safety requirements (e.g., storage of fissile waste). However, the contractor shall try to maximize the use of SSAs, SAA, and 90 Day Storage Areas, while minimizing the need to keep and process waste in waste storage facilities.

The Contractor shall compliantly manage, characterize, process, and package all waste generated with certification as required during this Contract. The Contractor shall also be responsible for dispositioning all waste generated or received prior to 90

days before this Contract expires. This includes final characterization, packaging, labeling, and final disposition of all acceptable waste (e.g. not sanitary waste) from the Infrastructure Contractor, TVA (primarily expected to be MLLW), or that which was left behind by the incumbent contractor. Waste generated and in process for disposition by previous contractors is expected to exist. The Contractor shall disposition the wastes from the previous contractors, and notify DOE upon completion. For all activities, the Contractor shall maximize use of recycling excess materials and equipment to reduce project costs.

Waste generated from environmental remediation activities using the CERCLA process (in accordance with Executive Order 12580, Superfund Implementation) shall comply with the requirements of DOE O 435.1 (and subsequent revision e.g., DOE O 435.1A), Radioactive Waste Management, DOE M 435.1-1, Radioactive Waste Management Manual, and any other requirements, as specified in the CERCLA ARARs for the projects.

The Contractor shall manage the generated CERCLA Project wastes, including all secondary wastes, such that; waste disposal is not delayed until after the completion of the remediation/removal activity, waste disposal is completed within 45 days of the remedial/removal process, and waste disposal is completed prior to submittal of the D1 Remedial Action Completion Report (RACR) or D1 Completion Notice to DOE.

All waste management activities shall meet the appropriate waste acceptance criteria with certification, as appropriate, for approved waste disposition/disposal options. The Contractor, in compliance with DOE M 435.1-1 requirements, shall prepare exemption requests for use of non-DOE treatment, storage, and disposal facilities, which includes lifecycle cost analysis for disposition (non-DOE treatment, storage, or disposal) options considered. The Contractor has access to the national IDIQ disposal and Basic Ordering Agreement treatment contracts (i.e., DOE LL/ MLLW Disposal Services IDIQ Contracts and DOE LL/ MLLW Treatment Services Basic Ordering Agreements as needed for the execution of waste management activities.

The Contractor shall development, submit, and maintain a Waste Management Plan in accordance with DOE M 435.1 Chg 1 and obtain DOE approval. The Waste Management Plan should reflect an integrated overarching approach to waste management that minimizes generation, maximizes recycling and reuse, and moves the site toward elimination of waste processing and storage at the PGDP as early as possible.

The Contractor shall ensure operation of storage and treatment areas or facilities, and comply with all permits, orders, and regulatory requirements. The Contractor shall, to the extent possible, minimize the number of facilities used for waste storage and waste/materials in storage.

The Contractor shall establish an accounting system and baseline (i.e.,CPB) such that 100% of all Waste Operations costs (fully burdened) are distributed to the projects

generating the wastes and utilizing these services, other than those costs directly associated with the management and disposition of: 1) the previous contractor's wastes (90 Day inventory), 2) TVA and 3) other site contractors.

The Contractor may distribute the S&M and associated regulatory compliance activities required for having the facilities to either the S&M WBS or WBS where project management support is captured in lieu of allocating the costs to the projects that are generating the wastes.

The Contractor shall perform all activities to:

- a. Operate and maintain the waste storage facilities identified in Table C.2.EM.PA.0040.A002.04.DR.01-1 in compliance with applicable permits, and restrictions. Any facilities not required or effective for operations shall be compliantly placed into STANDBY mode and DOE concurrence gained prior to deactivation shutdown.
- b. The Contractor shall continue any waste determination efforts regarding De-Listing Waste and as described within the 2003 Agreed Order Site-Wide Contained-In determinations.
- c. Comply with the agreement with the Tennessee Valley Authority (TVA) Shawnee Fossil Plant for DOE to accept certain ⁹⁹Tc contaminated waste associated with the PDGP ⁹⁹Tc groundwater plume.
- d. Waste generated during the execution of this Contract may require treatment prior to final disposition. Subject to regulatory requirements to meet the waste acceptance criteria for disposal, treatment services may be performed on-site, off-site, or at other DOE facilities. The Contractor, in compliance with DOE M 435.1-1 requirements, shall prepare exemption requests for use of non-DOE treatment, storage, and disposal facilities, which includes lifecycle cost analysis for disposition (non-DOE treatment, storage, or disposal) options considered.
- e. The contractor shall also develop and maintain summary information for Nevada National Security Site (NNSS) on waste stream life-cycle projections planned for treatment facilities, including forecasts and updates as requested by NNSS throughout the year.
- f. The Contractor shall perform all activities associated with the characterization, packaging, handling and hauling/transportation of waste to various facilities with waste certification as appropriate. This includes the transport to off-site and on-site treatment and/or storage facilities and off-site and on-site disposal facilities. All packaging and transportation practices shall be in accordance with applicable Federal, state, and local regulations and requirements. In addition, the Contractor shall:
 - i. Consider the DOE-negotiated tender for transportation services.
 - ii. Procure necessary packaging and carrier services for transport to/from treatment facilities and to disposal facilities;
 - iii. Make the appropriate requests and gain approval from the DOE ODSA for classified shipments;

- iv. Develop appropriate transportation plans, including transportation security plans, for various waste types, obtain appropriate transport permits, and coordinate with DOE as appropriate; and
- v. Receive and manage the disposal certificates for all wastes shipped off-site.
- vi. Establish or accept the current existing program for meeting the NNSS waste certification process.
- vii. Annually report LLW/MLLW volumes for prior year actual and forecast shipments as requested by the DOE Office of Environmental Management.
- viii. Provide auditor support for DOECAP audits of commercial facilities if non-DOE treatment and disposal services are used.

Table C.2.EM.PA.0040.A002.04.DR.01-1							
Waste Storage Facilities							
Building Number	Building Title	FT ²	Bldg. Description	Waste Type			
				RCRA	RCRA/TSCA	TSCA	LLW
C-733	Waste Oil and Chemical Storage Facility	4,224	Covered structure enclosed by a wall on one side and fencing on the other sides. This building is RCRA permitted and holds the flammable/ignitable hazardous material. Several large tanks are here for batching/transfer operations.	X	X		X
C-746-B1	Staging Area	71,000	Waste staging area west of C-746-A. Gravel pad used to store scrap metal, pallets, etc. for size reduction prior to going for disposal.				X
C-746-H3	Storage Area	56,150	Concrete slab for 90-day storage of RCRA material. Two clean shell structures are located on the pad for storing LLW and solid waste.	X			X
C-746-Q	Hazardous and Low-Level Waste Storage Facility	33,165	Prefabricated metal building that stores RCRA and LLW. Material that requires nuclear criticality storage is located here. Some USEC waste is stored in the building.	X	X	X	X
C-746-V	Waste Staging	10,000	Outside gravel pad. LLW and solid waste is				X

Table C.2.EM.PA.0040.A002.04.DR.01-1 Waste Storage Facilities							
Building Number	Building Title	FT ²	Bldg. Description	Waste Type			
				RCRA	RCRA/ TSCA	TSCA	LL W
	Area		temporarily stored here.				
C-752-A	Waste Storage Facility	43,600	Prefabricated metal building used for operations and storage of waste. This building is permitted for RCRA storage and treatment. The southeast corner of the building has a structure for waste treatment that can be isolated from the rest of the building and hooked to air containment systems. Treatment for wastewater occurs here by activated carbon or a low capacity ultraviolet light system. The building is also used for sorting and packaging waste.	X	X	X	X
C-754	Low Level Waste Storage	7872	Sprung Structure				X
C-757	Solid and LL Waste Processing	10,000	Waste management staging & processing				X
C-759	Staging Area	124,893	Gravel pad for waste staging and processing				X
C-760	Pad	104,822	90-day accumulation area				X
C-761	Staging Area	71,046	Gravel pad for waste staging and processing				X
C-746-Q1		16,335	This unit is part of the C-746-Q facility designed to manage both solid and liquid hazardous wastes. Wastes are stored in containers. This unit currently is permitted for the crushing of light bulbs and for chemical treatment of hazardous wastes in containers.	X	X		X

LLW = low-level waste

RCRA = Resource Conservation and Recovery Act of 1976

Table C.2.EM.PA.0040.A002.04.DR.01-1 Waste Storage Facilities							
Building Number	Building Title	FT ²	Bldg. Description	Waste Type			
				RCRA	RCRA/TSCA	TSCA	LLW

TSCA = Toxic Substances Control Act of 1976, Public Law 94-469, October 11, 1976, 15 USC Section 2622

Source: DOE/LX/07-0035&D1, Scoping Document for CERCLA Waste Disposal Alternatives Evaluation Remedial Investigation/Feasibility Study at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

Table C.2.EM.PA.0040.A002.04.DR.01-2 Waste Operations Requirements Documents	
Document Number	Title
DWM-31434-042	2003 Agreed Order Site-Wide Contained-In Determinations
NA	Agreement with Tennessee Valley Authority (TVA) Shawnee Fossil Plant for DOE to accept Certain ⁹⁹ Tc contaminated wastes
CP2-WM-0011/R0	Waste Acceptance Criteria for the Treatment, Storage, and Disposal Facilities at the Paducah U.S. Department of Energy Site, December 2015
DWM-30039-042	1997 Agreed Order for Site Treatment Plan
Permit Numbers 073-00045, 073-00014, 073-00015	Kentucky Division of Waste Management C-746-U, C-746-S and C-746-T Landfills Solid Waste Permits
Permit Number KY8-890-008-982	Kentucky Division of Waste Management Hazardous Waste Management Facilities Permit, includes the Hazardous and Solid Waste Amendments permit issued by U.S. EPA

Table C.2.EM.PA.0040.A002.04.DR.01-3 Waste Management Operations Milestones/Schedule	
Milestone	Date
Submit Waste Management Plan	90 days after NTP
Complete disposition of wastes remaining from previous contractors and TVA	180 days after transition is complete

EM.PA.0040.A002.05.DR LANDFILL OPERATIONS

The Paducah Site has one 60-acre Subtitle D landfill (approximately 22 acres are permitted for disposal) that is currently operational and is designated as the C-746-U landfill. The landfill waste acceptance criteria prohibits the disposal of classified, hazardous, or LLW. However, waste within authorized limits for radionuclides may be disposed in the C-746-U landfill. The location of the landfill is outside the security fence. Five of 23 cells within the C-746-U landfill are currently active. The landfill has a capacity to accept an estimated 1.96 million cubic yards of waste, and currently contains an estimated 300,000 cubic yards. C-746-S and C-746-T are two closed landfills that are currently permitted.

EM.PA.0040.A002.05.DR.01 Operate the Landfills

The Contractor shall perform all activities to operate and maintain the three landfills (C-746-U, C-746-S, and C-746-T) in accordance with Kentucky regulations, DOE

requirements (e.g., authorized limits), closure and post-closure requirements, and the operating permit, to include but not limited to, the following:

- a. Accept waste (including waste from other site contractors or TVA) that meets the requirements of the permit.
- b. Operate and maintain the leachate collection and treatment systems at C-746-U and C-746-S (Note C-746-T does not have a leachate collection system). Collect, characterize, transport, treat as necessary, and discharge all leachate, (including leachate from any new cells constructed/operated) estimated at 825,000 gallons of leachate annually (five year trending average) from the C-746-U Cells 1-5 (798,000 gallons) and C-746-S (27,000 gallons) at an approved wastewater treatment facility. C-746-U leachate is collected and pumped into leachate storage tanks. Leachate from C-746-S is collected in a sump and transferred into tanker trucks where it can be transferred to the leachate storage tanks. Leachate is treated in the C-746-U leachate treatment system. Treatment of the leachate (transferred via tanker trucks) at C-615 is allowed by the site's various permits when the C-746-U treatment system is unavailable or leachate treatment demands exceed the C-746-U treatment system capacity (such as during maintenance or discharges into outfall 19).
- c. Be named as the operator on the permit for the C-746-U, C-746-S and C-746-T landfills, the RCRA permit, and the KPDES permit. If this work is subcontracted out, the Contractor shall remain named as the operator. Additionally, the Contractor shall be designated as the waste generator and responsible for making waste determinations at the site. The Contractor shall enter into a RCRA co-generator agreement with DOE consistent with the existing agreement at the Paducah Site.
- d. Operate and maintain entire permitted area including fencing, mowing, gates, and buildings/structures.

EM.PA.0040.A005.02.DR SOUTHWEST PLUME SOURCES REMEDIATION

EM.PA.0040.A005.02.DR.02 SWMUs 211 A&B Remediation

The Contractor shall complete the installation of the Bio-Remediation delivery system and monitoring system, including monitoring wells at SWMUs 211A needed to implement long-term monitoring of the source areas. The Contractor shall implement the Bio-Remediation remedy as specified in the applicable CERCLA documents. The Contractor shall complete the Remedial Action Completion Report (RACR) for SWMUs 211A and implement long-term monitoring. The Contractor shall perform all activities supporting the long-term monitoring of the Southwest Plume Sources, including sampling and analyses necessary to: demonstrate the effectiveness of the treatment; the development and submittal of all regulatory documents and reports; and compliant waste disposal. All wastes generated up to 90 days prior to the end of the Contract must be disposed of prior to the end of the period of performance.

As a result of the successful completion of the active treatment of the three SW Plume Sources (SWMU 211A) the contractor shall perform long-term monitoring of the source areas for one year under the project and then incorporate additional years of monitoring into the Paducah Site EMP. All data shall be included in the CERCLA 5-Year Site Review and the FFA Semi-annual Report. The initial deliverables submitted to DOE shall be of sufficient quality, depth, thoroughness, and format to support DOE approval.

The current ROD alternatives for SWMU 211B (Long-Term Monitoring or Bio-Remediation) are no longer appropriate based on recent data collected in support of remedy selection. The Contractor shall support future planning and regulatory activities for a path forward for SWMU 211B.

Table C.2.EM.PA.0040.A005.02.DR.02-1 SWMUs 211 A&B Remediation Requirements Documents	
Document Number	Title
DOE/LX/07-0186&D2	Memorandum of Agreement for Resolution of Informal Dispute for the Focused Feasibility Study for the Southwest Plume Volatile Organic Compound Sources (Oil Landfarm and C-720 Northeast and South East Sites) at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, 2010
DOE/LX/07-0365&D2/R1	Record of Decision for Solid Waste Management Units 1, 211-A, 211-B, and Part of 102 Volatile Organic Compound Sources for the Southwest Groundwater Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, March 2012
DOE/LX/07-1288&D2	Final Characterization Report for Solid Waste Management Units 211-A and 211-B Volatile Organic Compound Sources for the Southwest Groundwater Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, December 2013
DOE/LX/07-1268&D2/R2/A1	Addendum to the Remedial Design Work Plan for Solid Waste Management Units 1, 211-A, and 211-B Volatile Organic Compound Sources for the Southwest Groundwater Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Sampling and Analysis Plan, February 2015
DOE/LX/07-1288&D2/A1	Addendum to Final Characterization Report for Solid Waste Management Units 211-A and 211-B Volatile Organic Compound for the Southwest Groundwater Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, December 2015
PPPO-02-3287657-16	Final Characterization Notification for Solid Waste Management Unit 211-A and Solid Waste Management Unit 211-B at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, December 17, 2015

Table C.2.EM.PA.0040.A005.02.DR.02-2 SWMUs 211 A Remediation Milestones/Schedule	
Milestone	Date
D1 Remedial Design Work Plan for SWMU 211A	Consistent with the SMP and the approved CPB
30% Remedial Design Report for SWMU 211A	Consistent with the SMP and the approved CPB

Table C.2.EM.PA.0040.A005.02.DR.02-2 SWMUs 211 A Remediation Milestones/Schedule	
Milestone	Date
60% Remedial Design Report for SWMU 211A	Consistent with the SMP and the approved CPB
90% Remedial Design Report for SWMU 211A	Consistent with the SMP and the approved CPB
D1 Remedial Action Work Plan for SWMU 211A	Consistent with the SMP and the approved CPB
Field Start for SWMU 211A Remedial Action	Consistent with the SMP and the approved CPB
D1 Post Construction Report	Consistent with the SMP and the approved CPB
D1 Operation and Maintenance Plan	Consistent with the SMP and the approved CPB
Complete waste disposition for SWMU 211A Remedial Action	Consistent with the SMP and the approved CPB
D1 Remedial Action Completion Report(s) for SWMU 211A	Consistent with the SMP and the approved CPB

EM.PA.0040.A005.03.DR C-400 SOURCE REMEDIATION

TCE was discovered in residential wells north of the Paducah Site in 1988. The Administrative Consent Order site investigation delineated two off-site groundwater contamination plumes, referred to as the Northwest and Northeast Plumes, and identified several potential on and off-site source areas requiring additional investigation and action. An additional on-site plume has been found to the southwest of the Paducah site. In addition, a series of Remedial Investigation/Feasibility Studies (RI/FS) were conducted under the FFA, including the evaluation of all potential major contaminant sources impacting groundwater and surface water. The project continues to evaluate ongoing potential sources of contamination. In accordance with these investigations, DOE implemented interim actions that focused on reducing potential risks associated with off-site contamination.

The Southwest and Northwest Plumes all have TCE and ⁹⁹Tc contaminants. The Northeast Plume has TCE contamination. A preliminary study has been completed on the viability of utilizing natural attenuation as a final remedy. The preliminary study showed that aerobic degradation is occurring in the Regional Gravel Aquifer.

EM.PA.0040.A005.03.DR.01 C-400 Phase IIb

The C-400 Cleaning Building has historically been found to be a major source of TCE in the Northwest and Northeast Plumes. TCE and other related Volatile Organic Compounds (VOC) have been found in the vadose zone from the surface down to the water table. Concentrations of TCE up to 11,055,000 µg/kg in the soil have been found. Concentrations of TCE in groundwater in the C-400 area have been recorded as high as 1,400,000 ppb. Significant quantities of TCE have been released to the environment.

An interim Record of Decision selecting Electrical Resistance Heating (ERH) was signed in August 2005. Additionally, a Remedial Design Support Investigation

(RDSI) was completed in August 2006 further defining the location of TCE Dense Non-Aqueous Phase Liquid (DNAPL) source material near C-400. Additional remedial actions may be necessary to complete removal of TCE sources. This may include utilization of other technologies and the development and submittal of additional CERCLA documents.

The C-400 IRA will be completed in two Phases. Phase I focused on two treatment areas; one on the southwest corner of the C-400 area and one in 11th Street east of C-400. Phase II focuses on a treatment area in the southeast corner of the C-400 area. As a result of lessons learned during Phase I operations, specifically the inability to adequately heat the deep RGA, Phase II was further divided into two sub-phases; Phase IIa and Phase IIb. Phase IIa utilized electrical resistance heating (ERH) in the Upper Continental Recharge System (UCRS) and upper Regional Gravel Aquifer (RGA). The target depth of treatment for ERH in Phase IIa was 20 to 60 feet below ground surface (bgs). Phase IIb is to use an alternate treatment method approved by the FFA parties through appropriate CERCLA documentation for approximately 55 to 95 feet bgs. Phase I and Phase IIa are complete.

In 2015, DOE completed a treatability study for implementation of steam treatment in the Phase IIb region. Utilizing the results of the Treatability Study, a revision to the ROD to select Steam Treatment for the Phase IIb region has been completed. The Contractor shall complete all applicable CERCLA documentation for Phase IIb, including the 30%, 60%, 90%, CFC design packages, the RAWP, a post construction report, and a RACR. The RACR shall include the results of all phases of the C-400 source remediation activities (Phase I, Phase IIa, and Phase IIb). The initial deliverables submitted to DOE shall be of sufficient quality, depth, thoroughness, and format to support DOE approval.

The Contractor shall perform all activities to complete the ongoing remediation of the C-400 sources (Phase IIb), including but not limited to:

- a) Design, construction, testing, and operation of the treatment system;
- b) Sampling and analyses necessary to operate and demonstrate effectiveness of the treatment;
- c) Shutdown and removal of the treatment system (including any components remaining in place from Phase IIa);
- d) Development and submittal of all regulatory documents and reports;
- e) Demobilization;
- f) Site restoration; and
- g) 100% compliant waste disposal.

All wastes excavated or generated during this project and all site restoration and demobilization activities shall be completed prior to submitting the D1 RACR to the regulatory agencies. All wastes excavated or generated up to 90 days prior to the end of the Contract must be disposed of prior to the end of the period of performance.

As a result of the successful completion of the active treatment of the C-400 Groundwater Sources (Phase I, Phase IIa, and Phase IIb) the Contractor shall perform long-term monitoring of the source areas for one year under the project and then incorporate additional years of monitoring into the Paducah Site EMP. All data shall be included in the FFA Semi-annual Report and the CERCLA 5 Year Site Review.

