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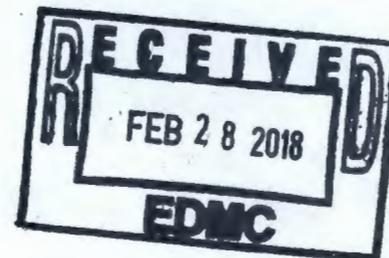
OFFICE OF RIVER PROTECTION

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FEB 27 2018

18-ORP-0010

Ms. Alexandra K. Smith, Program Manager
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Department of Ecology
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Ms. Smith:

FEBRUARY 13, 2018 MEETING FOLLOW-UP ACTIONS

Following up on our February 13, 2018 meeting, I wanted to thank you for accepting my request to delay this month's Consent Decree-required reporting (i.e., both the monthly and quarterly reports) until March 9, 2018. The U. S. Department of Energy (DOE), Office of River Protection (ORP) takes its reporting obligations very seriously, and the additional time will allow us to provide the Washington State Department of Ecology (Ecology) with full and accurate information. ORP values the cooperative relationship that we have developed with you and your staff, and I view the written reports as a key component in maintaining that relationship.

Based on our discussions, as well as the correspondence between Principal Deputy Assistant Secretary for Environmental Management James Owendoff and Ecology Director Maia Bellon (including Ms. Bellon's January 2, 2018 letter to Mr. Owendoff), ORP understands that Ecology remains interested in DOE's ongoing evaluation of continued preservation of the High-Level Waste (HLW) and Pretreatment (PT) facilities. ORP will continue to make sure that our reporting is as up-to-date as possible on that issue. In the meantime, I am attaching a recently issued contractor white paper regarding continued preservation and maintenance of the HLW and PT facilities (Attachment 1). In addition, as we have discussed, ORP expects that the U.S. Army Corps of Engineers will soon begin an analysis of potential impacts that continued preservation of the HLW and PT facilities could have on DOE's ability to meet certain Amended Consent Decree milestones. ORP will share that analysis with you once it is complete. For reference, I am attaching a copy of the underlying interagency agreement and statement of work (Attachment 2). I would be happy to discuss with you both the contractor white paper and the Army Corps' statement of work at our meeting on March 9, 2018.

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23

Ms. Alexandra K. Smith
18-ORP-0010

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FEB 27 2018

As we also discussed, ORP will convene workshops in March to help us evaluate likely challenges associated with design completion and rebaselining for HLW and PT. The HLW and PT workshops will allow ORP to take a focused look at the current states of those facilities and at issues associated with the potential for continued preservation and maintenance, and also to identify the most logical activities that could occur in the near-term if additional funding is made available. ORP will also be looking at the strategy to retain technical competency to support the progression of design activities for HLW and PT in the future. I will brief you on the workshops when we meet regarding the quarterly report on March 9, 2018. I will also brief you on information that ORP expects to receive from contractors in early March related to Tank-Side Cesium Removal and the Low Activity Waste Pretreatment System. Although, I do not expect that the upcoming quarterly report will include information on these topics (given the period covered by the report), I will nonetheless provide as much information as possible when we meet. Future reports will describe developments on those topics in more detail as appropriate.

As always, please do not hesitate to contact me at (509) 372-2315 if you have any questions or concerns.



Brian T. Vance
Manager

ORP:BTV

Attachments: (2)

cc w/attachs:

R.P. Detwiler, RL

S.D. Stubblebine, RL

Administrative Record

Environmental Portal

**Attachment 1
18-ORP-0010
(11 Pages Excluding Cover Sheet)**

**High-Level Waste (HLW) Facility and Pretreatment (PT) Facility :
Evaluation of Potential Continued Preservation and Maintenance, and
Restart of Facilities**

Hanford Tank Waste Treatment and Immobilization Plant (WTP)



High-Level Waste (HLW) Facility and Pretreatment (PT) Facility: Evaluation of Potential Continued Preservation and Maintenance, and Restart of Facilities

High-Level Waste (HLW) Facility



Pretreatment (PT) Facility



Executive Summary

In 2012, the US Department of Energy (DOE) identified certain technical decisions largely associated with the Pretreatment (PT) Facility, and to a lesser extent with the High-Level Waste (HLW) Facility. DOE had effectively suspended work on the PT Facility and certain portions of the HLW Facility in November 2011 due to funding limitations and priorities, and pending completion of technical decisions. Work continued on the Low-Activity Waste (LAW) Facility, and Bechtel National, Inc. (BNI) and DOE commenced efforts to enable the direct feed (DF) of waste to that facility consistent with meeting construction and operational milestones established by the court in the case of *State of Washington v. U.S. Department of Energy*, [2:08-CV-05085-RMP] (Amended Consent Decree). In December 2016, DOE approved the WTP Project Performance Baseline Change Proposal for direct feed of low-activity waste (DFLAW) to establish a formal baseline to complete the DFLAW mission.