Table C.2.EM.PA.0040.A005.03.DR.01-1 C-400 Phase IIb Requirements Documents	
Document Number	Title
DOE/OR/07-2150&D2/R2	Record of Decision for Interim Remedial Action for the Groundwater Operable Unit for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, July 2005
DOE/OR/07-2151&D2/R2	Land Use Control Implementation Plan: Interim Remedial Action for the Groundwater Operable Unit for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, February 2008
DOE/LX/07-1260&D1	Technical Performance Evaluation for Phase I of the C-400 Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, August 2011
DOE/LX/07-1294&D2	Treatability Study Work Plan for Steam Injection, Groundwater Operable Unit, at Paducah Gaseous Diffusion Plant, Paducah, Kentucky, February 2014
DOE/LX/07-1295&D2/R1	Treatability Study Design, Design Drawings and Technical Specifications Package for the C-400 Interim Remedial Action Phase IIb Steam Injection Treatability Study at Paducah Gaseous Diffusion Plant, Paducah, Kentucky, July 2014
DOE/LX/07-2202&D1	Treatability Study Report for the C-400 Interim Remedial Action Phase IIb Steam Injection Treatability Study, December 2015

Table C.2.EM.PA.0040.A005.03.DR.01-1 C-400 Phase IIb Milestones/Schedule	
Milestone	Date
30% Design Package	As established in the Contractor's CPB and approved by DOE. Dates must be consistent with the latest approved version of the FFA SMP.
60% Design Package	As established in the Contractor's CPB and approved by DOE. Dates must be consistent with the latest approved version of the FFA SMP.
90% Design Package	As established in the Contractor's CPB and approved by DOE. Dates must be consistent with the latest approved version of the FFA SMP.
D1 RAWP	As established in the Contractor's CPB and approved by DOE. Dates must be consistent with the latest approved version of the FFA SMP.

Table C.2.EM.PA.0040.A005.03.DR.01-1 C-400 Phase IIb Milestones/Schedule	
Milestone	Date
Begin field construction (actual field work does not include mobilization)	As established in the Contractor’s CPB and approved by DOE. Dates must be consistent with the latest approved version of the FFA SMP.
D1 RACR	As established in the Contractor’s CPB and approved by DOE. Dates must be consistent with the latest approved version of the FFA SMP.

EM.PA.0040.A005.10.DR.01 C-400 Building Subsurface Groundwater Source Remediation

The Contractor shall complete an investigation, including any and all sampling, to determine the nature and extent of any TCE contamination that might extend beneath the C-400 Cleaning Building, beyond the currently known TCE or other contaminants source areas around C-400. The Contractor shall develop and submit to DOE and the regulatory agencies all applicable CERCLA documentation, including any sampling and analysis plans necessary to complete the investigation. The Contractor shall work to gain DOE and regulatory agency approval of the CERCLA documentation, including the results of the investigation. The Contractor shall comply with the FFA and other applicable regulatory agreements/requirements.

The Contractor shall develop and submit to DOE and the regulatory agencies all applicable CERCLA documentation (e.g., revised or new Proposed Plans, Records of Decision, Explanations of Significant Differences, Design Packages, Remedial Design Work Plans, Remedial Action Work Plans, etc. necessary to complete remediation of any TCE contamination that extends beneath the C-400 Cleaning Building. The Contractor shall work to gain DOE and regulatory agency approval of the applicable CERCLA documentation.

The Contractor shall complete the remediation of TCE contamination that extends beneath the C-400 Cleaning Building, beyond the currently known TCE source areas around C-400 while the C-400 Building is still in place. The Contractor shall maximize the synergies associated with the implementation of the C-400 Phase IIb Remediation (see Section C.2 EM.PA.0040.A005.03.DR.01) utilizing existing equipment and systems where possible. The Contractor shall comply with the FFA and other applicable regulatory agreements/requirements.

Table C.2.EM.PA.0040.A005.10.DR.01-1 C-400 BUILDING SUBSURFACE GROUNDWATER SOURCE INVESTIGATION Milestones/Schedule	
Milestone	Date
C-400 Subsurface Investigation Report	2 years after completion of Transition
Modify necessary CERCLA documentation to support Remediation of C-400 subsurface TCE contamination	4 years after completion of Transition

Table C.2.EM.PA.0040.A005.10.DR.01-1	
C-400 BUILDING SUBSURFACE GROUNDWATER SOURCE INVESTIGATION	
Milestones/Schedule	
Milestone	Date
Complete the remediation of TCE contamination that extends beneath the C-400 Cleaning Building,	NLT end of FY 23

EM.PA.0040.A008.41.DR SURVEILLANCE AND MAINTENANCE

EM.PA.0040.A008.41.DR.01 Surveillance and Maintenance of Facilities

The Contractor shall perform routine surveillance and maintenance of all DOE-owned facilities assigned to the Paducah D&R Contractor in FIMS and identified in Section J, Attachment J-18. The Contractor shall perform all S&M activities associated with these facilities through the end of the Contract. While not an all-inclusive list, examples of S&M activities are: system monitoring, routine inspections, calibrations, certifications, corrective maintenance, facility repairs necessary to maintain the integrity of the facility, combustible removal, cleanup of spills/leaks, control of loose contamination and airborne particles, isolation of utilities, etc.

Additionally, the Contractor shall minimize the size/footprint of occupied facilities to the greatest extent practical. The goal of this action is to reduce utility and S&M costs and maximize productivity of personnel. The Contractor shall submit annually a Site Facility Occupational Status Report that documents which facilities are occupied and the plans associated with the unoccupied. The report shall include a plan and schedule to reduce the number of occupied facilities by 20% over the life of the contract while meeting all PWS requirements and tasks. A facility shall be considered occupied, consistent with DOE Orders and the Life Safety Code (NFPA-101), if the facility is occupied by personnel on a regular basis (more than just making rounds or walk-throughs of the facility). If operations are performed in a facility, it shall be considered occupied. The Contractor shall implement that plan to the extent practical.

The Contractor shall also, to the extent practicable, remove and disposition permanently unoccupied temporary facilities (e.g. trailers) or small structures to preclude degradation that would result in increased cost to DOE. DOE approval is not required prior to implementing such actions. However, CERCLA and other applicable regulatory requirements processes shall be adhered to. Additionally, the Contractor shall maximize the use of PED for excessing any such facilities.

The Contractor shall develop, document, and maintain an S&M Program Plan as appropriate for all facilities that are within the Contractor’s responsibility.

The S&M activities shall be tailored during the facility life-cycle in accordance with DOE O 430.1B, Real Property Asset Management, and 10 CFR 851, Worker Safety and Health Program. Other areas that may require S&M include closed areas, remediated areas, capped areas (e.g., landfill), open areas, etc.

The Contractor shall provide preventive and corrective maintenance using a graded approach on buildings, trailers and Other Structures and Facilities (OSF) assigned to the Contractor in FIMS and identified in Section J, Attachment J-18. A graded approach is defined as the process of ensuring that actions used to comply with a requirement are commensurate with:

- a. the relative importance of safety and safeguards and security,
- b. the magnitude of any hazard(s) involved,
- c. the life cycle stage of the facility,
- d. the programmatic mission of the facility,
- e. the particular characteristics of the facility,
- f. the relative importance of the radiological and non-radiological hazards, and
- g. any other relevant factor.

The Contractor shall ensure that an electronic S&M tracking/work processing software package is used to integrate historical S&M data with S&M work requests for subsequent scheduling. The Contractor shall accept, utilize, and optimize the existing electronic system. Further, the Contractor shall ensure that no systems, equipment, or items related to safety (including defense in depth) are degraded for more than 30 days without written DOE consent. The Contractor shall ensure that long-lead or critical spares are in on-site inventory where practical. The Contractor shall ensure mitigating actions are put in place within 24 hours of identifying a degraded system, equipment, or item related to safety.

The Contractor shall review the Authorization Basis, the Technical Safety Requirements (TSR), and the defense-in-depth safety related programs and shall present to DOE within 45 days after Transition completion, a comprehensive, itemized list of systems, equipment, and items related to safety (including those items credited for defense-in-depth or other safety related systems). The Contractor shall implement and adhere to the guidance provided in DOE memoranda *Deferred Maintenance Report Recommendations and Implementation Plan, June 25, 2015* and *Deferred Maintenance PPPO-02-2742794-15, March 30, 2015*. The Contractor shall actively work with DOE safety personnel and reach agreement on the list within 60 days after Transition completion. As such, there shall be no deferred maintenance of safety related systems, equipment, or items greater than 30 days without express written consent from DOE.

The Contractor shall perform all S&M activities including, but not limited to, the following:

- a. Minimize and reduce the occupation of facilities to the maximum extent possible;
- b. Maintain the operability of critical equipment such as the criticality accident alarm systems (CAAS), monitor radiological conditions, and check and maintain safety-related items. As facility conditions change, the Contractor

- shall reduce or eliminate critical equipment or use of critical systems that are no longer required for compliance with DOE requirements.
- c. Perform minimally required facility inspections including equipment and/or structure;
 - d. Conduct preventive, predictive, and corrective maintenance actions only necessary to support near-term Contractor or site tenants/contractors operations. As operational activities change, the Contractor shall annually assess if continued preventative, predictive, and corrective maintenance is still warranted.
 - e. At the completion of Uranium deposit/holdup removal and ⁹⁹Tc thermal treatment actions in a facility, the Contractor shall ensure that the CAAS and Fire Suppression Systems are no longer required. The Contractor shall modify all applicable safety basis documents of facilities/systems that support elimination of those systems for facilities including, but not limited to, C-337/C-337-A, C-333/C-333-A, and C-360. The Contractor shall actively pursue and justify, from a technical and regulatory perspective, the deactivation of these systems in preparation for deactivation and decommissioning.

Table C.2.EM.PA.0040.A008.41.DR.01-2 Surveillance and Maintenance of Facilities Milestones/Schedule	
Milestone	Date
Annual Site Facility Occupational Status Report	90 days after conclusion of transition and annually thereafter
Comprehensive list of systems, equipment, and items related to safety	Within 45 days after transition completion and reach agreement with DOE safety personnel within 60 days after transition completion.

EM.PA.0040.A008.41.DR.02 Facility Roofs

The Contractor shall ensure that all Category 2 nuclear facility roofs do not leak. If a leak is discovered the Contractor shall take immediate mitigation action(s) and pursue full repair actions to ensure all temporary repair actions are replaced with permanent repair(s) within 60 days of leak identification. This includes any and all structural aspects of the roofs. Further, the Contractor shall ensure that roof leaks do not impact operational activities (defined as taking any type of action that adjusts the operation from pre-leak condition/configuration, including modifying operator PPE) in non-Category 2 nuclear facilities and shall permanently repair such leaks within 90 days of identification. Permanent repairs are defined as returning the roof to its original pre-leak configuration or equivalent. The Contractor shall submit a non-Category 2 facility operations roof list to DOE 45 days after Transition is complete. The Contractor shall gain DOE approval of the list within 60 days after Transition is complete.

The Contractor shall assess the integrity of all of the PGDP facility roofs 30 days after Transition is complete and annually thereafter. The Contractor shall provide DOE a report of the integrity (ability to withstand/resist water infiltration) of facility roofs within 30 days of completing its assessment, including the costs and

schedule for repair of the roofs. (Note: The cost for roof repair is informational; the Contractor is responsible for funding those repairs.) All repairs shall be completed in a compliant, timely manner and shall prevent water leakage.

Further, the roofs for C-310, C-310-A, C-331, C-333, C-335, C-337, and C-720 were replaced with a fire resistant structural membrane system. These roofs shall be maintained in a sound condition that does not invalidate the warranty of the roofs. In the event leaks are identified, the Contractor shall work with the installer to resolve warranted deficiencies.

Non-Category 2/Category 3 facilities that are: 1) shutdown, 2) do not have routine personnel access, 3) have utilities isolated, and 4) do not have authorization basis requirements associated with facility safety do not require roof maintenance. This does not apply to facilities with structural membrane systems (C-310, C-310-A, C-331, C-333, C-335, C-337, and C-720). The roof structural membrane must be maintained in accordance with warranty requirements.

Table C.2.EM.PA.0040.A008.41.DR.02-1 Facility Roofs Reference	
Document Number	Title
FPAD-16-1430	Paducah Gaseous Diffusion Plant Roof Report

Table C.2.EM.PA.0040.A008.41.DR.02-2 Facility Roofs Milestones/Schedule	
Milestone	Date
Submit Roof Integrity Assessment	60 days after Transition is complete and annually thereafter

EM.PA.0040.A008.42.DR UTILITIES OPERATIONS

EM.PA.0040.A008.42.DR.01 Utility Operations

The Contractor shall operate and maintain utilities and ensure utility services are provided to site tenants for the utilities described within this section. The Contractor shall work with the other site tenants/contractors to ensure that decisions to provide these services are based on overall cost effectiveness. The Site’s Nitrogen System Distribution System has been deactivated and all nitrogen is supplied by bottles (Dewars or portable cylinders). Natural gas is provided from off-site via two main utility lines; one to the north that services GDP facilities and one to the south for DUF₆ facilities.

Additionally, the tracking and metering of utilities in Federal Buildings is maintained by Section 103 of the Energy Policy Act of 2005. Since DOE will be performing clean-up operations in portions of the facility for the foreseeable future, the Contractor shall install and track meters for the usage of power, natural gas, water, and other fuels, when repairs are made to the utility service for a building/group of buildings, such that installation of the meters is practicable to DOE annually (unless the facility(ies) is/are actively undergoing or, has completed deactivation).

Table C.2.EM.PA.0040.A008.42.DR.01-1 Utility Operations Milestones/Schedule	
Milestone	Date
List of facility meters added or deleted	12 months after transition is complete and annually thereafter

EM.PA.0040.A008.42.DR.02 Steam, Chilled Water, Compressed Air, & Waste Heat Systems

The Contractor shall operate and maintain the existing five (5) package boilers units (22,500 pounds/hour each) to meet the site demands, including cell treatment, of up to 100,000 pounds/hour. A connection for a sixth package boiler is available should the Contractor determine that additional steam capacity is required to support the Contractor’s operational needs. The Contractor shall remove the package boilers as demand is reduced site-wide. Table C.2.EM.PA.0040.A008.42.DR.02-1 lists the facilities that use steam (with estimated demand loads) for heating and to support their operations.

Table C.2.EM.PA.0040.A008.42.DR.02-1 Facilities Using Steam and Estimated Load			
Bldg #	Title	Winter lbs/hr	Summer lbs/hr
C-101	Medical	1000	0
C-300	Control	1000	1000
C-310	Product	5000	5000
C-315	Tails/C-620 Air	5000	5000
C-331	Process	7000	7000
C-333	Process	12,500	12,500
C-333-A	Vaporizer	1500	1500
C-335	Process	7000	7000
C-337	Process	12,500	12,500
C-337-A	Vaporizer	1500	1500
C-360	Toll Transfer	5000	5000
C-400	Cleaning	4000	4000
C-409	Stabilization	2000	2000
C-531	Switchyard	1000	0
C-532	Relay House	1000	0
C-533	Switchyard	1000	0
C-535	Switchyard	1000	0
C-536	Relay House	1000	0
C-537	Switchyard	1000	0
C-631	Pump House	500	0
C-633	Pump House	500	0
C-635	Pump House	500	0
C-635-6	Waste Heat Exchange	20,000	0
C-637	Pump House	500	0
C-709/710	Laboratory	1000	1000
C-720	Maintenance	2000	0
C-724	Carpenter Shop	1000	1000
C-750	Garage	1000	0

The Contractor shall ensure that the facilities currently using steam for heating have a replacement heat supply installed if the facility is going to continue to be occupied/operated. The Contractor shall ensure that the ductwork needed to distribute the heating/cooling is properly configured and sized as part of the replacement heating/cooling. The Contractor shall develop and submit to DOE the plan and schedule for replacing the heat source to facilities that are going to remain operational.

Heat and chilled water will still be required for certain facilities that currently utilize the recirculating heat systems (formerly the Waste Heat System tied to the Recirculating Cooling Water System). The Contractor shall operate and maintain these systems until shutdown of end user facilities. The following facilities use chilled water: C-100; C-101; C-102; C-200; C-205; C-300; C-600; C-709; C-710; and C-720. The following facilities use the recirculating heat system to provide heat (including estimated percentage of total load used): C-100 (8%); C-200 (2%); C-400 (39.5%); C-710 (6.5%); and C-720 (44%) buildings; as well as pre-heating boiler feed water (C-635-6) (1%). The Contractor shall ensure that those facilities using chilled water or the recirculating heat system have replacement heating/cooling installed if the facility is going to continue to be occupied/operated. The Contractor shall ensure that the ductwork needed to distribute the heating/cooling is properly configured and sized as part of the replacement heating/cooling. The Contractor shall develop and submit to DOE the plan and schedule for replacing the heating/cooling service to facilities that are going to remain operational. Upon completion of replacing the heating/cooling services to those facilities, the Contractor shall shut-down the plant chiller (located in C-602) and the heat exchanger east of C-600. The Contractor shall work with the PED to excess the heat exchanger.

There are several air compressors of varying age, reliability, and capacity that provide dry compressed air to a plant-wide dry air distribution system. The Contractor shall operate and maintain, as necessary, dry compressed air distribution system and associated air compressors until the Contractor can modify the system to facilitate shutdown and discontinue use of the plant-wide dry air distribution system. The Contractor shall utilize local air compressors or air compressors within the building to provide any required dry compressed air. No air compressors shall use once-through cooling from the plant/sanitary water system. The air compressors in C-620 and in C-602 shall be shut down.

Table C.2.EM.PA.0040.A008.42.DR.02-2	
Steam, Chilled Water, Compressed Air, and Waste Heat Systems Milestones/Schedule	
Milestone	Date
Steam Heat Service Replacement Plans and Schedule	12 months after Transition is complete
Shut down of the Plant Compressed Air Distribution System and air compressors in C-620 and C-602	24 months after Transition is complete
Discontinue use of the Plant Dry Air /Compressed Air System and any air compressors that use once through cooling from plant/sanitary water	24 months after Transition is complete

Table C.2.EM.PA.0040.A008.42.DR.02-2 Steam, Chilled Water, Compressed Air, and Waste Heat Systems Milestones/Schedule	
Milestone	Date
Complete Installation of the Replacement Heating/Cooling Service for the Chiller and Recirculating Heat System	30 months after Transition is complete
Complete Installation of Replacement Heat Service for Steam	42 months after Transition is complete

EM.PA.0040.A008.42.DR.03 Water Systems

The Contractor shall ensure the operation and maintenance of the permitted C-611 Water Treatment Facilities and provide potable and non-potable (process) water to the site’s contractors/tenants. This includes maintenance of associated raw water lines, distribution lines to the individual site facilities, water towers, pump, housings, etc. The raw water treatment process is based on conventional water treatment techniques which include softening, coagulation, flocculation, sedimentation, and chlorination. Raw water is obtained from the Ohio River through an intake station and pumped through water-softening units at the facility.

The Contractor shall continue to operate the existing on-site water treatment facilities and distribution network until a commercial/community water supplier connects and begins to provide water to the site.

The process to acquire potable water from one of the local water districts has been initiated and includes running two water lines off site and installing additional infrastructure to supply the PGDP between 0.5 and 1 million (1,000,000) gallons of water per day. The Contractor shall complete this process and complete all actions, including design, procurement, and construction necessary to place the in-coming water lines from the local water district into service, while minimizing the operation and maintenance of existing on-site water treatment facilities and systems. The Contractor shall develop and submit to DOE a plan and detailed schedule that identifies the facilities/systems to be shut down and those required to continue to operate after connection to the local water district. The Contractor shall shut down, de-energize, isolate, and drain liquids, from all water treatment facilities/systems (including ancillary systems) no longer required to be operated. The Contractor shall ensure sufficient water capacity remains on-site in support of fire suppression systems and firefighting response actions.

Table C.2.EM.PA.0040.A008.42.DR.03-1 Water Systems Milestones/Schedule	
Milestone	Date
Water Facility Shutdown Plan	12 months after Transition is complete
Complete transition of the Site’s sanitary/plant water systems to a local water district.	24 months after Transition is complete
Complete the shut down, de-energization, isolation, and draining of liquids, of the unnecessary facilities/systems (including ancillary/support systems)	30 months after Transition is complete

**Note: Transfer of facilities may involve multiple steps, including lease prior to completing all necessary facility transfer requirements.*

EM.PA.0040.A008.42.DR.04 Electric Power Distribution

In 2015, the site completed the reconfiguration of the site's 14KV power distribution system, allowing the shut-down of the low-side of the C-533, C-535, and C-537 switchyards. All power currently is distributed out of the C-531 switchyard. A new switchyard to replace C-531 is planned to be constructed east of the C-755 Trailer Complex. The design of the 14KV power distribution to by-pass the C-531 Switchyard and connect all site loads to the new switchyard is complete. The Contractor shall complete all actions necessary to construct the 14KV distribution lines/system by-passing the C-531 Switchyard and tie those lines into the new switchyard and place the new switchyard into service. The Contractor shall ensure as-built drawings are provided. The Contractor shall shut-down the C-531 Switchyard upon completing tie-ins to the new switchyard. The utility responsible for constructing the new switchyard will also be responsible for its operation and maintenance. The Contractor shall maintain and operate the 14KV Power Distribution systems at the site.

The Contractor shall operate and maintain the high side of the site's four switchyards in accordance with the requirements established by the regional reliability coordinator (TVA), until TVA, EEI, or KU have migrated the 161KV lines away from the switchyards. As TVA, EEI, and KU complete the migration of the 161 KV power lines coming into the site's four switchyards, the Contractor shall shutdown and isolate the high side of the switchyards and eliminate all power (including any ancillary or station power) and other utility services to the switchyards and associated ancillary facilities. All oils shall be drained and compliantly dispositioned and fire suppression systems shall be deactivated. Upon completion of this activity all C-500 series facilities shall be shutdown, de-energized, drained of liquids, and unoccupied.

The Contractor shall have the ability to collect the fully burdened costs for maintaining and operating the high-side of each switchyard by month starting in FY18. The costs shall include an apportionment of supporting utilities (e.g., power, steam, fire suppression, water) and program management cost in addition to overhead, fringe, and fee. DOE may recover costs from the electrical utilities.

The Contractor shall ensure power is provided to all on-site tenants/contractors (does not include commercial power provided to remote areas of the site that are managed by the Infrastructure Contractor). Although the Contractor is not responsible for purchasing power (DOE purchases power), the Contractor shall project the power needs for all site operations (including infrastructure and DUF₆ needs) for a five-year period and update that projection quarterly. The Contractor shall also provide updates as requested.

Table C.2.EM.PA.0040.A008.42.DR.04-1 Electric Power Distribution Milestones/Schedule	
Milestone	Date
Complete construction of the C-531 14KV By-Pass to the new Switchyard	8 months after Transition is complete
Complete shut-down, isolation, de-energization, and draining of the C-537 and C-535 Switchyards and associated ancillary/support facilities	6 months after EEI and TVA complete re-configuration of the 161 KV lines to migrate away from C-537 and C-535
Complete Tie-in to the new switchyard and take C-531 out of service	2 months after completion of construction of the new switchyard and the C-531 14KV By-Pass
Complete shut-down, isolation, de-energization, and draining of the C-533 and C-531 switchyards and associate ancillary/support facilities	6 months after EEI and TVA complete re-configuration of the 161 KV lines to migrate away from C-531 and C-533.
Quarterly Site Power Projections	The 15 th of January, April, July, and October for each preceding quarter

Table C.2.EM.PA.0040.A008.42.DR.04-2 Electric Power Distribution Reference Documents	
	SST 14KV DESIGN PACKAGE
	North-end Power Reconfiguration 535 and 537
	Power Contract

EM.PA.0040.A008.42.DR.05 Sewage Treatment Systems

The Contractor shall provide sewage handling and treatment (e.g. C-615 Sewage Disposal Plant) services for the site’s contractors/tenants. The C-615 Sewage Treatment Plant provides secondary treatment and consists of primary and secondary settling basins, trickling filter, sludge digester and settling beds, chlorinator, and contact chamber.

The Contractor shall continue isolation of low use or damaged sewer lines, and transition to the use of contractor supplied self-contained restroom facilities.

The Contractor shall assess the capabilities of the on-site sewage collection and treatment systems and facilities for purposes of replacing these facilities with more efficient modular treatment systems or with use of local community sewage treatment districts. Additionally, the Contractor shall assess the site’s near-term and long-term operational needs as the DUF₆ operations continue, environmental remediation activities continue, the GDP continues to be deactivated, and include as a part of its assessment the needs of other on-site tenants/contractors. The sewage facilities and associated infrastructure have historical radiological contamination, and any recommendation provided by the

Contractor must ensure no migration of contamination off-site. The Contractor shall prepare an alternatives analysis to replace, modify, repair, optimize or supplement the existing sewage treatment system, the existing sewage lines, and the existing sewage collection and treatment systems and facilities. The Contractor is required to perform a smoke test to verify the integrity of the sewage lines and determine where blocks or leaks exist and incorporate the results into the alternative analysis. As part of the alternatives analysis the Contractor shall include dry chemical and other environmentally friendly sewage systems, and all costs necessary to implement and operate the various alternatives. The analysis shall include an evaluation of all of the cost /benefits for each alternative and a schedule of implementing each alternative, including key milestones.

Table C.2.EM.PA.0040.A008.42.DR.05-1 Sewage Treatment Systems Milestones/Schedule	
Milestone	Date
Submittal of the Sewage Alternatives Analysis	72 months after transition is complete

**Note: Transfer of facilities may involve multiple steps, including lease prior to completing all necessary facility transfer requirements.*

EM.PA.0040.A008.43.DR ANALYTICAL LABORATORY

Onsite laboratory facilities C-709, C-710 and associated ancillary facilities will become the responsibility of the Contractor.

EM.PA.0040.A008.43.DR.01 Analytical Laboratory Operations

Costs for off-site analytical services shall be assigned to the applicable projects/PWS activities and not included within this PWS.

The operation of on-site analytical facilities to provide analytical laboratory services will be at the discretion of the Contractor.

In the event the Contractor performs some analytical services on-site, the services shall be available to other DOE on-site contractors. The Contractor shall ensure costs for services to the Contractor’s projects/PWS elements and other on-site contractors are segregated appropriately, and shall require the Contractor’s projects/PWS activities and other site tenants/contractors to pay the fully burdened costs for performance of the analytical analysis/services.

Samples (waste or otherwise) shall be disposed of within six (6) months of the acceptance of the Analytical Laboratory deliverable/data. The Contractor shall arrange for and coordinate the disposition of GFE laboratory equipment no longer needed, chemicals, samples, waste resulting from its services, and any other materials associated with laboratory services.

The Contractor shall participate in Performance Evaluation Studies (PES) for its self-performed laboratory services provided through industry standard vendors and/or control programs. The PES programs include, but are not limited to:

- a. Mixed Analyte Proficiency Evaluation Report Program (MAPEP),
- b. American Industrial Hygiene Association and National Institute of Occupational Safety and Health Asbestos Proficiency Testing Programs,
- c. Environmental Resource Associates (ERA) Proficiency Testing Program, and Discharge Monitoring Report – Quality Assurance (DMR-QA) study.

The Analytical Laboratory may also be subject to blind PES submittals at the discretion of DOE. The Contractor shall submit to on-site audits led by DOECAP or their designees within the DOE and Contractor organizations. Audit teams will typically consist of personnel from the DOECAP, and other DOE contractors. The audits will be performed periodically as identified by the DOECAP.

Regardless of the Contractor's decision to continue laboratory operations, the Contractor shall disposition samples and/or waste from analytical services provided by the previous contractor that may be present and associated with C-709 and C-710 laboratory facilities within 6 months of transition. The Contractor shall disposition all sources, fissionable/fissile materials, chemicals, other materials, and excess GFE equipment remaining in the facility that the Contractor does not use to support its operation of the Analytical Laboratory (including ancillary facilities) or remains after transition from the previous contractor within 6 months of transition.

EM.PA.0040.A008.48.DR STABILIZATION AND DEACTIVATION

The Contractor shall perform stabilization, as appropriate, to ensure the GDP uranium processing facilities are in a safe configuration with minimal S&M activities required until decommissioning begins and shall be addressed as part of the Contractor's Stabilization and Deactivation Plan.

In general "stabilization" refers to the early stages of the deactivation process when nuclear and hazardous materials are removed from the facility, shutting facility systems down, de-energizing equipment in preparation for long-term S&M (EM.PA.0040.A008.41), completely isolating (i.e. "air gapping") the facility from site utilities, removal of all fire loading, and preparing the facility for long-term surveillance awaiting demolition.

The PGDP enrichment facility consists of 1820 stages by design. The stages are arranged in two cascades. The cascade buildings are designated as C-331 (400 stages), C-333 (480 stages), C-335 (400 stages), C-337 (480 stages) and C-310 (60 stages). The C-331 and C-333 stages are placed in series to form what is known as the "Lower Cascade" and similarly the C-335 and C-337 stages are placed in series to form the "Upper Cascade". The Uranium Hexafluoride (UF₆) enriched product and lighter molecular weight gases are separated and removed in the C-310 facility. The depleted UF₆ is removed in the C-315 facility which does not contain operating stages.

In C-310 (purge cascade), the facility contains one Unit. Unit 1 has ten (10) Cells, Each C-310 Cell has six (6) "XX" sized converters (i.e., 60 stages). In C-331 and C-335, each facility contains four (4) Units. Each C-331 and C-335 Unit has ten (10) Cells, each Cell has ten (10)

“OO” sized converters (i.e., 400 stages each). In C-333 and C-337, each facility has six (6) Units. Each C-333 and C-337 Unit has ten (10) Cells, each Cell has eight (8) “OOO” sized converters (i.e., 480 stages each).

Under Section 4.4 of the Lease Agreement between DOE and USEC, USEC was required to *“remove solid “Greater than Safe Mass” (GSM) deposits, of UO_2F_2/UF_4 to the extent necessary to prevent criticality, using an in-place removal process, such as the chemical fluorination treatment; and ensure that nothing adversely affects the operability of the purge cascade, the coolant, storage systems, HVAC systems, and air filtration systems”*. To comply with the turnover requirements of the Lease Agreement, USEC performed the following activities during the shutdown of operations:

- a. Isolation of each of the “units” from the remaining process via a series of valves in the process piping;
- b. Evacuation of the Uranium Hexafluoride (UF_6) gas in the equipment and the system flushed with air; and
- c. Follow-up sampling to ensure the individual components contain only minimal amounts of UF_6 .

The majority of the inner surfaces of equipment, piping and valves that have been exposed to UF_6 may have a thin coating of solid uranium hexafluoride, similar to a coating of dust. Additionally, due to the enormous surface area of the uranium process systems, a significant amount of uranium has been chemically and physically absorbed to the inner walls of the piping and cell components. This deposited uranium is referred to as the in process uranium “hold-up”. There are also uranium deposits caused by wet air leakage. Upon entering the cascade the moisture in the air reacts with UF_6 to form various uranium oxy-fluorides resulting in “deposits” near the leak, most commonly UO_2F_2 . Removal of the deposit and hold-up (both terms are interchangeable with regard to performing removal activities) materials will facilitate reducing the categorization of the uranium processing facilities from Nuclear Category 2 to Radiological Facilities. This will reduce the long-term surveillance and maintenance (S&M) costs associated with the facilities and subsequent waste characterization and waste disposal associated with D&D activities.

In C-746-Q1, there are 14 UF_6 Cold Traps that were removed from the C-410 Feed Plant, packaged into boxes and placed into storage. These cold traps are not expected to contain greater than 0.722 weight % U^{235} (NU). However, they are believed to contain elevated levels of Plutonium (Pu) and transuranics that require additional radiological controls. Additionally, there are 2 UF_6 Cold Traps stored in C-746-Q1 that were previously stored in C-746-B Doors 1&2 and that are believed to have originated from Oak Ridge and were temporarily used in the PGDP process. The Contractor shall complete disposition of all 16 cold traps. In the event that the Portable Cell Treatment Carts (PCTC) systems are used to support removal of the deposits/hold-up, the Contractor shall assume that any radiological contaminants such as Pu or transuranics are not re-introduced into the process facilities or into the cylinder collecting the regenerated UF_6 from the uranium process facility deposit/hold-up removal. Any such off-spec uranium generated from the cold traps shall be dispositioned as waste.

There are a number of convertors and compressors that have been removed from the process that contain deposits/hold-up. Some of the convertors are located on outside storage pads in addition to being stored within the process buildings. Although these items are no longer connected to the cascade, the Contractor shall ensure in-situ chemical treatment (ICT) of these components. After successful treatment, these items may remain within the process building for future dispositioning. For those components stored on outside storage pads, they may remain within the process building where treatment occurred for future dispositioning.

There are ten (10) Portable Cell Treatment Cart Systems which include the Portable Cell Treatment Carts (PCTC), gas sampling and analytical equipment (Test Buggies) that will provide gas analysis and associated support equipment (pumps; temperature, pressure, and flow instrumentation; etc.) during ICT activities of the PGDP process equipment. The PCTC Systems are provided as GFSI to the Contractor and shall be used to maximum extent possible. If additional cell treatment systems are deemed necessary to support stabilization approach, the contractor may procure the new PCTCs.

Deposit/Holdup Removal activities are primarily focused on C-310, C-310-A, C-331, C-333, C-333-A, C-335, C-337, C-337-A, C-360, and the associated process facility tie lines. The Contractor shall use as its initial plan, the "Deposit/Holdup Removal Plan and Schedule" which provides a current overall strategy and approach to deposit/hold-up removal. It also includes details pertaining to the types of facility modifications that may have been made to support these activities. The Contractor shall revise the Plan and Schedule as necessary in accordance with its work sequencing and approach.

EM.PA.0040.A008.48.DR.01.01. DEPOSIT/HOLD-UP REMOVAL C-337 & C-337A

The Contractor shall complete the removal and disposition of any remaining lube oils, Freon, or other hazardous materials and complete the shutdown and isolation of the facilities, supporting long-term S&M in C-337/C-337A. The Contractor shall complete the performance of the necessary facility stabilization and deactivation activities including, but not limited to, the following:

- a. Evaluate and determine the need for the continued safety requirements for monitoring and/or maintaining systems; and
- b. Perform deactivation and/or verification activities that support facilities stabilization, per DOE O 420.1C, Facility Safety and contractor safety basis documentation.

Additionally, the Contractor shall remove the fire loading from each of the facilities and ensure a Transitional Hazard Facility Analysis (THFA) is developed and approved.

In support of the hazard reduction objectives of stabilization, the Contractor shall perform deposit/holdup removal activities to ensure C-337/C-337A is in a safe configuration with minimal S&M activities required until decommissioning begins. The criteria for successful deposit/holdup removal is to disposition nuclear materials in uranium processing facilities a manner that presents a "crit-incredible" condition and that when

the facility is eventually decommissioned that the resulting waste is compliant with applicable waste acceptance criteria for an on-site CERCLA Cell (e.g., the OSWDF).

The Contractor shall complete the remaining deposit/hold-up removal for the process equipment and piping associated C-337/C-337A. The overall goal is to complete the uranium removal in the uranium processing facilities as quickly as possible to be able to eliminate criticality safety concerns in each of the production facilities, shut down the CAAS and then to be able to complete air gapping of all utilities and associated support systems, so as to reduce S&M costs. A secondary goal is to be able to avoid additional uranium treatment to meet Waste Acceptance Criteria for an on-site CERCLA Cell (if approved) during deactivation and decommissioning activities.

The Contractor shall perform ICT and uranium deposit/hold-up removal for the process equipment and valves and process piping associated with C-337/C-337A. Exhibit C-1, C-337C-337A Deposit & Hold-up Removal, is available for reference.

The Contractor shall remove the deposit and hold-up materials from the following categories of equipment:

- a. Cells (including all piping/lines located inside of the boundaries of the cell block valves);
- b. Cells partially connected (e.g., have equipment missing, such as compressors and/or convertors) or that have not operated; and
- c. Convertors, compressors, equipment that was cut out of operating cells (These convertors are stored in various locations within the process buildings and in outside storage areas).

The Contractor shall be responsible for completion of all additional design, testing, or operational activities required to ensure effective operations of the PCTC and Test Buggy system to maximize ICT of deposits for the cells, associated UF₆ piping, valves, expansion joints, bellows, etc.

The Contractor shall also design, procure, install and test any required PGDP facility modifications necessary to support the deposit/hold-up removal using the PCTC Systems and for regeneration and change-out of NaF trapping material associated with the use of the PCTC Systems. The Contractor shall collect the resulting/ regenerated UF₆ material, handling it as product (in large UF₆ cylinder) for transfer to the DUF₆.

The Contractor shall implement alternative treatment options (mechanical removal, cut and cap for off-site disposal, etc.) for applications that do not lend themselves to the use of the PCTC system, upon approval by DOE.

Completion Thresholds are as follows:

- Chemically treat all UF₆ equipment and piping with a mixture of ClF₃ and F₂ in order to remove residual uranium remaining in the UF₆ systems, unless an alternative treatment methodology is approved by DOE. The treatments will be

done utilizing an end point based on the ClF₃ consumption and the UF₆ generation that will maximize the amount of uranium removed; AND

- Removal of uranium to allow the shutdown of the CAAS for the given areas treated; AND
- Removal of uranium to allow the process equipment and piping to be placed in an On-site Disposal Facility (e.g. On-Site CERCLA Cell) without further processing. Assume a target objective of half (50%) of the final Oak Ridge disposal facility waste (i.e., the EMWMF) acceptance criteria; AND
- Removal of uranium and re-categorization of the processing facilities from Category 2 Nuclear Facilities to Radiological Facilities.

The Contractor shall develop any additional protocols (NDA, visual inspections, sampling and testing, statistical analysis, etc.) that will be used to demonstrate that the post treatment condition of the equipment and piping will meet completion thresholds for deposit/hold-up materials removal activities. These protocols need to include identification of specific data that will be collected, how it will be collected and how it will be used to assess post treatment conditions. The data collected will also be needed to support development of final waste acceptance criteria for the process equipment and piping. Collection of NDA or analytical data prior to initial treatment is not required. Identify/evaluate removal of unneeded CAAS Clusters once the deposit/holdup removal activities are completed. The evaluation should address serviceability through completion of future deactivation and decommissioning activities.

The Contractor shall complete deposit/holdup removal in C-337/C-337A of the uranium processing facilities, including, but not limited to:

- a. removal of all deposits/hold-up to below levels needed to achieve incredibility of criticality and removal/shutdown of CAAS and the WAC for On-site CERCLA Waste Disposal Facility;
- b. transfer of any large cylinders generated as part of deposit/hold-up removal to the DUF6 Contractor when the cylinder is full;
- c. submit all documentation necessary to support criticality incredibility, including authorization basis changes to downgrade the uranium processing facilities to radiological facilities and gain DOE approval; and
- d. deactivate/shutdown the CAAS in the uranium production facilities.

Table C.2. EM.PA.0040.A008.48.DR.01.01-1 DEPOSIT/HOLD-UP REMOVAL C-337 & C-337A	
Milestone	Date
Complete deposit/holdup removal in C-337/C-337A	NLT end of FY19

EM.PA.0040.A008.48.DR.01.02 ⁹⁹Tc THERMAL TREATMENT C-337 & C-337A

Technetium-99 (⁹⁹Tc) is a high-yield fission product. Some ⁹⁹Tc accompanies uranium during reprocessing of spent reactor fuel and forms a gas during fluorination. Hence, recycled uranium is contaminated with ⁹⁹Tc. In the cascade,

the relatively light ^{99}Tc moves toward the enrichment end. One of the concerns for the Paducah Deactivation and Decommissioning phase is the uncertainty of the actual levels of ^{99}Tc which will be encountered in the disposition of the process equipment. Considerable amounts of UF_6 were produced at Paducah from reactor return uranium. Estimates have been made that approximately 550 kilograms of ^{99}Tc were fed into the PGDP cascade as a contaminant in the UF_6 between 1953 and 1977 (Reference the Smith Report and the PGDP Mass Balance Report).

The typical trace levels of ^{99}Tc compounds in the operating GDP's is below the minimum detectable limit for any of the process gas analyzers. Consequently, it cannot be definitively stated which technetium compounds are present in the operational cascades. The only gas phase technetium compound that has been reported to have been detected in the cascade gas stream is the pertechnetyl fluoride, TcO_3F , which was detected in the purge cascade during treatments to unplug the barrier. The technetium compounds that should be considered as potential cascade vapor phase compounds would consist of TcO_3F , HTcO_4 , TcOF_4 , and TcF_6 . The oxides Tc_2O_7 , and TcO_2 , could also possibly exist as condensed species, along with the liquid or solid pertechnetic acid, HTcO_4 , and the oxyfluoride TcO_2F_3 . (Reference the Simmons Report)

Technetium hexafluoride (TcF_6), technetium oxide tetrafluoride (TcOF_4), technetium trioxide fluoride (TcO_3F), and technetium dioxide tri-fluoride (TcO_2F_3) have sufficient volatility to be in the cascade gas streams of an operating gaseous diffusion plant, but TcO_3F is the only compound of technetium to be identified. There are also non-volatile and less volatile compounds such as TcO_2 and HTcO_4 , respectively. The formation of TcO_2 on steel surfaces is one effect which can retard the release of technetium. The volatile compound TcO_3F has been prepared from the non-volatile solid TcO_2 by use of fluorine at 300°F (degrees Fahrenheit). (Reference the Simmons Report)

It has been demonstrated at the three former gaseous diffusion plants that technetium can be removed from the process surfaces by heating the metals to sufficient temperatures (i.e., approximately 250 degrees Fahrenheit). The more volatile ^{99}Tc compounds have been removed to a certain extent from process equipment by heating the cell with the cell off stream and the compressors running using air to volatilize the technetium into the gas phase and trapping it using accepted methods standard to the diffusion process. However, due to the limitations of heating the process equipment while it was operating the heat was limited to approximately 250 degrees Fahrenheit and at this temperature complete removal of ^{99}Tc was not accomplished. The heated air is circulated through the converters by the compressors. The volatilized ^{99}Tc is then captured using cold traps, magnesium fluoride or activated alumina. This technique has been done with moderate success at the GDPs to unplug cells and to prepare cells for maintenance thus reducing worker exposure to ^{99}Tc . This method has not been used with a goal of meeting the sites disposal Waste Acceptance Criteria (WAC).