As part of its evaluation process, DOE requested that BNI assess whether proposed continued preservation and maintenance (CPM), for a period of an additional 3 to 5 years, could be implemented without adversely impacting the Department's ability to complete the HLW and PT Facilities by the milestones set forth in the Amended Consent Decree.

Equipment, components, and material for the HLW and PT Facilities are currently maintained through a suite of maintenance programs and processes covering various elements of facility completion (e.g., control of government property, periodic maintenance and surveillance, asset preservation maintenance, and construction equipment maintenance). The suite of maintenance programs and processes were designed for active construction activity, and implemented under the assumption that the facilities would resume construction in the near term.

DOE is evaluating whether the implementation of a CPM program for the HLW and PT Facilities would best ensure that the limited available funding and resources are efficiently and effectively used to increase confidence in the successful completion of the DFLAW approach. To understand the potential impact of implementing the proposed CPM on the HLW and PT Facilities, BNI consulted subject matter experts (SME) of several nuclear facilities that experienced a period of relative inactivity followed by successful restart and completion. Based on recommendations and lessons learned from the SMEs, BNI has developed a CPM Program. The objective of the CPM Program is to ensure the preservation and maintenance of the facilities, and associated equipment, components, and material to facilitate successful restart of construction and eventual operational activities of the HLW and PT Facilities.

The SMEs also identified programmatic lessons learned from the restart of the other facilities including the value of 1) robust property management; 2) freezing design requirements; 3) document management; 4) configuration management; and 5) the importance of sub-tier suppliers in refurbishing and recertifying equipment and components.

The CPM Program and implementation of lessons learned would facilitate the restart of the HLW and PT Facilities by minimizing the need for rework or refurbishment when construction resumes. In addition to CPM, WTP core competencies in knowledge and facility familiarity could be maintained to enable an efficient and effective restart. To support this objective, a core team will be identified that could support execution of CPM activities and limited engineering, procurement, and construction activities, as resources permit.

Once the decision is made to restart, and adequate funding is made available, additional personnel would be mobilized to become familiar with the state of the facilities and complete work that may have progressed prior to restart. Efforts would begin to complete the design of the facilities, followed by the award of remaining procurements and refurbishment or replacement of previously procured equipment and components. As design matures and equipment, components, and bulk material become available, physical construction of the

facilities would resume. As process and utility system installations are completed, the facilities would transition from construction to startup, and then to commissioning to initiate waste treatment operations.

If DOE were to proceed with implementing the proposed CPM, several elements would be critical to enhancing restart activities, and support meeting the Amended Consent Decree milestones for the HLW and PT Facilities. The HLW Facility has a matured design and a recently updated preliminary documented safety analysis (PDSA) has been approved. The technical decisions associated with the PT Facility are in the process of being completed in calendar year 2018. Mature design, completion of remaining technical decisions, and an approved PDSA for the facilities supports freezing design requirements to enhance restart and completion of the HLW and PT Facilities. The overall execution strategy of the facilities will be evaluated and optimized based primarily on resource availability (i.e., adequate funding), as well as design decisions and operating interfaces to achieve success.

This report summarizes the state of the HLW and PT Facilities, lessons learned from other nuclear facilities, the program to optimize preservation and maintenance of the facilities, and the strategy and elements necessary to increase the probability of a successful restart.

Background

The WTP includes three primary processing facilities:

- The Pretreatment (PT) Facility, which would separate the waste into its low-activity waste (LAW) and high-level waste (HLW) fractions
- The HLW Facility, which would vitrify the high-level waste
- The LAW Facility, which would vitrify the low-activity waste

The WTP also includes the Analytical Laboratory (Lab), and supporting facilities referred to as the Balance of Facilities (BOF).

In December 2016, the WTP Project schedule and sequence of activities was modified to focus on completion of the LAW Facility with direct feed from the Hanford Tank Farms to the LAW Facility, referred to as the direct feed of low-activity waste (DFLAW) facility configuration. In addition, the subsequent completion of the HLW and PT Facilities at a later date is consistent with the milestones in the Amended Consent Decree. The modified strategy projected initiation of the DFLAW approach in December 2021 and included prioritizing the work scope of the LAW Facility and supporting BOF and Lab capability to complete hot commissioning of DFLAW, and continuing limited engineering and construction in support of the HLW and PT Facilities. However, because of the prioritization of resources to support the DFLAW, the HLW and PT Facilities may be placed in a CPM state for a period of 3 to 5 years.