The final WAC's for Paducah and Portsmouth Plants have not officially been determined, however, the Oak Ridge Environmental Management Waste Management Facility (EMWMF) ^{99}Tc WAC is 172 pCi/g. Analyses of barrier samples recently removed from converters indicate the concentration of ^{99}Tc is two orders of magnitude above the Oak Ridge WAC.

Since the ^{99}Tc is not completely removed during the cell treatments for uranium deposits removal, the ^{99}Tc will need to be thermally treated to remove it from the equipment in order to meet waste disposal limits. The ^{99}Tc limits are more restrictive than uranium due to the difference in mobility of the compounds of the two elements. The ultimate goal of gas phase decontamination is to remove the technetium to sufficient levels that the radioactive contamination is below the free release levels and/or meet the Paducah WAC once it is established. Graph and spreadsheets illustrating known Tc^{99} concentrations by facility and unit by provided in Exhibit C-2.

EM.PA.0040.A008.48.DR.01.02.01 ^{99}Tc THERMAL TREATMENT C-337
UNITS 1-6

The Contractor shall develop, select and implement an approach to thermally treat the converters in C-337 Units 1-6 to reduce ^{99}Tc levels to below the to be established OSWDF WAC, if the OSWDF is the selected remedy. The Contractor shall ensure the implemented technique provides the most cost effective approach for the lifecycle. Upon completion of the ^{99}Tc thermal treatment activities, the Contractor shall remove any remaining instrument lines, piping, or equipment necessary to achieve crit-incredible that had not already been removed/treated, but was left in place to support ^{99}Tc thermal treatment.

The Contractor shall ensure the following requirements are met during the development, evaluation and implementation of the thermal treatment technique:

- a. Minimize the potential for redepositing of ^{99}Tc in/on equipment/components during the process.
- b. Many plant utilities may have been shut down, air gapped and/or demobilized as a result of Deposit/Hold-up removal completion. The Contractor shall acquire necessary equipment (skid mounted or mobile systems to replace removed utilities), as necessary, to implement the thermal treatment technique and to capture the liberated ^{99}Tc .
- c. The C-310 Purge Cascade is shut down and unavailable for use. The Contractor may select to use the PCTCs used for Deposit/Hold-up removal activities as an approach to capture the liberated ^{99}Tc .
- d. All waste generated during the treatment process shall be disposed during the option period of performance. Wastes shall not be transferred to a subsequent contractor.
- e. The dose/concentration of the resulting waste (e.g., Magnesium Fluoride and/or Alumina trapping media) shall not exceed limits that requires

remote handling and shall not exceed limits that prohibit waste shipments or disposal to off-site disposal facilities.

Table C.2. EM.PA.0040.A008.48.DR.01.02.01-1 99Tc Treatment C-337 Units 1-6	
Milestone	Date
Complete 99Tc Treatment in C-337 Units 1-6	NLT end of FY21

**EM.PA.0040.A008.48.DR.01.03 BYPASS PIPING AND TRAPPING
 EQUIPMENT C-337 & C-337A**

For C-337 and C-337A, the Contractor shall complete deposit/holdup removal and additional hazard reduction/stabilization activities in piping outside the cell block valves (including the cell block valves) and all tie-lines connected to the C-337 & C-337A facilities. The Contractor shall include any and all additional UF₆ piping/lines that have not been addressed by WBS

EM.PA.0040.A008.48.DR.01.01. The Contractor shall complete all deposit/hold-up removal in all chemical traps and associated treatment/support equipment that operated in a UF₆ environment (cold boxes, surge drums, valves, pumps, etc.) containing uranium (use of the PCTC may not be warranted). The Contractor shall submit all documentation necessary to support criticality incredibility, including authorization basis changes to downgrade the uranium processing facilities to radiological facilities and gain DOE approval.

Table C.2. EM.PA.0040.A008.48.DR.01.03 -1 Bypass Piping and Trapping Equipment C-337 and C-337A	
Milestone	Date
Complete C-337 and C-337A Bypass Piping and Trapping Equipment Disposition	NLT end of FY22

EM.PA.0040.A008.48.DR.01.04 EQUIPMENT REMOVAL C-337 & C-337A

The Contractor shall disposition any loose or spare equipment/materials containing fissile (e.g., deposit/hold-up) materials (use of the PCTCs may not be warranted) in C-337 and C-337A in order to support the Contractor’s ability to deactivate the CAAS that provides coverage in these facilities. The Contractor shall dispose of any fissile equipment and not return the item after the fissile material has been removed, unless agreed to by DOE. Relocation to another on-site facility for storage is not authorized without DOE approval. The Contractor shall complete equipment removal in uranium process building C-337 & C-337A, including but not limited to:

- a. disposition of all loose fissile material and equipment (e.g. spare parts, uninstalled equipment, removed equipment);
- b. Any remaining equipment that contains fissile material precluding the building from achieving crit-incredible status.

- c. transfer of any large cylinders generated as part of deposit/hold-up removal to the DUF₆ Contractor

Table C.2. EM.PA.0040.A008.48.DR.01.04 -1 EQUIPMENT REMOVAL C-337 & C-337A	
Milestone	Date
Complete C-337 and C-337A Equipment Removal	NLT end of FY20

EM.PA.0040.A008.48.DR.01.05 UTILITY/INSTRUMENTATION LINE ISOLATION C-337 & C-337A

Consistent with the Transitional Hazard Facility Analysis (THFA), all fire systems in C-337 and C-337A shall be deactivated or configured in a manner that eliminates the need for freeze protection. Modification of facilities to eliminate the need to provide fire suppression is an acceptable approach. This requires the Contractor to submit all supporting documentation and authorization basis changes for deactivation of the fire suppression systems in these facilities. The Contractor shall isolate and air gap all of the utilities supporting/feeding C-337 and C-337A. The Contractor shall remove all temporary power/utilities service and remaining fire loading (including any resulting from the treatment process) in C-337 and C-337A.

Table C.2. EM.PA.0040.A008.48.DR.01.05 -1 UTILITY/INSTRUMENTATION LINE ISOLATION C-337 & C-337A	
Milestone	Date
Complete C-337 and C-337A Utility/Instrumentation Line Isolation	NLT end of FY21

EM.PA.0040.A008.48.DR.02.01 DEPOSIT REMOVAL C-333 & C-333A

The Contractor shall complete the removal and disposition of any lube oils, Freon, or other hazardous materials and complete the shutdown and isolation of the facilities, supporting long-term S&M in C-333/C-333A. The Contractor shall complete the performance of the necessary facility stabilization and deactivation activities including, but not limited to, the following:

- a. Evaluate and determine the need for the continued safety requirements for monitoring and/or maintaining systems; and
- b. Perform deactivation and/or verification activities that support facilities stabilization, per DOE O 420.1C, Facility Safety and contractor safety basis documentation.

Additionally, the Contractor shall remove the fire loading from each of the facilities and ensure a THFA is developed and approved.

In support of the hazard reduction objectives of stabilization, the Contractor shall perform deposit/holdup removal activities to ensure C-333/C-333A is in a safe configuration with minimal S&M activities required until decommissioning

begins. The criteria for successful deposit/holdup removal is to disposition nuclear materials in uranium processing facilities a manner that presents a “crit-incredible” condition and that when the facility is eventually decommissioned that the resulting waste is compliant with applicable waste acceptance criteria for an on-site CERCLA Cell (e.g., the OSWDF).

The Contractor shall complete the remaining deposit/hold-up removal for the process equipment and piping associated C-333/C-333A. The overall goal is to complete the uranium removal in the uranium processing facilities as quickly as possible to be able to eliminate criticality safety concerns in each of the production facilities, shut down the CAAS and then to be able to complete air gapping of all utilities and associated support systems, so as to reduce S&M costs. A secondary goal is to be able to avoid additional uranium treatment to meet Waste Acceptance Criteria for an on-site CERCLA Cell (if approved) during deactivation and decommissioning activities.

The Contractor shall perform ICT and uranium deposit/hold-up removal for the process equipment and valves and process piping associated with C-333/C-333A. Exhibit C-1, C-337/C-337A Deposit & Hold-up Removal is available for reference.

As part of deposit/hold-up removal activities, the Contractor shall maximize the use of the PCTC, gas sampling and analytical equipment (Test Buggies) and associated support equipment (pumps, temperature/pressure/flow instrumentation, etc.) during ICT activities of the PGDP process equipment and associated valves and piping. The Contractor shall remove the deposit and hold-up materials from the following categories of equipment:

- a. Cells (including all piping/lines located inside of the boundaries of the cell block valves);
- b. Cells partially connected (e.g., have equipment missing, such as compressors and/or convertors) or that have not operated; and
- c. Convertors, compressors, equipment that was cut out of operating cells (These convertors are stored in various locations within the process buildings and in outside storage areas).

The Contractor shall be responsible for completion of all additional design, testing, or operational activities required to ensure effective operations of the PCTC and Test Buggy system to maximize ICT of deposits for the cells, associated UF₆ piping, valves, expansion joints, bellows, etc.

The Contractor shall also design, procure, install and test any required PGDP facility modifications necessary to support the deposit/hold-up removal using the PCTC Systems and for regeneration and change-out of NaF trapping material associated with the use of the PCTC Systems. The Contractor shall collect the

resulting/ regenerated UF₆ material, handling it as product (in large UF₆ cylinder) for transfer to the DUF₆.

The Contractor shall implement alternative treatment options (mechanical removal, cut and cap for off-site disposal, etc.) for applications that do not lend themselves to the use of the PCTC system, upon approval by DOE.

Completion Thresholds are as follows:

- Chemically treat all UF₆ equipment and piping with a mixture of ClF₃ and F₂ in order to remove residual uranium remaining in the UF₆ systems, unless an alternative treatment methodology is approved by DOE. The treatments will be done utilizing an end point based on the ClF₃ consumption and the UF₆ generation that will maximize the amount of uranium removed; AND
- Removal of uranium to allow the shutdown of the CAAS for the given areas treated; AND
- Removal of uranium to allow the process equipment and piping to be placed in an On-site Disposal Facility (e.g. On-Site CERCLA Cell) without further processing. Assume a target objective of half (50%) of the final Oak Ridge disposal facility waste (i.e., the EMWMF) acceptance criteria; AND
- Removal of uranium and re-categorization of the processing facilities from Category 2 Nuclear Facilities to Radiological Facilities.

The Contractor shall develop any additional protocols (NDA, visual inspections, sampling and testing, statistical analysis, etc.) that will be used to demonstrate that the post treatment condition of the equipment and piping will meet completion thresholds for deposit/hold-up materials removal activities. These protocols need to include identification of specific data that will be collected, how it will be collected and how it will be used to assess post treatment conditions. The data collected will also be needed to support development of final waste acceptance criteria for the process equipment and piping. Collection of NDA or analytical data prior to initial treatment is not required. Identify/evaluate removal of unneeded CAAS Clusters once the deposit/holdup removal activities are completed. The evaluation should address serviceability through completion of future deactivation and decommissioning activities.

The Contractor shall complete deposit/holdup removal in C-333/C-333A of the uranium processing facilities, including, but not limited to:

- a. removal of all deposits/hold-up to below levels needed to achieve incredibility of criticality and removal/shutdown of CAAS and the WAC for On-site CERCLA Waste Disposal Facility;
- b. transfer of any large cylinders generated as part of deposit/hold-up removal to the DUF₆ Contractor when the cylinder is full;

- c. submit all documentation necessary to support criticality incredibility, including authorization basis changes to downgrade the uranium processing facilities to radiological facilities and gain DOE approval;
- d. deactivate/shutdown the CAAS in the uranium production facilities.

Table C.2. EM.PA.0040.A008.48.DR.02.01-1 DEPOSIT/HOLD-UP REMOVAL C-333 & C-333A	
Milestone	Date
Complete deposit/holdup removal in C-333/C-333A	NLT end of FY23

EM.PA.0040.A008.48.DR.02.03 BYPASS PIPING AND TRAPPING EQUIPMENT C-333 & C-333A

For C-333 and C-333A, the Contractor shall complete deposit/holdup removal and additional hazard reduction/stabilization activities in piping outside the cell block valves (including the cell block valves) and all tie-lines connected to the C-333 & C-333A facilities. The Contractor shall include any and all additional UF₆ piping/lines that have not been addressed by WBS

EM.PA.0040.A008.48.DR.02.01. The Contractor shall complete all deposit/hold-up removal in all chemical traps and associated treatment/support equipment that operated in an UF₆ environment (cold boxes, surge drums, valves, pumps, etc.) containing uranium (use of the PCTC may not be warranted). The Contractor shall submit all documentation necessary to support criticality incredibility, including authorization basis changes to downgrade the uranium processing facilities to radiological facilities and gain DOE approval.

Table C.2. EM.PA.0040.A008.48.DR.02.03 -1 Bypass Piping and Trapping Equipment C-333 and C-333A	
Milestone	Date
Complete C-333 and C-333A Bypass Piping and Trapping Equipment Disposition	NLT end of FY24

EM.PA.0040.A008.48.DR.02.04 EQUIPMENT REMOVAL C-333 & C-333A

The Contractor shall disposition any loose or spare equipment/materials containing fissile (e.g., deposit/hold-up) materials (use of the PCTCs may not be warranted) in C-333 and C-333A in order to support the Contractor’s ability to deactivate the CAAS that provides coverage in these facilities. The Contractor shall dispose of any fissile equipment and not return the item after the fissile material has been removed, unless agreed to by DOE. Relocation to another on-site facility for storage is not authorized without DOE approval. The Contractor shall complete equipment removal in uranium process building C-333 & C-333A, including but not limited to:

- a. disposition of all loose fissile material and equipment (e.g. spare parts, uninstalled equipment, removed equipment);
- b. any remaining equipment that contains fissile material precluding the building from achieving crit-incredible status; and

- c. transfer of any large cylinders generated as part of deposit/hold-up removal to the DUF₆ Contractor.

Table C.2. EM.PA.0040.A008.48.DR.02.04 -1 EQUIPMENT REMOVAL C-333 & C-333A	
Milestone	Date
Complete C-333 and C-333A Equipment Removal	NLT end of FY24

EM.PA.0040.A008.48.DR.02.05 UTILITY/INSTRUMENTATION LINE ISOLATION C-333 & C-333A

Consistent with the THFA, all fire systems in C-333 and C-333A shall be deactivated or configured in a manner that eliminates the need for freeze protection. Modification of facilities to eliminate the need to provide fire suppression is an acceptable approach. This requires the Contractor to submit all supporting documentation and authorization basis changes for deactivation of the fire suppression systems in these facilities. The Contractor shall isolate and air gap all of the utilities supporting/feeding C-333 and C-333A. The Contractor shall remove all temporary power/utilities service and remaining fire loading (including any resulting from the treatment process) in C-333 and C-333A.

Table C.2. EM.PA.0040.A008.48.DR.02.05 -1 UTILITY/INSTRUMENTATION LINE ISOLATION C-333 & C-333A	
Milestone	Date
Complete C-333 and C-333A Utility/Instrumentation Line Isolation	NLT end of FY24

EM.PA.0040.A008.48.DR.03.01 DEPOSIT REMOVAL C-331

The Contractor shall complete the removal and disposition of any lube oils, Freon, or other hazardous materials and complete the shutdown and isolation of the facilities, supporting long-term S&M in C-331. The Contractor shall complete the performance of the necessary facility stabilization and deactivation activities including, but not limited to, the following:

- a. Evaluate and determine the need for the continued safety requirements for monitoring and/or maintaining systems; and
- b. Perform deactivation and/or verification activities that support facilities stabilization, per DOE O 420.1C, Facility Safety and contractor safety basis documentation.

Additionally, the Contractor shall remove the fire loading from each of the facilities and ensure a THFA is developed and approved.

In support of the hazard reduction objectives of stabilization, the Contractor shall perform deposit/holdup removal activities to ensure C-331 is in a safe configuration with minimal S&M activities required until decommissioning begins. The criteria for successful deposit/holdup removal is to disposition

nuclear materials in uranium processing facilities a manner that presents a “crit-credible” condition and that when the facility is eventually decommissioned that the resulting waste is compliant with applicable waste acceptance criteria for an on-site CERCLA Cell (e.g., the OSWDF).

The Contractor shall complete the remaining deposit/hold-up removal for the process equipment and piping associated C-331. The overall goal is to complete the uranium removal in the uranium processing facilities as quickly as possible to be able to eliminate criticality safety concerns in each of the production facilities, shut down the CAAS and then to be able to complete air gapping of all utilities and associated support systems, so as to reduce S&M costs. A secondary goal is to be able to avoid additional uranium treatment to meet Waste Acceptance Criteria for an on-site CERCLA Cell (if approved) during deactivation and decommissioning activities.

The Contractor shall perform in-ICT and uranium deposit/hold-up removal for the process equipment and valves and process piping associated with C-331. Exhibit C-1, C-337C-337A Deposit & Hold-up Removal, is available for reference.

As part of deposit/hold-up removal activities, the Contractor shall maximize the use of the PCTC, gas sampling and analytical equipment (Test Buggies) and associated support equipment (pumps, temperature/pressure/flow instrumentation, etc.) during ICT activities of the PGDP process equipment and associated valves and piping. The Contractor shall remove the deposit and hold-up materials from the following categories of equipment:

- a. Cells (including all piping/lines located inside of the boundaries of the cell block valves).
- b. Cells partially connected (e.g., have equipment missing, such as compressors and/or convertors) or that have not operated; and
- c. Convertors, compressors, equipment that was cut out of operating cells (These convertors are stored in various locations within the process buildings and in outside storage areas).

The Contractor shall be responsible for completion of all additional design, testing, or operational activities required to ensure effective operations of the PCTC and Test Buggy system to maximize in-ICT of deposits for the cells, associated UF₆ piping, valves, expansion joints, bellows, etc.

The Contractor shall also design, procure, install and test any required PGDP facility modifications necessary to support the deposit/hold-up removal using the PCTC Systems and for regeneration and change-out of NaF trapping material associated with the use of the PCTC Systems. The Contractor shall collect the resulting/ regenerated UF₆ material, handling it as product (in large UF₆ cylinder) for transfer to the DUF₆.

The Contractor shall implement alternative treatment options (mechanical removal, cut and cap for off-site disposal, etc.) for applications that do not lend themselves to the use of the PCTC system, upon approval by DOE.

Completion Thresholds are as follows:

- Chemically treat all UF₆ equipment and piping with a mixture of ClF₃ and F₂ in order to remove residual uranium remaining in the UF₆ systems, unless an alternative treatment methodology is approved by DOE. The treatments will be done utilizing an end point based on the ClF₃ consumption and the UF₆ generation that will maximize the amount of uranium removed; AND
- Removal of uranium to allow the shutdown of the CAAS for the given areas treated; AND
- Removal of uranium to allow the process equipment and piping to be placed in an On-site Disposal Facility (e.g. On-Site CERCLA Cell) without further processing. Assume a target objective of half (50%) of the final Oak Ridge disposal facility waste (i.e., the EMWMF) acceptance criteria; AND
- Removal of uranium and re-categorization of the processing facilities from Category 2 Nuclear Facilities to Radiological Facilities.

The Contractor shall develop any additional protocols (NDA, visual inspections, sampling and testing, statistical analysis, etc.) that will be used to demonstrate that the post treatment condition of the equipment and piping will meet completion thresholds for deposit/hold-up materials removal activities. These protocols need to include identification of specific data that will be collected, how it will be collected and how it will be used to assess post treatment conditions. The data collected will also be needed to support development of final waste acceptance criteria for the process equipment and piping. Collection of NDA or analytical data prior to initial treatment is not required. Identify/evaluate removal of unneeded CAAS Clusters once the deposit/holdup removal activities are completed. The evaluation should address serviceability through completion of future deactivation and decommissioning activities.

The Contractor shall complete deposit/holdup removal in C-331 of the uranium processing facilities, including, but not limited to:

- a. removal of all deposits/hold-up to below levels needed to achieve incredibility of criticality and removal/shutdown of CAAS and the WAC for On-site CERCLA Waste Disposal Facility;
- b. transfer of any large cylinders generated as part of deposit/hold-up removal to the DUF₆ Contractor when the cylinder is full;
- c. submit all documentation necessary to support criticality incredibility, including authorization basis changes to downgrade the uranium processing facilities to radiological facilities and gain DOE approval; and

- d. deactivate/shutdown the CAAS in the uranium production facilities.

Table C.2. EM.PA.0040.A008.48.DR.03.01-1 DEPOSIT/HOLD-UP REMOVAL C-331	
Milestone	Date
Complete deposit/holdup removal in C-331	NLT end of FY25

EM.PA.0040.A008.48.DR.03.02 ⁹⁹Tc THERMAL TREATMENT C-331

Technetium-99 (⁹⁹Tc) is a high-yield fission product. Some ⁹⁹Tc accompanies uranium during reprocessing of spent reactor fuel and forms a gas during fluorination. Hence, recycled uranium is contaminated with ⁹⁹Tc. In the cascade, the relatively light ⁹⁹Tc moves toward the enrichment end. One of the concerns for the Paducah deactivation and decommissioning phase is the uncertainty of the actual levels of ⁹⁹Tc which will be encountered in the disposition of the process equipment. Considerable amounts of UF₆ were produced at Paducah from reactor return uranium. Estimates have been made that approximately 550 kilograms of ⁹⁹Tc were fed into the PGDP cascade as a contaminant in the UF₆ between 1953 and 1977 (Reference the Smith Report and the PGDP Mass Balance Report).

The typical trace levels of ⁹⁹Tc compounds in the operating GDP's is below the minimum detectable limit for any of the process gas analyzers. Consequently, it cannot be definitively stated which technetium compounds are present in the operational cascades. The only gas phase technetium compound that has been reported to have been detected in the cascade gas stream is the pertechnetyl fluoride, TcO₃F, which was detected in the purge cascade during treatments to unplug the barrier. The technetium compounds that should be considered as potential cascade vapor phase compounds would consist of TcO₃F, HTcO₄, TcOF₄, and TcF₆. The oxides Tc₂O₇, and TcO₂, could also possibly exist as condensed species, along with the liquid or solid pertechnetic acid, HTcO₄, and the oxyfluoride TcO₂F₃. (Reference the Simmons Report)

Technetium hexafluoride (TcF₆), technetium oxide tetrafluoride (TcOF₄), technetium trioxide fluoride (TcO₃F), and technetium dioxide tri-fluoride (TcO₂F₃) have sufficient volatility to be in the cascade gas streams of an operating gaseous diffusion plant, but TcO₃F is the only compound of technetium to be identified. There are also non-volatile and less volatile compounds such as TcO₂ and HTcO₄, respectively. The formation of TcO₂ on steel surfaces is one effect which can retard the release of technetium. The volatile compound TcO₃F has been prepared from the non-volatile solid TcO₂ by use of fluorine at 300°F (degrees Fahrenheit). (Reference the Simmons Report)

It has been demonstrated at the three former gaseous diffusion plants that technetium can be removed from the process surfaces by heating the metals to sufficient temperatures (i.e., approximately 250 degrees Fahrenheit). The more volatile ⁹⁹Tc compounds have been removed to a certain extent from process equipment by heating the cell with the cell off stream and the compressors

running using air to volatilize the technetium into the gas phase and trapping it using accepted methods standard to the diffusion process. However, due to the limitations of heating the process equipment while it was operating the heat was limited to approximately 250 degrees Fahrenheit and at this temperature complete removal of ^{99}Tc was not accomplished. The heated air is circulated through the converters by the compressors. The volatilized ^{99}Tc is then captured using cold traps, magnesium fluoride or activated alumina. This technique has been done with moderate success at the GDPs to unplug cells and to prepare cells for maintenance thus reducing worker exposure to ^{99}Tc . This method has not been used with a goal of meeting the sites disposal Waste Acceptance Criteria (WAC). The final WAC's for Paducah and Portsmouth Plants have not officially been determined, however, the Oak Ridge Environmental Management Waste Management Facility (EMWMF) ^{99}Tc WAC is 172 pCi/g. Analyses of barrier samples recently removed from converters indicate the concentration of ^{99}Tc is two orders of magnitude above the Oak Ridge WAC.

Since the ^{99}Tc is not completely removed during the cell treatments for uranium deposits removal, the ^{99}Tc will need to be thermally treated to remove it from the equipment in order to meet waste disposal limits. The ^{99}Tc limits are more restrictive than uranium due to the difference in mobility of the compounds of the two elements. The ultimate goal of gas phase decontamination is to remove the technetium to sufficient levels that the radioactive contamination is below the free release levels and/or meet the Paducah WAC once it is established. Graph and spreadsheets illustrate known Tc^{99} concentrations by facility and unit is provided in Exhibit C-2.

EM.PA.0040.A008.48.DR.03.02.1 ^{99}Tc THERMAL TREATMENT C-331 Units 1-4

The Contractor shall develop, select and implement an approach to thermally treat the converters in C-331 Units 1-4 to reduce ^{99}Tc levels to below the to be established OSWDF WAC, if the OSWDF is the selected remedy. The Contractor shall ensure the implemented technique provides the most cost effective approach for the lifecycle. Upon completion of the ^{99}Tc thermal treatment activities, the Contractor shall removal any remaining instrument lines, piping, or equipment necessary to achieve crit-incredible that had not already been removed/treated, but was left in place to support ^{99}Tc thermal treatment.

The Contractor shall ensure the following requirements are met during the development, evaluation and implementation of the thermal treatment technique:

- a. Minimize the potential for redepositing of ^{99}Tc in/on equipment/components during the process.
- b. Many plant utilities may have been shut down, air gapped and/or demobilized as a result of Deposit/Hold-up removal completion. The Contractor to shall acquire necessary equipment (skid mounted or mobile

- systems to replace removed utilities), as necessary, to implement the thermal treatment technique and to capture the liberated ⁹⁹Tc.
- c. The C-310 Purge Cascade is shut down and unavailable for use. The Contractor may select to use the PCTCs used for Deposit/Hold-up removal activities as an approach to capturing the liberated ⁹⁹Tc.
 - d. All waste generated during the treatment process shall be disposed during the option period of performance. Wastes shall not be transferred to a subsequent contractor.
 - e. The dose/concentration of the resulting waste (e.g., Magnesium Fluoride and/or Alumina trapping media) shall not exceed limits that requires remote handling and shall not exceed limits that prohibit waste shipments or disposal to off-site disposal facilities.

Table C.2. EM.PA.0040.A008.48.DR.03.02.01-1 99Tc Treatment C-331 Units 1-4	
Milestone	Date
Complete 99Tc Treatment in C-331 Units 1-4	NLT end of FY25

EM.PA.0040.A008.48.DR.03.03 BYPASS PIPING AND TRAPPING EQUIPMENT C-331

For C-331, the Contractor shall complete deposit/holdup removal and additional hazard reduction/stabilization activities in piping outside the cell block valves (including the cell block valves) and all tie-lines connected to C-331 facility. The Contractor shall include any and all additional UF₆ piping/lines that have not been addressed by WBS EM.PA.0040.A008.48.DR.03.01. The Contractor shall complete all deposit/hold-up removal in all chemical traps and associated treatment/support equipment that operated in a UF₆ environment (cold boxes, surge drums, valves, pumps, etc.) containing uranium (use of the PCTC may not be warranted). The Contractor shall submit all documentation necessary to support criticality incredibility, including authorization basis changes to downgrade the uranium processing facilities to radiological facilities and gain DOE approval.

Table C.2. EM.PA.0040.A008.48.DR.03.03 -1 Bypass Piping and Trapping Equipment C-331	
Milestone	Date
Complete C-331 Bypass Piping and Trapping Equipment Disposition	NLT end of FY26

EM.PA.0040.A008.48.DR.03.04 EQUIPMENT REMOVAL C-331

The Contractor shall disposition any loose or spare equipment/materials containing fissile (e.g., deposit/hold-up) materials (use of the PCTCs may not be warranted) in C-331 in order to support the Contractor's ability to deactivate the CAAS that provides coverage in these facilities. The Contractor shall dispose of any fissile equipment and not return the item after the fissile material has been

removed, unless agreed to by DOE. Relocation to another on-site facility for storage is not authorized without DOE approval. The Contractor shall complete equipment removal in uranium process building C-331, including but not limited to:

- a. disposition of all loose fissile material and equipment (e.g. spare parts, uninstalled equipment, removed equipment);
- b. any remaining equipment that contains fissile material precluding the building from achieving crit-incredible status; and
- c. transfer of any large cylinders generated as part of deposit/hold-up removal to the DUF₆ Contractor.

Table C.2. EM.PA.0040.A008.48.DR.03.04 -1 EQUIPMENT REMOVAL C-331	
Milestone	Date
Complete C-331 Equipment Removal	NLT end of FY26

EM.PA.0040.A008.48.DR.03.05 UTILITY/INSTRUMENTATION LINE ISOLATION C-331

Consistent with the THFA, all fire systems in C-331 shall be deactivated or configured in a manner that eliminates the need for freeze protection. Modification of facilities to eliminate the need to provide fire suppression is an acceptable approach. This requires the Contractor to submit all supporting documentation and authorization basis changes for deactivation of the fire suppression systems in these facilities. The Contractor shall isolate and air gap all of the utilities supporting/feeding C-331. The Contractor shall remove all temporary power/utilities service and remaining fire loading (including any resulting from the treatment process) in C-331.

Table C.2. EM.PA.0040.A008.48.DR.03.05 -1 UTILITY/INSTRUMENTATION LINE ISOLATION C-331	
Milestone	Date
Complete C-331 Utility/Instrumentation Line Isolation	NLT end of FY27

EM.PA.0040.A008.48.DR.04.01 DEPOSIT REMOVAL C-335

The Contractor shall complete the removal and disposition of any lube oils, Freon, or other hazardous materials and complete the shutdown and isolation of the facilities, supporting long-term S&M in C-335. The Contractor shall complete the performance of the necessary facility stabilization and deactivation activities including, but not limited to, the following:

- a. Evaluate and determine the need for the continued safety requirements for monitoring and/or maintaining systems; and
- b. Perform deactivation and/or verification activities that support facilities stabilization, per DOE O 420.1C, Facility Safety and contractor safety basis documentation.

Additionally, the Contractor shall remove the fire loading from each of the facilities and ensure a THFA is developed and approved.

In support of the hazard reduction objectives of stabilization, the Contractor shall perform deposit/holdup removal activities to ensure C-335 is in a safe configuration with minimal S&M activities required until decommissioning begins. The criteria for successful deposit/holdup removal is to disposition nuclear materials in uranium processing facilities a manner that presents a “crit-incapable” condition and that when the facility is eventually decommissioned that the resulting waste is compliant with applicable waste acceptance criteria for an on-site CERCLA Cell (e.g., the OSWDF).

The Contractor shall complete the remaining deposit/hold-up removal for the process equipment and piping associated C-335. The overall goal is to complete the uranium removal in the uranium processing facilities as quickly as possible to be able to eliminate criticality safety concerns in each of the production facilities, shut down the CAAS and then to be able to complete air gapping of all utilities and associated support systems, so as to reduce S&M costs. A secondary goal is to be able to avoid additional uranium treatment to meet Waste Acceptance Criteria for an on-site CERCLA Cell (if approved) during deactivation and decommissioning activities.

The Contractor shall perform ICT and uranium deposit/hold-up removal for the process equipment and valves and process piping associated with C-335.

As part of deposit/hold-up removal activities, the Contractor shall maximize the use of the PCTC, gas sampling and analytical equipment (Test Buggies) and associated support equipment (pumps, temperature/pressure/flow instrumentation, etc.) during ICT activities of the PGDP process equipment and associated valves and piping. The Contractor shall remove the deposit and hold-up materials for the following categories of equipment:

- a. Cells (including all piping/lines located inside of the boundaries of the cell lock valves);
- b. Cells partially connected (e.g., have equipment missing, such as compressors and/or convertors), or that have not operated; and
- c. Convertors, compressors, equipment that was cut out of operating cells (These convertors are stored in various locations within the process buildings and in outside storage areas).

The Contractor shall be responsible for completion of all additional design, testing, or operational activities required to ensure effective operations of the PCTC and Test Buggy system to maximize ICT of deposits for the cells, associated UF₆ piping, valves, expansion joints, bellows, etc.

The Contractor shall also design, procure, install and test any required PGDP facility modifications necessary to support the deposit/hold-up removal using the PCTC Systems and for regeneration and change-out of NaF trapping material associated with the use of the PCTC Systems. The Contractor shall collect the resulting/ regenerated UF₆ material, handling it as product (in large UF₆ cylinder) for transfer to the DUF₆.

The Contractor shall implement alternative treatment options (mechanical removal, cut and cap for off-site disposal, etc.) for applications that do not lend themselves to the use of the PCTC system, upon approval by DOE.

Completion Thresholds are as follows:

- Chemically treat all UF₆ equipment and piping with a mixture of ClF₃ and F₂ in order to remove residual uranium remaining in the UF₆ systems, unless an alternative treatment methodology is approved by DOE. The treatments will be done utilizing an end point based on the ClF₃ consumption and the UF₆ generation that will maximize the amount of uranium removed; AND
- Removal of uranium to allow the shutdown of the CAAS for the given areas treated; AND
- Removal of uranium to allow the process equipment and piping to be placed in an On-site Disposal Facility (e.g. On-Site CERCLA Cell) without further processing. Assume a target objective of half (50%) of the final Oak Ridge disposal facility waste (i.e., the EMWMF) acceptance criteria; AND
- Removal of uranium and re-categorization of the processing facilities from Category 2 Nuclear Facilities to Radiological Facilities.

The Contractor shall develop any additional protocols (NDA, visual inspections, sampling and testing, statistical analysis, etc.) that will be used to demonstrate that the post treatment condition of the equipment and piping will meet completion thresholds for deposit/hold-up materials removal activities. These protocols need to include identification of specific data that will be collected, how it will be collected and how it will be used to assess post treatment conditions. The data collected will also be needed to support development of final waste acceptance criteria for the process equipment and piping. Collection of NDA or analytical data prior to initial treatment is not required. Identify/evaluate removal of unneeded CAAS Clusters once the deposit/holdup removal activities are completed. The evaluation should address serviceability through completion of future deactivation and decommissioning activities.

The Contractor shall complete deposit removal in 21 of the 40 cells (52.5%) in uranium process building C-335, including, but not limited to:

- a. removal of all deposits/hold-up to below levels needed to achieve incredibility of criticality and removal/shutdown of CAAS and the WAC for On-site CERCLA Waste Disposal Facility;

- b. transfer of any large cylinders generated as part of deposit/hold-up removal to the DUF₆ Contractor when the cylinder is full;
- c. submit all documentation necessary to support criticality incredibility, including authorization basis changes to downgrade the uranium processing facilities to radiological facilities and gain DOE approval; and
- d. deactivate/shutdown the CAAS in the uranium production facilities.

Table C.2. EM.PA.0040.A008.48.DR.04.01-1 DEPOSIT/HOLD-UP REMOVAL C-335	
Milestone	Date
Complete deposit/holdup removal in 21 of 40 cells in C-335	NLT end of FY27

EM.PA.0040.A008.48.DR.08.01 NICKEL AND ⁹⁹Tc MICROWAVE THERMAL TREATMENT TECHNOLOGY STUDY AND EVALUATION

Within the first 18 months of the POP, the contractor shall complete activities to investigate the use of microwave technology to thermally treat the ⁹⁹Tc contained in the nickel barrier and subsequently melt the metal nickel for recovery purposes (*Nickel and ⁹⁹Tc Microwave Thermal Treatment Technology Study and Evaluation*).

All personnel performing this evaluation must possess (at a minimum) an "L" Clearance.

The goal of the Nickel and ⁹⁹Tc Microwave Thermal Treatment Technology Study and Evaluation is to determine if the use of microwave technology to in-situ thermally heat and melt the nickel in an installed convertor, allowing the release and capture of ⁹⁹Tc in the barrier is practical. As such, this technology potentially allows for nickel recycling, reduces the weight loading of the convertors, and allows them to be removed during facility demolition.

The Nickel and ⁹⁹Tc Microwave Thermal Treatment Technology Study and Evaluation must evaluate Microwave Thermal Treatment with the following specific requirements and objectives:

- a. Thermally smelt 100% of classified barrier material to permit declassification. Smelting of other metals (e.g. Copper, Aluminum) within the convertor shall also be demonstrated;
- b. Reduce ⁹⁹Tc concentrations within the convertor to permit material to be disposed of in an on-site CERCLA Cell (cannot exceed 800 pCi/g);
- c. Remove 95% of the nickel and 95% of the other recyclable metals in the convertor;
- d. Ensure treated convertor is left "in-place" for removal at facility demolition;
- e. Demonstrate capability in a 000 convertor;
- f. Prevent re-deposit of the released ⁹⁹Tc in other portions of the convertor/cascade;

- g. Capture of the ^{99}Tc using PCTC (or similar/simulated trapping method) with recommendations for improving the trapping process; and
- h. Removal (draining) of smelted metals from the installed converter to allow for removal and storage elsewhere prior to building demolition.

Initially, the Contractor will design and complete a bench scale test study to demonstrate the safety and potential implementation success of microwave thermal treatment, prior to conducting a pilot scale test scenario under field conditions.

The Contractor shall issue a report to DOE upon completion of the bench scale study. The report shall provide DOE with a detailed description of the study, an evaluation of the feasibility data and the associated technology, identification of the advantages and disadvantages of the technology, validation of the results in regards to the technologies ability to meet the goals in regards to ^{99}Tc removal and metal melt, opportunities to enhance the technologies performance, evaluation of the economic viability of the technology in regard to pilot scale implementation.

Upon gaining approval from DOE, the Contractor shall continue the Nickel and ^{99}Tc Microwave Thermal Treatment Technology Study and Evaluation by conducting a Pilot Scale Study and Evaluation. The pilot scale study shall be conducted based on parameters that closely simulate the field conditions at PGDP process buildings including the various forms of Tc suspected to be present (TcO_3F , HTcO_4 , TcOF_4 , TcF_6 and oxides Tc_2O_7 , TcO_2). The pilot scale study shall include the development of the test equipment, procedures, test parameters, sampling, and analysis of data and information (including data on the volatilization temperature of the various Tc compounds). The pilot scale study shall utilize PGDP barrier materials, be constructed to simulate other parameters, variables (including ambient temperature, space limitations, power loading, etc.) and contaminants expected to be encountered in actual field conditions. The pilot scale study shall specifically address possible in-situ application of the treatment at PGDP.

The Contractor shall issue a report to DOE upon completion of the pilot scale study. The report shall provide DOE with a detailed description of the study, an evaluation of the feasibility data and the associated technology, identification of the advantages and disadvantages of the technology, validation of the results in regards to the technologies ability to meet the goals in regards to ^{99}Tc removal and metal melt, opportunities to enhance the technologies performance, evaluation of the economic viability of the technology in regards to full scale field implementation, and a detailed cost and schedule for full scale implementation. This shall allow the Contractor and DOE to determine the economic viability of the technology, and to determine the feasibility of scaling up the technology to accommodate a full size process converter.

Table C.2.EM.PA.0040.A008.48.DR.05.02-1 Nickel and ⁹⁹Tc Microwave Thermal Treatment Technology Study & Evaluation	
Milestone	Date
Design and complete a bench scale test study to demonstrate the safety and potential implementation success of microwave thermal treatment	In accordance with Contractor's technical proposal
Issue a report upon completion of the bench scale study for DOE approval to proceed to Pilot Study activity	In accordance with Contractor's technical proposal
Conduct a Pilot Scale Study and Evaluation	In accordance with Contractor's technical proposal
Issue a Nickel and ⁹⁹ Tc Microwave Thermal Treatment Technology Study & Evaluation Pilot Study Report	18 months after conclusion of transition

EM.PA.0040.A008.48.DR.09 R-114 FREON

The Contactor shall manage, inspect, and disposition, the existing R-114 inventory. Historically, PGDP has maintained approximately 8.5 million pounds of R-114 Freon on site. The bulk of the R-114 Freon contained in the Process Buildings (C-310, C-331, C-333, C-335, and C-337) coolant systems in the process equipment (e.g., drain tanks, condensers, etc.). Additionally, there are 15-18 rail cars on-site containing approximately 2-3 million pounds (total) of R-114. There are up to 10 ISO containers (for on-site storage only) available. Some of the R-114 Freon has been removed from the C-337 Building. The Contractor shall perform any regulatory required inspections, which may include leak checks and level checks to ensure the rail cars and ISO containers are not leaking to the atmosphere. The railcars are not DOT compliant.

Consistent with the Secretary of Energy's directives pertaining to the reuse/recycling of materials/chemicals, a competitive subcontract was awarded to disposition the R-114 Freon. The Contractor shall accept assignment of all such contracts and continue disposition of the R-114 Freon. The Contractor shall ensure that all of the R-114 Freon at the Paducah Site is completely dispositioned within the performance period of the contract. This includes any and all R-114 Freon rejected for recycling/reprocessing.