Because of the proposed CPM period, BNI reached out to SMEs from other nuclear facilities that have experienced similar or longer extended periods of subdued activity followed by resumption and then completion. The SMEs were contacted to understand lessons learned and what could be done proactively for the HLW and PT Facilities to implement effective preservation and maintenance during the CPM period.

Comparable Projects and Lessons Learned

The following projects were completed over the past three decades, and achieved successful operations after a period of inactivity:

- **Tennessee Valley Authority - Watts Bar Nuclear Units 1 and 2:** Construction on both Unit 1 and Unit 2 stopped in 1985. At that time, Unit 2 was considered 80% complete. Construction on Unit 1 resumed shortly after in 1987 and it went operational in 1996. Approval to complete Unit 2 was provided in 2007 and it went operational in 2016.

Although a scope-specific maintenance program was initially established for Unit 2, it was abandoned several years before construction resumed, which contributed to degradation, obsolescence, and loss of configuration management.

- **Tennessee Valley Authority - Browns Ferry Nuclear Units 1, 2, and 3:** The three Browns Ferry Units had completed design, construction, startup, and began commercial operation in 1974 (Unit 1), 1975 (Unit 2), and 1977 (Unit 3). In 1985, all three units were taken offline for operational and management issues. Unit 2 was restarted in 1991, Unit 3 restarted in 1995, and Unit 1 restarted in 2007. Unlike Watts Bar Nuclear Unit 2, the facilities established and maintained a long-term preservation and maintenance program, providing for a more positive and efficient restart process.
- **Device Assembly Facility - Nevada Test Site:** Bechtel assumed management and operations of the Nevada Test Site (now known as the Nevada National Security Site) in 1995, the scope of which included completion of the Device Assembly Facility (DAF). At the time, the DAF had been in a state of construction for a period longer than 12 years. When Bechtel assumed control, complete documentation of work performed and to-go scope were not available and configuration control had to be established. The DAF was successfully completed and turned over to operations in 1999.

Bechtel National, Inc. (BNI) collaborated with SMEs from the abovementioned projects, which included the former Project Director of the Watts Bar Completion Project (2011 - 2016), who was previously a manager at the Browns Ferry Unit 1 Restart Project (2001 - 2004) and at the Nevada Test Site (1995 - 1999). BNI also collaborated with the Bechtel Global Discipline Chief for Materials Engineering Technology who had experience from Browns Ferry, Watts Bar, and several nuclear power plant projects. Based on walk downs of the HLW and PT Facilities by some SMEs and virtual conferences with the SMEs, valuable insights were identified that are applicable to a proposed CPM Program, and restart of the HLW and PT Facilities. The SMEs were paired with representatives of WTP Field Engineering and Plant Maintenance, the Program Manager of the CPM Program, and Project Managers of the HLW and PT Facilities to identify lessons learned and key characteristics that compare or differentiate the HLW and PT Facilities from other facilities and projects. Lessons learned identified through the effort are summarized below.

Lessons Learned for Success of CPM and Restart of HLW and PT Facilities

Success of CPM

- **Sustained Preservation:** Because the preservation maintenance program at Watts Bar Unit 2 was suspended, equipment and components degraded and had to be refurbished or replaced, and large sections of completed work had to be removed and reworked. In contrast, the restart efforts at Browns Ferry Units 1, 2, and 3 were much more successful because the preservation maintenance program was sustained, and therefore the units required less refurbishment and rework at the time they were restarted.
- **Identify and Mitigate Conditions:** The comparable projects were mostly enclosed, which provided protection from weather conditions. Despite the physical protection, and efforts to identify and replace or refurbish degraded items, startup activities at Watts Bar still determined approximately 15% of items required refurbishment or replacement after construction testing (identified as "hidden" defects). A robust CPM program is necessary to mitigate the risk of such degradation. The SMEs identified the HLW and PT Facilities are substantially more exposed, which necessitates improvements to protection from environmental elements for the period.