Table C.2.EM.PA.0040.A008.48.DR.03-1 R-114 Freon Milestones/Schedule	
Milestone	Date
Disposition all Paducah Site R-114 Freon	Per the Contractor's Proposal

Table C.2.EM.PA.0040.A008.48.DR.03-2 R-114 Freon Reference Documents	
Document Number	Title
NA	Hatton e:mail May 12, 2015 to vendors, subject: "Request for an Expression of Interest – R-114" with one Attachment (EOI)
	Disposition Agreement

EM.PA.0040.C002.03.DR ON-SITE WASTE DISPOSAL FACILITY (OSWDF) CAPITAL ASSET PROJECT

The DOE estimates a future need for disposal of approximately 3.7 million cubic yards of radioactively contaminated, non-radioactively contaminated, and hazardous material (soil and building debris), including sanitary waste through the end of deactivation and decommissioning of the PGDP. The majority of this waste will be disposed of outside of the period of performance of this Contract as it is currently associated with deactivation and decommissioning of the GDP. Approximately 2,000 yd³ of these volumes are classified waste.

Table C.2.EM.PA.0040.C002.01.DR-1								
Estimated Disposal Volume, by Waste Form, for Waste Disposition Options Project through 2040 in 1000YD³								
Waste form	LLW	LL W/ RC RA	LLW/ RCR A/ TSCA	LLW / TSC A	RCR A	TSC A	Sanitary	Total
Asbestos	4	1	25	0	0	4	1	33
Concrete	377	1	0	0	0	0	393	771
General Construction Debris	425	3	0	1	0	3	235	667
Other Dry Solids	46	1	5	1	1	1	4	57
Scrap Metal	408	1	0	0	0	4	69	480
Soil	1,286	29	1	0	16	2	376	1,710
Total	2,547	36	31	2	17	14	1,079	3,719

LLW = low-level waste
 RCRA = Resource Conservation and Recovery Act of 1976
 TSCA = Toxic Substances Control Act of 1976, Public Law 94-469, October 11, 1976, 15 USC Section 2622

Source: DOE/LX/07-0035&D1, Scoping Document for CERCLA Waste Disposal Alternatives Evaluation Remedial Investigation/Feasibility Study at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, April 2008

EM.PA.0040.C002.03.DR .01 OSWDF CELL 1 AND INFRASTRUCTURE

The Contractor shall assume responsibility for all ongoing activities for OSWDF approvals and design. The Contractor shall assume that at the time of transition, a Record of Decision (ROD) and CD 0/1 approval has been obtained. This project is a Capital Asset Project and all Critical Decision processes shall be completed by the Contractor.

The Contractor shall complete all CERCLA documentations, DOE 435.1 required LFRG documents (e.g. performance assessment, annual reviews and composite analysis), the necessary designs (consistent with the planned lifecycle waste projections) for OSWDF Cell 1 and necessary infrastructure during the POP, consistent with the Project Data Sheet and CD-0/1 documentation.

Consistent with the FFA schedules, the Contractor shall prepare regulatory documents including, but not limited to, CERCLA documentation required per the regulatory agreement(s). The Contractor shall develop the necessary CERCLA documentation, and develop the necessary subsequent work plans and supplemental documents under the agreed-upon CERCLA process.

In addition, the Contractor shall be responsible for developing and coordinating all regulatory documentation necessary to support other activities associated with the onsite waste disposal facility (e.g., sampling, monitoring, waste treatment, disposal, storage).

The Contractor shall:

- a. Prepare, submit, and obtain regulatory approval of the OSWDF Remedial Design Work Plan/Remedial Design Support Investigation. The initial deliverable shall be of sufficient quality, depth, thoroughness, and format to support DOE concurrence and regulatory approval.
- b. Complete the Remedial Design Support Investigation, including any necessary fieldwork to complete the investigation, including any data analysis, modeling, and other reporting necessary to support completion of the OSWDF design.
- c. Prepare and submit the OSWDF Critical Decision Documents (CD-2/3 and CD-3A) to DOE for review and approval. . The initial deliverable shall be of sufficient quality, depth, thoroughness, and format to support DOE approval.
- d. Prepare and submit the OSWDF Safety Basis Documentation. The initial deliverable shall be of sufficient quality, depth, thoroughness, and format to support DOE approval.
- e. Prepare and obtain regulatory approval of the Waste Acceptance Criteria for the OSWDF
- f. Prepare, submit, and obtain regulatory approval of the OSWDF 30%, 60%, and 90% Remedial Design Reports, and the CFC Remedial Design Report, Remedial Action Work Plan, O&M Plan, Post Construction Report, and all other CERCLA documents and supporting documents necessary to complete construction and begin operations of the OSWDF. The initial deliverable shall be of sufficient quality, depth, thoroughness, and format to support DOE concurrence and regulatory approval.

Table C.3.EM.PA.0040.C002.01.DR.01-1 OSWDF Cell 1 and Infrastructure Milestones/Schedule	
Milestone	Date
Complete 90% Design Review (Cell 1 and Infrastructure)	18 months after completion of Transition
Complete CD-2/3 Documentation for DOE HQ Review (Cell 1 and Infrastructure)	NLT end of FY19
Complete LFRG PA Review and Approval (Cell 1 and Infrastructure)	NLT end of FY21
Complete D1 Remedial Action Work Plan (Cell 1 and Infrastructure)	NLT end of FY21

Table C.3.EM.PA.0040.C002.01.DR.01-1 OSWDF Cell 1 and Infrastructure Milestones/Schedule	
Milestone	Date
Complete CD-3A Documentation for DOE HQ Review (Cell 1 and Infrastructure)	NLT end of FY21

C.3 TECHNICAL OPTION WORK

As funding becomes available the Contractor may be asked to pursue various options for some scope elements that currently do not appear in the PWS. These options will be managed under unique CLINs if released by the Contracting Officer.

EM.PA.0040.A008.48.DR.04.01.01 DEPOSIT REMOVAL C-335

The Contractor shall complete the removal and disposition of any lube oils, Freon, or other hazardous materials and complete the shutdown and isolation of the facilities, supporting long-term S&M in C-335. The Contractor shall complete the performance of the necessary facility stabilization and deactivation activities including, but not limited to, the following:

- a. Evaluate and determine the need for the continued safety requirements for monitoring and/or maintaining systems; and
- b. Perform deactivation and/or verification activities that support facilities stabilization, per DOE O 420.1C, Facility Safety and contractor safety basis documentation.

Additionally, the Contractor shall remove the fire loading from each of the facilities and ensure a THFA is developed and approved.

In support of the hazard reduction objectives of stabilization, the Contractor shall perform deposit/holdup removal activities to ensure C-335 is in a safe configuration with minimal S&M activities required until decommissioning begins. The criteria for successful deposit/holdup removal is to disposition nuclear materials in uranium processing facilities a manner that presents a “crit-incredible” condition and that when the facility is eventually decommissioned that the resulting waste is compliant with applicable waste acceptance criteria for an on-site CERCLA Cell (e.g., the OSWDF).

The Contractor shall complete the remaining deposit/hold-up removal for the process equipment and piping associated C-335. The overall goal is to complete the uranium removal in the uranium processing facilities as quickly as possible to be able to eliminate criticality safety concerns in each of the production facilities, shut down the CAAS and then to be able to complete air gapping of all utilities and associated support systems, so as to reduce S&M costs. A secondary goal is to be able to avoid additional uranium treatment to meet Waste Acceptance Criteria for an on-site CERCLA Cell (if approved) during deactivation and decommissioning activities.

The Contractor shall perform ICT and uranium deposit/hold-up removal for the process equipment and valves and process piping associated with C-335. Exhibit C-1, C-337C-337A Deposit & Hold-up Removal, is available for reference.

As part of deposit/hold-up removal activities, the Contractor shall maximize the use of the PCTC, gas sampling and analytical equipment (Test Buggies) and associated support equipment (pumps, temperature/pressure/flow instrumentation, etc.) during ICT activities of the PGDP process equipment and associated valves and piping. The Contractor shall remove the deposit and hold-up materials from the following categories of equipment:

- a. Cells (including all piping/lines located inside of the boundaries of the cell block valves).
- b. Cells partially connected (e.g., have equipment missing, such as compressors and/or convertors) or that have not operated.
- c. Convertors, compressors, equipment that was cut out of operating cells (These convertors are stored in various locations within the process buildings and in outside storage areas).

The Contractor shall be responsible for completion of all additional design, testing, or operational activities required to ensure effective operations of the PCTC and Test Buggy system to maximize ICT of deposits for the cells, associated UF₆ piping, valves, expansion joints, bellows, etc.

The Contractor shall also design, procure, install and test any required PGDP facility modifications necessary to support the deposit/hold-up removal using the PCTC Systems and for regeneration and change-out of NaF trapping material associated with the use of the PCTC Systems. The Contractor shall collect the resulting/ regenerated UF₆ material, handling it as product (in large UF₆ cylinder) for transfer to the DUF₆.

The Contractor shall implement alternative treatment options (mechanical removal, cut and cap for off-site disposal, etc.) for applications that do not lend themselves to the use of the PCTC system, upon approval by DOE.

Completion Thresholds are as follows:

- Chemically treat all UF₆ equipment and piping with a mixture of ClF₃ and F₂ in order to remove residual uranium remaining in the UF₆ systems, unless an alternative treatment methodology is approved by DOE. The treatments will be done utilizing an end point based on the ClF₃ consumption and the UF₆ generation that will maximize the amount of uranium removed; AND
- Removal of uranium to allow the shutdown of the CAAS for the given areas treated; AND
- Removal of uranium to allow the process equipment and piping to be placed in an On-site Disposal Facility (e.g. On-Site CERCLA Cell) without further processing. Assume a target objective of half (50%) of the final Oak Ridge disposal facility waste (i.e., the EMWMF) acceptance criteria; AND
- Removal of uranium and re-categorization of the processing facilities from Category 2 Nuclear Facilities to Radiological Facilities.

The Contractor shall develop any additional protocols (NDA, visual inspections, sampling and testing, statistical analysis, etc.) that will be used to demonstrate that the post treatment condition of the equipment and piping will meet completion thresholds for deposit/hold-up materials removal activities. These protocols need to include identification of specific data that will be collected, how it will be collected and how it will be used to assess post treatment conditions. The data collected will also be needed to support development of final waste acceptance criteria for the process equipment and piping. Collection of NDA or analytical data prior to initial treatment is not required. Identify/evaluate removal of unneeded CAAS Clusters once the deposit/holdup removal activities are completed. The evaluation should address serviceability through completion of future deactivation and decommissioning activities.

The Contractor shall complete deposit removal in 19 of the 40 cells (47.5%) in uranium process building C-335, including but not limited to:

- a. removal of all deposits/hold-up to below levels needed to achieve incredibility of criticality and removal/shutdown of CAAS and the WAC for On-site CERCLA Waste Disposal Facility;
- b. transfer of any large cylinders generated as part of deposit/hold-up removal to the DUF₆ Contractor when the cylinder is full;
- c. submit all documentation necessary to support criticality incredibility, including authorization basis changes to downgrade the uranium processing facilities to radiological facilities and gain DOE approval; and
- d. deactivate/shutdown the CAAS in the uranium production facilities.

Table C.3.2 EM.PA.0040.A008.48.DR.04.01.01-1 DEPOSIT/HOLD-UP REMOVAL C-335	
Milestone	Date
Complete deposit/holdup removal in remaining 19 of 40 cells in C-335	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.04.03 BYPASS PIPING AND TRAPPING EQUIPMENT C-335

In C-335, the Contractor shall complete deposit/holdup removal and additional hazard reduction/stabilization activities in piping outside the cell block valves (including the cell block valves) and all tie-lines connected to the C-335 facility. The Contractor shall include any and all additional UF₆ piping/lines that have not been addressed by WBS EM.PA.0040.A008.48.DR.04.01.01. The Contractor shall complete all deposit/hold-up removal in all chemical traps and associated treatment/support equipment that operated in an UF₆ environment (cold boxes, surge drums, valves, pumps, etc.) containing uranium (use of the PCTC may not be warranted). The Contractor shall submit all documentation necessary to support criticality incredibility, including authorization basis changes to downgrade the uranium processing facilities to radiological facilities and gain DOE approval.

Table C.3.2 EM.PA.0040.A008.48.DR.04.03 -1 Bypass Piping and Trapping Equipment C-335	
Milestone	Date
Complete C-335 Bypass Piping and Trapping Equipment Disposition	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.04.04 EQUIPMENT REMOVAL C-335

The Contractor shall disposition any loose or spare equipment/materials containing fissile (e.g., deposit/hold-up) materials (use of the PCTCs may not be warranted) in C-335 in order to support the Contractor’s ability to deactivate the CAAS that provides coverage in these facilities. The Contractor shall dispose of any fissile equipment and not return the item after the fissile material has been removed, unless agreed to by DOE. Relocation to another on-site facility for storage is not authorized without DOE approval. The Contractor shall complete equipment removal in uranium process building C-335, including but not limited to:

- a. disposition of all loose fissile material and equipment (e.g. spare parts, uninstalled equipment, removed equipment);
- b. Any remaining equipment that contains fissile material precluding the building from achieving crit-incredible status; and
- c. transfer of any large cylinders generated as part of deposit/hold-up removal to the DUF₆ Contractor.

Table C.3.2 EM.PA.0040.A008.48.DR.04.04 -1 EQUIPMENT REMOVAL C-335	
Milestone	Date
Complete C-335 Equipment Removal	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.04.05 UTILITY/INSTRUMENTATION LINE ISOLATION C-335

Consistent with the THFA, all fire systems in C-335 shall be deactivated or configured in a manner that eliminates the need for freeze protection. Modification of facilities to eliminate the need to provide fire suppression is an acceptable approach. This requires the Contractor to submit all supporting documentation and authorization basis changes for deactivation of the fire suppression systems in these facilities. The Contractor shall isolate and air gap all of the utilities supporting/feeding C-335. The Contractor shall remove all temporary power/utilities service and remaining fire loading (including any resulting from the treatment process) in C-335.

Table C.3.2 EM.PA.0040.A008.48.DR.04.05 -1 UTILITY/INSTRUMENTATION LINE ISOLATION C-335	
Milestone	Date
Complete C-335 Utility/Instrumentation Line Isolation	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.05.01 DEPOSIT REMOVAL C-310

The Contractor shall complete the removal and disposition of any lube oils, Freon, or other hazardous materials and complete the shutdown and isolation of the facilities, supporting long-term S&M in C-310. The Contractor shall complete the performance of the necessary facility stabilization and deactivation activities including, but not limited to, the following:

- a. Evaluate and determine the need for the continued safety requirements for monitoring and/or maintaining systems; and
- b. Perform deactivation and/or verification activities that support facilities stabilization, per DOE O 420.1C, Facility Safety and contractor safety basis documentation.

Additionally, the Contractor shall remove the fire loading from each of the facilities and ensure a THFA is developed and approved.

In support of the hazard reduction objectives of stabilization, the Contractor shall perform deposit/holdup removal activities to ensure C-310 is in a safe configuration with minimal S&M activities required until decommissioning begins. The criteria for successful deposit/holdup removal is to disposition nuclear materials in uranium processing facilities a manner that presents a “crit-incredible” condition and that when the facility is eventually decommissioned that the resulting waste is compliant with applicable waste acceptance criteria for an on-site CERCLA Cell (e.g., the OSWDF).

The Contractor shall complete the remaining deposit/hold-up removal for the process equipment and piping associated C-310. The overall goal is to complete the uranium removal in the uranium processing facilities as quickly as possible to be able to eliminate criticality safety concerns in each of the production facilities, shut down the CAAS and then to be able to complete air gapping of all utilities and associated support systems, so as to reduce S&M costs. A secondary goal is to be able to avoid additional uranium treatment to meet Waste Acceptance Criteria for an on-site CERCLA Cell (if approved) during deactivation and decommissioning activities.

The Contractor shall perform ICT and uranium deposit/hold-up removal for the process equipment and valves and process piping associated with C-310. Exhibit C-1, C-337C-337A Deposit & Hold-up Removal, is available for reference.

As part of deposit/hold-up removal activities, the Contractor shall maximize the use of the PCTC, gas sampling and analytical equipment (Test Buggies) and associated support equipment (pumps, temperature/pressure/flow instrumentation, etc.) during ICT activities of the PGDP process equipment and associated valves and piping. The Contractor shall remove the deposit and hold-up materials from the following categories of equipment:

- a. Cells (including all piping/lines located inside of the boundaries of the cell lock valves);

- b. Cells partially connected (e.g., have equipment missing, such as compressors and/or convertors) or that have not operated; and
- c. Convertors, compressors, equipment that was cut out of operating cells (These convertors are stored in various locations within the process buildings and in outside storage areas).

The Contractor shall be responsible for completion of all additional design, testing, or operational activities required to ensure effective operations of the PCTC and Test Buggy system to maximize ICT of deposits for the cells, associated UF₆ piping, valves, expansion joints, bellows, etc.

The Contractor shall also design, procure, install and test any required PGDP facility modifications necessary to support the deposit/hold-up removal using the PCTC Systems and for regeneration and change-out of NaF trapping material associated with the use of the PCTC Systems. The Contractor shall collect the resulting/ regenerated UF₆ material, handling it as product (in large UF₆ cylinder) for transfer to the DUF₆.

The Contractor shall implement alternative treatment options (mechanical removal, cut and cap for off-site disposal, etc.) for applications that do not lend themselves to the use of the PCTC system, upon approval by DOE.

Completion Thresholds are as follows:

- Chemically treat all UF₆ equipment and piping with a mixture of ClF₃ and F₂ in order to remove residual uranium remaining in the UF₆ systems, unless an alternative treatment methodology is approved by DOE. The treatments will be done utilizing an end point based on the ClF₃ consumption and the UF₆ generation that will maximize the amount of uranium removed; AND
- Removal of uranium to allow the shutdown of the CAAS for the given areas treated; AND
- Removal of uranium to allow the process equipment and piping to be placed in an On-site Disposal Facility (e.g. On-Site CERCLA Cell) without further processing. Assume a target objective of half (50%) of the final Oak Ridge disposal facility waste (i.e., the EMWMF) acceptance criteria; AND
- Removal of uranium and re-categorization of the processing facilities from Category 2 Nuclear Facilities to Radiological Facilities.

The Contractor shall develop any additional protocols (NDA, visual inspections, sampling and testing, statistical analysis, etc.) that will be used to demonstrate that the post treatment condition of the equipment and piping will meet completion thresholds for deposit/hold-up materials removal activities. These protocols need to include identification of specific data that will be collected, how it will be collected and how it will be used to assess post treatment conditions. The data collected will also be needed to support development of final waste acceptance criteria for the process equipment and piping. Collection of NDA or analytical data prior to initial treatment is not required. Identify/evaluate removal of unneeded CAAS Clusters once the deposit/holdup removal activities are completed. The evaluation should

address serviceability through completion of future deactivation and decommissioning activities.

The Contractor shall complete deposit removal in building C-310, including, but not limited to:

- a. removal of all deposits/hold-up to below levels needed to achieve incredibility of criticality and removal/shutdown of CAAS and the WAC for On-site CERCLA Waste Disposal Facility;
- b. transfer of any large cylinders generated as part of deposit/hold-up removal to the DUF₆ Contractor when the cylinder is full;
- c. submit all documentation necessary to support criticality incredibility, including authorization basis changes to downgrade the uranium processing facilities to radiological facilities and gain DOE approval;
- d. deactivate/shutdown the CAAS in the uranium production facilities.

Table C.3.2 EM.PA.0040.A008.48.DR.05.01-1 DEPOSIT/HOLD-UP REMOVAL C-310	
Milestone	Date
Complete deposit/holdup removal in C-310	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.05.03 BYPASS PIPING AND TRAPPING EQUIPMENT C-310

For C-310, the Contractor shall complete deposit/holdup removal and additional hazard reduction/stabilization activities in piping outside the cell block valves (including the cell block valves) and all tie-lines connected to the C-310 facility. The Contractor shall include any and all additional UF₆ piping/lines that have not been addressed by WBS EM.PA.0040.A008.48.DR.05.01. The Contractor shall complete all deposit/hold-up removal in all chemical traps and associated treatment/support equipment that operated in an UF₆ environment (cold boxes, surge drums, valves, pumps, etc.) containing uranium (use of the PCTC may not be warranted). The Contractor shall submit all documentation necessary to support criticality incredibility, including authorization basis changes to downgrade the uranium processing facilities to radiological facilities and gain DOE approval.

Table C.3.2 EM.PA.0040.A008.48.DR.05.03 -1 Bypass Piping and Trapping Equipment C-310	
Milestone	Date
Complete C-310 Bypass Piping and Trapping Equipment Disposition	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.05.04 EQUIPMENT REMOVAL C-310

The Contractor shall disposition any loose or spare equipment/materials containing fissile (e.g., deposit/hold-up) materials (use of the PCTCs may not be warranted) in C-310 in order

to support the Contractor’s ability to deactivate the CAAS that provides coverage in these facilities. The Contractor shall dispose of any fissile equipment and not return the item after the fissile material has been removed, unless agreed to by DOE. Relocation to another on-site facility for storage is not authorized without DOE approval. The Contractor shall complete equipment removal in uranium process building C-310, including but not limited to:

- a. disposition of all loose fissile material and equipment (e.g. spare parts, uninstalled equipment, removed equipment);
- b. Any remaining equipment that contains fissile material precluding the building from achieving crit-incredible status; and
- c. transfer of any large cylinders generated as part of deposit/hold-up removal to the DUF₆ Contractor.