Successful Restart

- **Property Management:** During the period of inactivity, components and material intended for Watts Bar Unit 2 were used for the benefit of the adjacent Watts Bar Unit 1 and a sister nuclear plant. The utilization was not controlled or tracked, and led to equipment and component deficiencies when activity restarted. Such utilization activities contributed to a "reduction" of approximately 20% complete (Unit 2 was estimated to be 80% complete when activities stopped, but estimated to be 60% complete when activities restarted).
- **Freezing Design Requirements:** For Watts Bar, the US Nuclear Regulatory Commission agreed to license Unit 2 based on the same code of record under which the project started (as opposed to being licensed under new or revised requirements). This mitigated significant design and construction rework.
- **Document Management:** Both Watts Bar Unit 2 and the Device Assembly Facility experienced conditions wherein inspection documents were either not properly maintained or could not be located. Because such documentation is required for commodities such as concrete, steel, pipe, and vessels, a substantial effort, resulting in increased cost and schedule delays, was experienced from having to inspect and requalify completed work.
- **Configuration Management:** When the period of inactivity started at Watts Bar, efforts were not made to close or organize design documents and procurements. As-built physical conditions were not well documented either. Because of these conditions, approximately 700 engineers had to review and organize in-process design documents; walk down the partially-completed plant to determine the level of completion; and identify as-built conditions and changes that were not identified in the design.
- **Supplier Input:** At Watts Bar Unit 2, an unexpected volume of equipment and components were sent to suppliers for refurbishment and recertification because of degradation and age, when activities resumed to meet design and operability requirements. Such activities contributed to overall cost and schedule delays.
- **Interfaces:** The SMEs identified that the HLW and PT Facilities will likely encounter challenges when they restart adjacent to a partially operating WTP Plant (due to DFLAW being operational by that time). It is imperative to prioritize the identification of potential interface deficiencies to incorporate modifications into design, and account for construction rework to incorporate necessary changes.

Lessons learned were considered as part of the preparation of a WTP CPM Program.

Continued Preservation and Maintenance Program

The WTP Project has a suite of maintenance programs and processes (e.g., control of government property, periodic maintenance and surveillance, asset preservation maintenance, and construction equipment maintenance) that are based on execution of the original construction completion strategy, as well as a supplemental PT Facility layup plan to guide construction activities. The actions required by the programs and processes generally provide short-term protection for equipment, components, and material during active construction, but that protection would normally be curtailed as the HLW and PT Facilities near construction completion and transfer to start-up and commissioning phases. For example, temporary structures designed to mitigate water intrusion from rain and snow are sufficient during active construction activities, but are not well suited for long-term exposure to inclement weather.

Therefore, a CPM program has been developed and proposed by BNI, and is ready to be implemented subject to the availability of adequate resources.

Key Program Features

The CPM Program addresses the following:

- **Sustained Preservation:** Equipment, components, and material will be evaluated, and a determination made if they will be useable or operable after extended storage, with

consideration given to potential deterioration or obsolescence. The evaluation will consider if alternative strategies such as repurposing or dispositioning as excess government property would provide better value than ongoing preservation and maintenance. To support the CPM Program, a layup plan would be expanded from the PT Facility to address the HLW Facility.

- **Changes to Storage Facilities and Laydown Areas:** Warehouses, laydown areas, and staging areas will require evaluations with respect to lease durations, weather and environmental exposure, storage enhancements, and material reconfiguration. Through such evaluations, options may be identified to relocate uninstalled equipment, components, and material because of expiring leases or better value storage options.
- **Temporary Facility Modifications:** Additional physical barriers may be required to protect installed equipment, components, and material from environmental elements (e.g., wind, dust, rain, and snow intrusion). For example, the PT Facility curtailed construction activities before the HLW Facility, and is expected to resume such activities after the HLW Facility. Without a fully completed roof, the PT Facility is subject to a greater risk of degradation because of the size of the exposed area and duration of exposure. The HLW Facility also has a partially completed roof. Completion of temporary roof covers for the facilities will improve protection to installed equipment, components, and material, and the effectiveness of CPM Program actions.
- **Identify and Mitigate Conditions:** Due to the duration of the CPM period, physical items that are not typically protected during construction will be evaluated for additional protective measures. For example, components embedded in concrete, structural steel, piping, heating ventilation and air-conditioning (HVAC) and ductwork, electrical components, and wall and floor coatings will be exposed to inclement weather due to continued curtailment of construction activities. Actions would be taken in accordance with the detailed facility layup plan (e.g., covering anchor bolts and embeds, applying caps to piping, applying preservative to mechanical rebar fasteners). A broad variety of actions would be implemented to reduce the impact of degradation because equipment, components, and material are in various stages of completion across the HLW and PT Facilities (e.g., in inventory, staged at the construction site, installed). Implementation of CPM Program activities would mitigate the potential risk of "hidden" defects during restart and completion of the facilities.
- **Property Management:** Equipment, components, and material removed from the facilities through the CPM Program would be systematically identified, accounted for, and tracked to form the basis of what needs to be reprocurd or replaced as part of the restart and completion effort.