Table C.3.2 EM.PA.0040.A008.48.DR.05.04 -1 EQUIPMENT REMOVAL C-310	
Milestone	Date
Complete C-310 Equipment Removal	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.05.05 UTILITY/INSTRUMENTATION LINE ISOLATION C-310

Consistent with the THFA, all fire systems in C-310 shall be deactivated or configured in a manner that eliminates the need for freeze protection. Modification of facilities to eliminate the need to provide fire suppression is an acceptable approach. This requires the Contractor to submit all supporting documentation and authorization basis changes for deactivation of the fire suppression systems in these facilities. The Contractor shall isolate and air gap all of the utilities supporting/feeding C-310. The Contractor shall remove all temporary power/utilities service and remaining fire loading (including any resulting from the treatment process) in C-310.

Table C.3.2 EM.PA.0040.A008.48.DR.05.05 -1 UTILITY/INSTRUMENTATION LINE ISOLATION C-310	
Milestone	Date
Complete C-310 Utility/Instrumentation Line Isolation	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.06.01 DEPOSIT REMOVAL C-360

The Contractor shall complete the removal and disposition of any lube oils, Freon, or other hazardous materials and complete the shutdown and isolation of the facilities, supporting long-term S&M in C-360. The Contractor shall complete the performance of the necessary facility stabilization and deactivation activities including, but not limited to, the following:

- a. Evaluate and determine the need for the continued safety requirements for monitoring and/or maintaining systems; and

- b. Perform deactivation and/or verification activities that support facilities stabilization, per DOE O 420.1C, Facility Safety and contractor safety basis documentation.
- c. Additionally, the Contractor shall remove the fire loading from each of the facilities and ensure a THFA is developed and approved.

In support of the hazard reduction objectives of stabilization, the Contractor shall perform deposit/holdup removal activities to ensure C-360 is in a safe configuration with minimal S&M activities required until decommissioning begins. The criteria for successful deposit/holdup removal is to disposition nuclear materials in uranium processing facilities a manner that presents a “crit-incredible” condition and that when the facility is eventually decommissioned that the resulting waste is compliant with applicable waste acceptance criteria for an on-site CERCLA Cell (e.g., the OSWDF).

The Contractor shall complete the remaining deposit/hold-up removal for the process equipment and piping associated C-360. The overall goal is to complete the uranium removal in the uranium processing facilities as quickly as possible to be able to eliminate criticality safety concerns in each of the production facilities, shut down the CAAS and then to be able to complete air gapping of all utilities and associated support systems, so as to reduce S&M costs. A secondary goal is to be able to avoid additional uranium treatment to meet Waste Acceptance Criteria for an on-site CERCLA Cell (if approved) during deactivation and decommissioning activities.

The Contractor shall perform ICT and uranium deposit/hold-up removal for the process equipment and valves and process piping associated with C-360.

As part of deposit/hold-up removal activities, the Contractor shall maximize the use of the PCTC, gas sampling and analytical equipment (Test Buggies) and associated support equipment (pumps, temperature/pressure/flow instrumentation, etc.) during ICT activities of the PGDP process equipment and associated valves and piping. The Contractor shall remove the deposit and hold-up materials from all installed equipment, including, but not limited to:

- a. All equipment associated with sampling activities (i.e., sample cabinets, valves, lines/piping, tubing, instrumentation, etc.); and
- b. All equipment associated with transfer activities (i.e., autoclave piping/lines, valves and instrumentation, transfer piping/lines, valves and instrumentation, etc.).

The Contractor shall be responsible for completion of all additional design, testing, or operational activities required to ensure effective operations of the PCTC and Test Buggy system to maximize ICT of deposits for the cells, associated UF6 piping, valves, expansion joints, bellows, etc.

The Contractor shall also design, procure, install and test any required PGDP facility modifications necessary to support the deposit/hold-up removal using the PCTC Systems and for regeneration and change-out of NaF trapping material associated with the use of the PCTC Systems. The Contractor shall collect the resulting/ regenerated UF6 material, handling it as product (in large UF6 cylinder) for transfer to the DUF6.

The Contractor shall implement alternative treatment options (mechanical removal, cut and cap for off-site disposal, etc.) for applications that do not lend themselves to the use of the PCTC system, upon approval by DOE.

Completion Thresholds are as follows:

- Chemically treat all UF₆ equipment and piping with a mixture of ClF₃ and F₂ in order to remove residual uranium remaining in the UF₆ systems, unless an alternative treatment methodology is approved by DOE. The treatments will be done utilizing an end point based on the ClF₃ consumption and the UF₆ generation that will maximize the amount of uranium removed; AND
- Removal of uranium to allow the shutdown of the CAAS for the given areas treated; AND
- Removal of uranium to allow the process equipment and piping to be placed in an On-site Disposal Facility (e.g. On-Site CERCLA Cell) without further processing. Assume a target objective of half (50%) of the final Oak Ridge disposal facility waste (i.e., the EMWMF) acceptance criteria; AND
- Removal of uranium and re-categorization of the processing facilities from Category 2 Nuclear Facilities to Radiological Facilities.

The Contractor shall develop any additional protocols (NDA, visual inspections, sampling and testing, statistical analysis, etc.) that will be used to demonstrate that the post treatment condition of the equipment and piping will meet completion thresholds for deposit/hold-up materials removal activities. These protocols need to include identification of specific data that will be collected, how it will be collected and how it will be used to assess post treatment conditions. The data collected will also be needed to support development of final waste acceptance criteria for the process equipment and piping. Collection of NDA or analytical data prior to initial treatment is not required. Identify/evaluate removal of unneeded CAAS Clusters once the deposit/holdup removal activities are completed. The evaluation should address serviceability through completion of future deactivation and decommissioning activities.

The Contractor shall complete deposit removal in building C-360, including but not limited to:

- a. removal of all deposits/hold-up to below levels needed to achieve incredibility of criticality and removal/shutdown of CAAS and the WAC for On-site CERCLA Waste Disposal Facility;
- b. transfer of any large cylinders generated as part of deposit/hold-up removal to the DUF₆ Contractor when the cylinder is full;
- c. submit all documentation necessary to support criticality incredibility, including authorization basis changes to downgrade the uranium processing facilities to radiological facilities and gain DOE approval; and
- d. deactivate/shutdown the CAAS in the uranium production facilities.

Table C.3.2 EM.PA.0040.A008.48.DR.06.01-1 DEPOSIT/HOLD-UP REMOVAL C-360	
Milestone	Date
Complete deposit/holdup removal in C-360	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.06.03 BYPASS PIPING AND TRAPPING EQUIPMENT C-360

For C-360, the Contractor shall complete deposit/holdup removal and additional hazard reduction/stabilization activities in all tie-lines connected to the C-360 facility. The Contractor shall include any and all additional UF6 piping/lines that have not been addressed by WBS EM.PA.0040.A008.48.DR.06.01.. The Contractor shall complete all deposit/hold-up removal in all chemical traps and associated treatment/support equipment that operated in an UF6 environment (cold boxes, surge drums, valves, pumps, etc.) containing uranium (use of the PCTC may not be warranted). The Contractor shall submit all documentation necessary to support criticality incredibility, including authorization basis changes to downgrade the uranium processing facilities to radiological facilities and gain DOE approval.

Table C.3.2 EM.PA.0040.A008.48.DR.06.03 -1 Bypass Piping and Trapping Equipment C-360	
Milestone	Date
Complete C-360 Bypass Piping and Trapping Equipment Disposition	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.06.04 EQUIPMENT REMOVAL C-360

The Contractor shall disposition any loose or spare equipment/materials containing fissile (e.g., deposit/hold-up) materials (use of the PCTCs may not be warranted) in C-360 in order to support the Contractor’s ability to deactivate the CAAS that provides coverage in these facilities. The Contractor shall dispose of any fissile equipment and not return the item after the fissile material has been removed, unless agreed to by DOE. Relocation to another on-site facility for storage is not authorized without DOE approval. The Contractor shall complete equipment removal in uranium process building C-360, including but not limited to:

- a. disposition of all loose fissile material and equipment (e.g. spare parts, uninstalled equipment, removed equipment);
- b. Any remaining equipment that contains fissile material precluding the building from achieving crit-incredible status; and
- c. transfer of any large cylinders generated as part of deposit/hold-up removal to the DUF₆ Contractor.

Table C.3.2 EM.PA.0040.A008.48.DR.06.04 -1 EQUIPMENT REMOVAL C-360	
Milestone	Date
Complete C-360 Equipment Removal	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.06.05 UTILITY/INSTRUMENTATION LINE ISOLATION C-360

Consistent with the THFA, all fire systems in C-360 shall be deactivated or configured in a manner that eliminates the need for freeze protection. Modification of facilities to eliminate the need to provide fire suppression is an acceptable approach. This requires the Contractor to submit all supporting documentation and authorization basis changes for deactivation of the fire suppression systems in these facilities. The Contractor shall isolate and air gap all of the utilities supporting/feeding C-360. The Contractor shall remove all temporary power/utilities service and remaining fire loading (including any resulting from the treatment process) in C-360.

Table C.3.2 EM.PA.0040.A008.48.DR.06.05 -1 UTILITY/INSTRUMENTATION LINE ISOLATION C-360	
Milestone	Date
Complete C-360 Utility/Instrumentation Line Isolation	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.07. LOOSE CONVERTORS

The Contractor shall complete the performance of the necessary stabilization and deactivation activities including, but not limited to, the following:

- a. Evaluate and determine the need for the continued safety requirements for monitoring and/or maintaining systems; and
- b. Perform deactivation and/or verification activities that support facilities stabilization, per DOE O 420.1C, Facility Safety and contractor safety basis documentation.

Additionally, the Contractor shall remove the fire loading from each of the facilities and ensure a THFA is developed and approved.

In support of the hazard reduction objectives of stabilization, the Contractor shall perform deposit/holdup removal activities to ensure loose convertors/compressors are in a safe configuration with minimal S&M activities required until decommissioning begins. The criteria for successful deposit/holdup removal is to disposition nuclear materials in loose convertors/compressors in a manner that presents a “crit-incredible” condition and that when the equipment is eventually dispositioned, that the resulting waste is compliant with applicable waste acceptance criteria for an on-site CERCLA Cell (e.g., the OSWDF).

The Contractor shall complete the remaining deposit/hold-up removal for loose convertors/compressors. The overall goal is to complete the uranium removal in the loose

convertors/compressors as quickly as possible to be able to eliminate criticality safety concerns in each of the loose convertors/compressors to reduce S&M costs. A secondary goal is to be able to avoid additional uranium treatment to meet Waste Acceptance Criteria for an on-site CERCLA Cell (if approved) during decontamination and decommissioning activities.

As part of deposit/hold-up removal activities, the Contractor shall maximize the use of the PCTC, gas sampling and analytical equipment (Test Buggies) and associated support equipment (pumps, temperature/pressure/flow instrumentation, etc.) during ICT activities of the PGDP process equipment and associated valves and piping. The Contractor shall remove the deposit and hold-up materials for loose convertors/compressors (use of the PCTC may not be warranted).

The Contractor shall collect the resulting/ regenerated UF₆ material, handling it as product (in large UF₆ cylinder) for transfer to the DUF₆.

In addition, the Contractor shall implement alternative treatment options (mechanical removal, cut and cap for off-site disposal, etc.) for applications that do not lend themselves to the use of the PCTC system, upon approval by DOE.

Completion Thresholds are as follows:

- Chemically treat all UF₆ equipment and piping with a mixture of ClF₃ and F₂ in order to remove residual uranium remaining in the UF₆ systems, unless an alternative treatment methodology is approved by DOE. The treatments will be done utilizing an end point based on the ClF₃ consumption and the UF₆ generation that will maximize the amount of uranium removed; AND
- Removal of uranium to allow the shutdown of the CAAS for the given areas treated; AND
- Removal of uranium to allow the process equipment and piping to be placed in an On-site Disposal Facility (e.g. On-Site CERCLA Cell) without further processing. Assume a target objective of half (50%) of the final Oak Ridge disposal facility waste (i.e., the EMWMF) acceptance criteria; AND
- Removal of uranium and re-categorization of the processing facilities from Category 2 Nuclear Facilities to Radiological Facilities.

The Contractor shall develop any additional protocols (NDA, visual inspections, sampling and testing, statistical analysis, etc.) that will be used to demonstrate that the post treatment condition of the equipment and piping will meet completion thresholds for deposit/hold-up materials removal activities. These protocols need to include identification of specific data that will be collected, how it will be collected and how it will be used to assess post treatment conditions. The data collected will also be needed to support development of final waste acceptance criteria for the process equipment and piping. Collection of NDA or analytical data prior to initial treatment is not required. Identify/evaluate removal of unneeded CAAS Clusters once the deposit/holdup removal activities are completed. The evaluation should

address serviceability through completion of future deactivation and decommissioning activities.

EM.PA.0040.A008.48.DR.07.01 DEPOSIT REMOVAL LOOSE CONVERTORS

The Contractor shall complete deposit removal in all loose convertors/compressors:

- a. removal of all deposits/hold-up to below levels needed to achieve incredibility of criticality and removal/shutdown of CAAS and the WAC for On-site CERCLA Waste Disposal Facility;
- b. transfer of any large cylinders generated as part of deposit/hold-up removal to the DUF₆ Contractor when the cylinder is full;
- c. submit all documentation necessary to support criticality incredibility, including authorization basis changes to downgrade the uranium processing facilities to radiological facilities and gain DOE approval; and
- d. deactivate/shutdown the CAAS in the uranium production facilities.

Table C.3.2 EM.PA.0040.A008.48.DR.07.01-1 DEPOSIT/HOLD-UP REMOVAL LOOSE CONVERTORS	
Milestone	Date
Complete deposit/holdup removal in Loose Convertors/Compressors	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.02.02 99Tc THERMAL TREATMENT C-333 & C-333A

Technetium-99 (99Tc) is a high-yield fission product. Some 99Tc accompanies uranium during reprocessing of spent reactor fuel and forms a gas during fluorination. Hence, recycled uranium is contaminated with 99Tc. In the cascade, the relatively light 99Tc moves toward the enrichment end. One of the concerns for the Paducah deactivation and decommissioning phase is the uncertainty of the actual levels of 99Tc which will be encountered in the disposition of the process equipment. Considerable amounts of UF₆ were produced at Paducah from reactor return uranium. Estimates have been made that approximately 550 kilograms of 99Tc were fed into the PGDP cascade as a contaminant in the UF₆ between 1953 and 1977 (Reference the Smith Report and the PGDP Mass Balance Report).

The typical trace levels of 99Tc compounds in the operating GDP's is below the minimum detectable limit for any of the process gas analyzers. Consequently, it cannot be definitively stated which technetium compounds are present in the operational cascades. The only gas phase technetium compound that has been reported to have been detected in the cascade gas stream is the pertechnetyl fluoride, TcO₃F, which was detected in the purge cascade during treatments to unplug the barrier. The technetium compounds that should be considered as potential cascade vapor phase compounds would consist of TcO₃F, HTcO₄, TcOF₄, and TcF₆. The oxides Tc₂O₇, and TcO₂, could also possibly exist as condensed species, along with the liquid or solid pertechnetic acid, HTcO₄, and the oxyfluoride TcO₂F₃. (Reference the Simmons Report)

Techneium hexafluoride (TcF₆), technetium oxide tetrafluoride (TcOF₄), technetium trioxide fluoride (TcO₃F), and technetium dioxide tri-fluoride (TcO₂F₃) have sufficient volatility to be in the cascade gas streams of an operating gaseous diffusion plant, but TcO₃F is the only compound of technetium to be identified. There are also non-volatile and less volatile compounds such as TcO₂ and HTcO₄, respectively. The formation of TcO₂ on steel surfaces is one effect which can retard the release of technetium. The volatile compound TcO₃F has been prepared from the non-volatile solid TcO₂ by use of fluorine at 300°F (degrees Fahrenheit). (Reference the Simmons Report)

It has been demonstrated at the three former gaseous diffusion plants that technetium can be removed from the process surfaces by heating the metals to sufficient temperatures (i.e., approximately 250 degrees Fahrenheit). The more volatile ⁹⁹Tc compounds have been removed to a certain extent from process equipment by heating the cell with the cell off stream and the compressors running using air to volatilize the technetium into the gas phase and trapping it using accepted methods standard to the diffusion process. However, due to the limitations of heating the process equipment while it was operating the heat was limited to approximately 250 degrees Fahrenheit and at this temperature complete removal of ⁹⁹Tc was not accomplished. The heated air is circulated through the converters by the compressors. The volatilized ⁹⁹Tc is then captured using cold traps, magnesium fluoride or activated alumina. This technique has been done with moderate success at the GDPs to unplug cells and to prepare cells for maintenance thus reducing worker exposure to ⁹⁹Tc. This method has not been used with a goal of meeting the sites disposal Waste Acceptance Criteria (WAC). The final WAC's for Paducah and Portsmouth Plants have not officially been determined, however, the Oak Ridge Environmental Management Waste Management Facility (EMWMF) ⁹⁹Tc WAC is 172 pCi/g. Analyses of barrier samples recently removed from converters indicate the concentration of ⁹⁹Tc is two orders of magnitude above the Oak Ridge WAC.

Since the ⁹⁹Tc is not completely removed during the cell treatments for uranium deposits removal, the ⁹⁹Tc will need to be thermally treated to remove it from the equipment in order to meet waste disposal limits. The ⁹⁹Tc limits are more restrictive than uranium due to the difference in mobility of the compounds of the two elements. The ultimate goal of gas phase decontamination is to remove the technetium to sufficient levels that the radioactive contamination is below the free release levels and/or meet the Paducah WAC once it is established. Graph and spreadsheets illustrate known Tc⁹⁹ concentrations by facility and unit is provided in Exhibit C-2.

EM.PA.0040.A008.48.DR.02.02.1 ⁹⁹Tc THERMAL TREATMENT C-333 & C-333A Units 1-6

The Contractor shall develop, select and implement an approach to thermally treat the converters in C-333 & C-333A Units 1-6 to reduce ⁹⁹Tc levels to below the to be established OSWDF WAC, if the OSWDF is the selected remedy. The Contractor shall ensure the implemented technique provides the most cost effective approach for the lifecycle. Upon completion of the ⁹⁹Tc thermal treatment activities, the Contractor shall remove any remaining instrument lines, piping, or equipment necessary to achieve crit-incredible that had not already been removed/treated, but was left in place to support ⁹⁹Tc thermal treatment.

The Contractor shall ensure the following requirements are met during the development, evaluation and implementation of the thermal treatment technique:

Minimize the potential for redepositing of ⁹⁹Tc in/on equipment/components during the process.

- a. Many plant utilities may have been shut down, air gapped and/or demobilized as a result of Deposit/Hold-up removal completion. The Contractor shall acquire necessary equipment (skid mounted or mobile systems to replace removed utilities), as necessary, to implement the thermal treatment technique and to capture the liberated ⁹⁹Tc.
- b. The C-310 Purge Cascade is shut down and unavailable for use. The Contractor may select to use the PCTCs used for Deposit/Hold-up removal activities as an approach to capturing the liberated ⁹⁹Tc.
- c. All waste generated during the treatment process shall be disposed during the option period of performance. Wastes shall not be transferred to a subsequent contractor.
- d. The dose/concentration of the resulting waste (e.g., Magnesium Fluoride and/or Alumina trapping media) shall not exceed limits that requires remote handling and shall not exceed limits that prohibit waste shipments or disposal to off-site disposal facilities.

Table C.3.2. EM.PA.0040.A008.48.DR.02.02.01-1 99Tc Treatment C-333 Units 1-6	
Milestone	Date
Complete ⁹⁹ Tc Treatment in C-333 Units 1-6	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.04.02 ⁹⁹Tc THERMAL TREATMENT C-335

Technetium-99 (⁹⁹Tc) is a high-yield fission product. Some ⁹⁹Tc accompanies uranium during reprocessing of spent reactor fuel and forms a gas during fluorination. Hence, recycled uranium is contaminated with ⁹⁹Tc. In the cascade, the relatively light ⁹⁹Tc moves toward the enrichment end. One of the concerns for the Paducah deactivation and decommissioning phase is the uncertainty of the actual levels of ⁹⁹Tc which will be encountered in the disposition of the process equipment. Considerable amounts of UF₆ were produced at Paducah from reactor return uranium. Estimates have been made that approximately 550 kilograms of ⁹⁹Tc were fed into the PGDP cascade as a contaminant in the UF₆ between 1953 and 1977 (Reference the Smith Report and the PGDP Mass Balance Report).

The typical trace levels of ⁹⁹Tc compounds in the operating GDP's is below the minimum detectable limit for any of the process gas analyzers. Consequently, it cannot be definitively stated which technetium compounds are present in the operational cascades. The only gas phase technetium compound that has been reported to have been detected in the cascade gas stream is the pertechnetyl fluoride, TcO₃F, which was detected in the purge cascade during treatments to unplug the barrier. The technetium compounds that should be considered as potential cascade vapor phase compounds would consist of TcO₃F, HTcO₄, TcOF₄, and TcF₆. The oxides Tc₂O₇, and TcO₂, could also possibly exist as condensed species, along

with the liquid or solid pertechnetetic acid, HTcO_4 , and the oxyfluoride TcO_2F_3 . (Reference the Simmons Report)

Technetium hexafluoride (TcF_6), technetium oxide tetrafluoride (TcOF_4), technetium trioxide fluoride (TcO_3F), and technetium dioxide tri-fluoride (TcO_2F_3) have sufficient volatility to be in the cascade gas streams of an operating gaseous diffusion plant, but TcO_3F is the only compound of technetium to be identified. There are also non-volatile and less volatile compounds such as TcO_2 and HTcO_4 , respectively. The formation of TcO_2 on steel surfaces is one effect which can retard the release of technetium. The volatile compound TcO_3F has been prepared from the non-volatile solid TcO_2 by use of fluorine at 300°F (degrees Fahrenheit). (Reference the Simmons Report)

It has been demonstrated at the three former gaseous diffusion plants that technetium can be removed from the process surfaces by heating the metals to sufficient temperatures (i.e., approximately 250 degrees Fahrenheit). The more volatile ^{99}Tc compounds have been removed to a certain extent from process equipment by heating the cell with the cell off stream and the compressors running using air to volatilize the technetium into the gas phase and trapping it using accepted methods standard to the diffusion process. However, due to the limitations of heating the process equipment while it was operating the heat was limited to approximately 250 degrees Fahrenheit and at this temperature complete removal of ^{99}Tc was not accomplished. The heated air is circulated through the converters by the compressors. The volatilized ^{99}Tc is then captured using cold traps, magnesium fluoride or activated alumina. This technique has been done with moderate success at the GDPs to unplug cells and to prepare cells for maintenance thus reducing worker exposure to ^{99}Tc . This method has not been used with a goal of meeting the sites disposal Waste Acceptance Criteria (WAC). The final WAC's for Paducah and Portsmouth Plants have not officially been determined, however, the Oak Ridge Environmental Management Waste Management Facility (EMWMF) ^{99}Tc WAC is 172 pCi/g. Analyses of barrier samples recently removed from converters indicate the concentration of ^{99}Tc is two orders of magnitude above the Oak Ridge WAC.

Since the ^{99}Tc is not completely removed during the cell treatments for uranium deposits removal, the ^{99}Tc will need to be thermally treated to remove it from the equipment in order to meet waste disposal limits. The ^{99}Tc limits are more restrictive than uranium due to the difference in mobility of the compounds of the two elements. The ultimate goal of gas phase decontamination is to remove the technetium to sufficient levels that the radioactive contamination is below the free release levels and/or meet the Paducah WAC once it is established. Graph and spreadsheets illustrate known Tc^{99} concentrations by facility and unit is provided in Exhibit C-2.

EM.PA.0040.A008.48.DR.04.02.1 ^{99}Tc THERMAL TREATMENT C-335 Units 1-4

The Contractor shall develop, select and implement an approach to thermally treat the converters in C-335 Units 1-4 to reduce ^{99}Tc levels to below the to be established OSWDF WAC, if the OSWDF is the selected remedy. The Contractor shall ensure the implemented

technique provides the most cost effective approach for the lifecycle. Upon completion of the ⁹⁹Tc thermal treatment activities, the Contractor shall remove any remaining instrument lines, piping, or equipment necessary to achieve crit-incredible that had not already been removed/treated, but was left in place to support ⁹⁹Tc thermal treatment.

The Contractor shall ensure the following requirements are met during the development, evaluation and implementation of the thermal treatment technique:

Minimize the potential for redepositing of ⁹⁹Tc in/on equipment/components during the process.

- a. Many plant utilities may have been shut down, air gapped and/or demobilized as a result of Deposit/Hold-up removal completion. The Contractor shall acquire necessary equipment (skid mounted or mobile systems to replace removed utilities), as necessary, to implement the thermal treatment technique and to capture the liberated ⁹⁹Tc.
- b. The C-310 Purge Cascade is shut down and unavailable for use. The Contractor may select to use the PCTCs used for Deposit/Hold-up removal activities as an approach to capturing the liberated ⁹⁹Tc.
- c. All waste generated during the treatment process shall be disposed during the option period of performance. Wastes shall not be transferred to a subsequent contractor.
- d. The dose/concentration of the resulting waste (e.g., Magnesium Fluoride and/or Alumina trapping media) shall not exceed limits that requires remote handling and shall not exceed limits that prohibit waste shipments or disposal to off-site disposal facilities.

Table C.3.3 EM.PA.0040.A008.48.DR.04.02.01 99Tc Treatment C-335 Units 1-4	
Milestone	Date
Complete ⁹⁹ Tc Treatment in C-335 Units 1-4	Consistent with Exercise of Option

EM.PA.0040.A008.48.DR.07.02 Tc99 LOOSE CONVERTORS

Technetium-99 (⁹⁹Tc) is a high-yield fission product. Some ⁹⁹Tc accompanies uranium during reprocessing of spent reactor fuel and forms a gas during fluorination. Hence, recycled uranium is contaminated with ⁹⁹Tc. In the cascade, the relatively light ⁹⁹Tc moves toward the enrichment end. One of the concerns for the Paducah deactivation and decommissioning phase is the uncertainty of the actual levels of ⁹⁹Tc which will be encountered in the disposition of the process equipment. Considerable amounts of UF₆ were produced at Paducah from reactor return uranium. Estimates have been made that approximately 550 kilograms of ⁹⁹Tc were fed into the PGDP cascade as a contaminant in the UF₆ between 1953 and 1977 (Reference the Smith Report and the PGDP Mass Balance Report).

The typical trace levels of ⁹⁹Tc compounds in the operating GDP's is below the minimum detectable limit for any of the process gas analyzers. Consequently, it cannot be definitively stated which technetium compounds are present in the operational cascades. The only gas phase technetium compound that has been reported to have been detected in the cascade gas

stream is the pertechnetyl fluoride, TcO_3F , which was detected in the purge cascade during treatments to unplug the barrier. The technetium compounds that should be considered as potential cascade vapor phase compounds would consist of TcO_3F , $HTcO_4$, $TcOF_4$, and TcF_6 . The oxides Tc_2O_7 , and TcO_2 , could also possibly exist as condensed species, along with the liquid or solid pertechnetic acid, $HTcO_4$, and the oxyfluoride TcO_2F_3 . (Reference the Simmons Report)

Technetium hexafluoride (TcF_6), technetium oxide tetrafluoride ($TcOF_4$), technetium trioxide fluoride (TcO_3F), and technetium dioxide tri-fluoride (TcO_2F_3) have sufficient volatility to be in the cascade gas streams of an operating gaseous diffusion plant, but TcO_3F is the only compound of technetium to be identified. There are also non-volatile and less volatile compounds such as TcO_2 and $HTcO_4$, respectively. The formation of TcO_2 on steel surfaces is one effect which can retard the release of technetium. The volatile compound TcO_3F has been prepared from the non-volatile solid TcO_2 by use of fluorine at 300°F (degrees Fahrenheit). (Reference the Simmons Report)

It has been demonstrated at the three former gaseous diffusion plants that technetium can be removed from the process surfaces by heating the metals to sufficient temperatures (i.e., approximately 250 degrees Fahrenheit). The more volatile ^{99}Tc compounds have been removed to a certain extent from process equipment by heating the cell with the cell off stream and the compressors running using air to volatilize the technetium into the gas phase and trapping it using accepted methods standard to the diffusion process. However, due to the limitations of heating the process equipment while it was operating the heat was limited to approximately 250 degrees Fahrenheit and at this temperature complete removal of ^{99}Tc was not accomplished. The heated air is circulated through the converters by the compressors. The volatilized ^{99}Tc is then captured using cold traps, magnesium fluoride or activated alumina. This technique has been done with moderate success at the GDPs to unplug cells and to prepare cells for maintenance thus reducing worker exposure to ^{99}Tc . This method has not been used with a goal of meeting the to be established OSWDF WAC, if the OSWDF is the selected remedy. The final WAC's for Paducah and Portsmouth Plants have not officially been determined, however, the Oak Ridge Environmental Management Waste Management Facility (EMWMF) ^{99}Tc WAC is 172 pCi/g. Analyses of barrier samples recently removed from converters indicate the concentration of ^{99}Tc is two orders of magnitude above the Oak Ridge EMWMF WAC.

Since the ^{99}Tc is not completely removed during the cell treatments for uranium deposits removal, the ^{99}Tc will need to be thermally treated to remove it from the equipment in order to meet waste disposal limits. The ^{99}Tc limits are more restrictive than uranium due to the difference in mobility of the compounds of the two elements. The ultimate goal of gas phase decontamination is to remove the technetium to sufficient levels that the radioactive contamination is below the free release levels and/or meet the to be established OSWDF WAC, if the OSWDF is the selected remedy. The following graph and spreadsheets illustrate known Tc^{99} concentrations by facility and unit.

The Contractor shall develop, select and implement an approach to thermally treat loose convertors ^{99}Tc levels to below the to be established OSWDF WAC, if the OSWDF is the

selected remedy. The Contractor shall ensure the implemented technique provides the most cost effective approach for the lifecycle. Upon completion of the ^{99}Tc thermal treatment activities, the Contractor shall remove any remaining instrument lines, piping, or equipment necessary to achieve criticality that had not already been removed/treated, but was left in place to support ^{99}Tc thermal treatment.

The Contractor shall ensure the following requirements are met during the development, evaluation and implementation of the thermal treatment technique:

Minimize the potential for redepositing of ^{99}Tc in/on equipment/components during the process.

- a. Many plant utilities may have been shut down, air gapped and/or demobilized as a result of Deposit/Hold-up removal completion. The Contractor shall acquire necessary equipment (skid mounted or mobile systems to replace removed utilities), as necessary, to implement the thermal treatment technique and to capture the liberated ^{99}Tc .
- b. The C-310 Purge Cascade is shut down and unavailable for use. The Contractor may select to use the PCTCs used for Deposit/Hold-up removal activities as an approach to capturing the liberated ^{99}Tc .
- c. All waste generated during the treatment process shall be disposed during the option period of performance. Wastes shall not be transferred to a subsequent contractor.
- d. The dose/concentration of the resulting waste (e.g., Magnesium Fluoride and/or Alumina trapping media) shall not exceed limits that requires remote handling and shall not exceed limits that prohibit waste shipments or disposal to off-site disposal facilities.

The Contractor shall develop, select and implement an approach to thermally treat loose converters to reduce ^{99}Tc levels to below the to be established OSWDF WAC, if the OSWDF is the selected remedy. The Contractor shall ensure the implemented technique provides the most cost effective approach for the lifecycle. Upon completion of the ^{99}Tc thermal treatment activities, the Contractor shall remove any remaining instrument lines, piping, or equipment necessary to achieve criticality that had not already been removed/treated, but was left in place to support ^{99}Tc thermal treatment.

The Contractor shall ensure the following requirements are met during the development, evaluation and implementation of the thermal treatment technique:

Minimize the potential for redepositing of ^{99}Tc in/on equipment/components during the process.

- a. Many plant utilities may have been shut down, air gapped and/or demobilized as a result of Deposit/Hold-up removal completion. The Contractor shall acquire necessary equipment (skid mounted or mobile systems to replace removed utilities), as necessary, to implement the thermal treatment technique and to capture the liberated ^{99}Tc .
- b. The C-310 Purge Cascade is shut down and unavailable for use. The Contractor may select to use the PCTCs used for Deposit/Hold-up removal activities as an approach to capturing the liberated ^{99}Tc .

- c. All waste generated during the treatment process shall be disposed during the option period of performance. Wastes shall not be transferred to a subsequent contractor.
- d. The dose/concentration of the resulting waste (e.g., Magnesium Fluoride and/or Alumina trapping media) shall not exceed limits that requires remote handling and shall not exceed limits that prohibit waste shipments or disposal to off-site disposal facilities.

Table C.3.3 EM.PA.0040.A008.48.DR.07.02-1 99Tc Treatment Loose Convertors	
Milestone	Date
Complete 99Tc Treatment in Loose Convertors	Consistent with Exercise of Option

DRAFT

C.4.1 IDIQ

EM.PA.0040.A009.04.DR.01 C-400 DEACTIVATION & DEMOLITION

Should the following PWS elements may be required; the Contracting Office will issue a Task Order Request.

The Contractor shall complete full de-inventorying and deactivation of the C-400 Cleaning Facility removing all hazardous equipment and materials, all fissile materials and equipment, and other items necessary to leave the facility in a demolition-ready state. These activities include, but are not limited to, completion of the following:

- a. Clean-out or removal of all tanks, pits, piping, etc., including physical verification that no liquids or solids remain in the items above contamination levels or levels that would require the materials to be managed as hazardous;
- b. Removal of facility equipment, personal property/fixtures, tanks, drums, asbestos, LLW and PCB contaminated items leaving only what would normally be left behind for building demolition;
- c. Air gapping all utilities services to the facility; and
- d. Characterization and disposal of all generated wastes.

The Contractor shall complete the demolition of the C-400 Facility. This includes all above ground structures associated with the C-400 Facility and support systems in direct contact with the C-400 Facility such as: HVAC systems, material and equipment supply lines to and from the C-400 Facility, and other structures and equipment to ensure the complete removal of C-400 from other surrounding facilities.

Table C.3.4.EM.PA.0040.A005.10.DR.01-1	
C-400 BUILDING DEACTIVATION & DEMOLITION	
Milestones/Schedule	
Milestone	Date
Complete C-400 Deactivation & Demolition	Consistent with Exercise of Task Order

Exhibit No. C-1, C-337/C-337A Deposit & Hold-up Removal

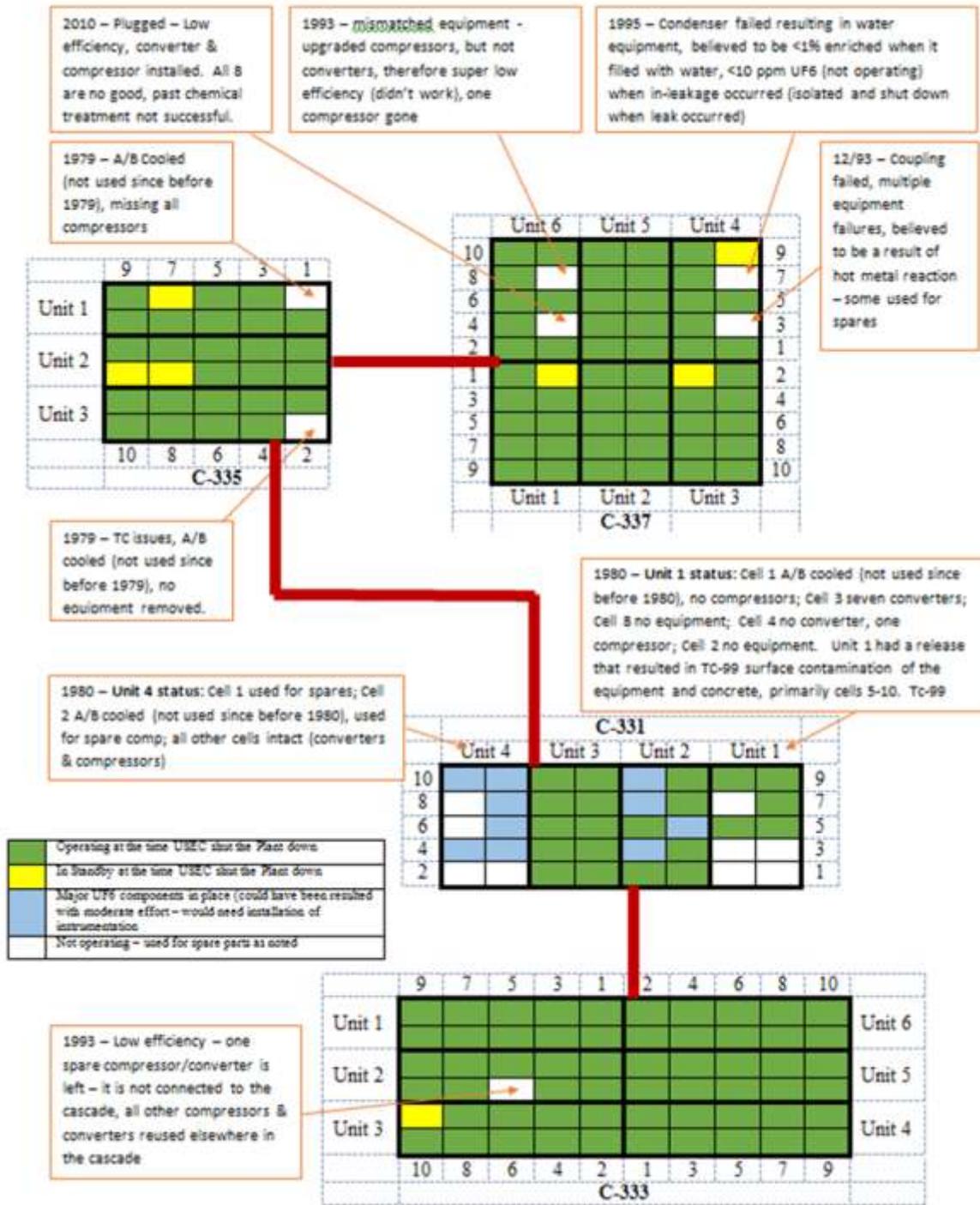


Exhibit No. C-2, Technetium Data

1980 Technetium Data

Location	Tc-99 (ppb)	Tc-99 (pCi/g)	Calc Tc-99 (pCi/g)	Unit Avg. Tc-99 (pCi/g)
C-331-2.2	900	15,284	15,300	15,300
C-333-2.3	819	13,908	13,923	13,923
C-333-4.3.2	872		14,824	
C-333-4.7.7	1000		17,000	15,912
C-333-6.4.1	3,890		66,130	66,130
C-331-4.9	5780		98,260	98,260
C-335-1.1	1,370	23,286	23,290	23,290
C-335-2.1	1,500		25,500	
C-335-2.8	1,600		27,200	26,350
C-337-1.5	1,480		25,160	
C-337-1.7	977	4,398	16,609	32,368
C-337-1.9	4,900		83,300	
C-337-1.10.3	259		4,403	
C-337-2.3	2,400		40,800	
C-337-2.5.1	1,350	22,025	22,950	23,868
C-337-2.7.2	1,200	20,378	20,400	
C-337-2.7	1,460	24,794	24,820	
C-337-2.2	610	10,359	10,370	
C-337-3.8	2,200		37,400	
C-337-3.6	6,750		114,750	76,075
C-337-4.10	15,100	256,427	256,700	
C-337-4.6.1	3,700		62,900	125,460
C-337-4.4	3,720		63,240	
C-337-4.2	7,000		119,000	
C-337-5.1	4,150		70,550	70,550
C-337-6.7	19,270		327,590	
C-337-6.10	18,340	436,437	311,780	422,932
C-337-6.8.8	25,700		436,900	
C-337-6.8	26,660	452,740	453,220	
C-337-6.6	25,200		428,400	
C-337-6.2	34,100		579,700	
C-335-4.6	47,000		799,000	799,000
C-310 average	51,000		867,000	867,000

2013/2014 Technetium Data

Tc-99 2013/2014 Barrier Sample Results From C-310, C-331, C-335, and C-337					
Customer Sample ID	Paducah LIMS #	Location	Concentration Tc-99 (pCi/g)	Unit Avg - Tc-99 pCi/g Barrier	Unit Avg - Tc-99 pCi/g Converter
C-00758	C14181010001	C-331 Unit 4 Cell 3	6,160		
13041501	C13254002001	C-331 Unit 4 Cell 6	7,600		
C-00662	C14147005001	C-331 Unit 4 Cell 6	1,520		
C-00575	C14181011001	C-331 Unit 4 Cell 9	17,400	8,170	1,258
C-713	C14147004001	C-335 Unit 1 Cell 6	117,000	117,000	18,010
C-15207	C14147003001	C-337 Unit 1 Cell 6	1,930	1,930	351
C-15088	C14147007001	C-337 Unit 3 Cell 1	3,930	3,930	715
C-15485	C14147006001	C-337 Unit 5 Cell 3	2,790	2,790	507
13020401	C13035028001	C-337 Unit 6 Cell 3 Sample 1	2,140		
13020402	C13035030001	C-337 Unit 6 Cell 3 Sample 2	3,890	3,015	548
C-20096	C14147001001	C-335 Unit 4 Cell 1	10,200		
C-759	C14147002001	C-335 Unit 4 Cell 7	5,040	7,620	1,173
SP-1307	C12311014001	C-310 Cell 7 Sample 1	55,400		
SP-1308	C12311014002	C-310 Cell 7 Sample 2	191,000		
SP-1309	C12311014003	C-310 Cell 7 Sample 3	175,000		
SP-1310	C12311014004	C-310 Cell 7 Sample 4	321,000	185,600	27,172