If implemented, the CPM Program would require walk downs using enhanced technical evaluation criteria, aimed at providing real-time direction on corrective actions to perform when potential degradation due to long-term storage is discovered. The steps to implementing the CPM Program are outlined as follows:

- 1) Project resources are allocated, and direction provided to implement the CPM Program with defined scope commensurate with resources;
- 2) Assign division of responsibility for the CPM Program among accountable groups;
- 3) Establish technical evaluation criteria to evaluate and monitor the degradation of equipment, components, and materials in staging/storage areas and in partially constructed facilities;
- 4) Perform a walk down and evaluate equipment, component, and materials to determine the baseline conditions;
- 5) Evaluate the population of equipment, components, and material related to the HLW and PT Facilities through a structured and consistent decision model to determine whether to repurpose, disposition, or maintain items;

- 6) Implement improvements to laydown and storage areas and the HLW and PT Facilities to enhance the ability to effectively manage the facilities and areas over the period; and
- 7) Establish a strategy to address suppliers with custody of government assets

Potential Preservation Maintenance Enhancements

To support a successful restart, the proposed CPM Program should be updated, and resources allocated, to address adverse conditions if they are recognized. For example, the SMEs from Watts Bar and Browns Ferry identified the success of a Microbial Induced Corrosion program that was instrumental in mitigating risk of damage to stainless-steel piping and plates for those projects. Enhancements, as they are identified, would be evaluated on a case-by-case basis. Implementation of enhancements may require additional resources and concurrence from DOE.

Retention of WTP Core Competencies

Beyond the preservation of the physical elements, and the maintenance of the existing configuration, an important component to successfully restarting the HLW and PT Facilities is to ensure that WTP core competencies in technical knowledge and familiarity of the HLW and PT Facilities are maintained to support an efficient restart. Such competencies enhance the process of organizing and sustaining in-process design and construction documents, and resuming engineering, procurement, and construction activities.

To support retention of core competencies, BNI could identify and retain a core team within the WTP Project workforce to support execution of CPM activities, and perform limited engineering, procurement, and construction activities that are outlined later in the report. The core team could include engineering SMEs in material engineering, nuclear safety, process engineering, pulse jet mixing, software, system design, and vessels, and support from procurement and construction.

As the engineering, construction, and startup phases of the DFLAW are completed over the following year, the WTP Project will be in an ideal position to leverage demobilizing employees with knowledge and familiarity of the HLW and PT Facilities. Additional resources, from outside of the WTP Project, may also be ramped up for the benefit of the HLW and PT Facilities to draw on the experience and knowledge of existing employees who transition from DFLAW. This supports knowledge transfer and retention, despite attrition that may be experienced during the CPM period, and develops the workforce in preparation for restart.

Program Cost

Since 2012, there has been a pause in certain engineering, procurement, and construction activities for the HLW and PT Facilities due to funding limitations and priorities, and pending completion of technical decisions. Preservation, maintenance, and storage expenses incurred by suspended procurements and current maintenance activities (under the suite of maintenance programs and processes) cost approximately \$11 million annually. The WTP Project is preparing a cost estimate for CPM Program implementation, using standard WTP Project change control processes. This estimate will include costs in the following categories:

- Asset management
- Capital and physical protection
- Storage and configuration management
- Programmatic support including quality assurance and document management

The cost estimate will also cover the labor, materials, extension of leases for storage facilities, installation of proposed roof covers, and replacement of aging preservation support and handling equipment.

The CPM Program would be designed to evaluate and disposition equipment, components, and material (including obsolescence issues), which may support repurposing such items. The process of supporting and implementing these decisions will be included in the estimated cost of the CPM Program, but the cost of replacing items upon resumption of the HLW and PT Facilities will be accounted for in future cost estimates when contemporary technologies and necessary interfaces can be evaluated in detail.

The cost estimate will have the necessary capital and workforce costs to achieve this adequate condition for continued preservation and maintenance, as well as the increased annual costs to sustain this status until the restart and completion of HLW and PT Facilities.

Restart and Completion of HLW and PT Facilities

The HLW and PT Facilities are in different stages of design, procurement, and construction, with the HLW Facility progressed further than the PT Facility. However, the general process of restarting the facilities is similar because both facilities will require an initial assessment and ramp-up of resources, followed by coordinated completion of design, procurement, construction, and commissioning activities.

Preservation and maintenance activities implemented prior to the CPM period, under the current suite of maintenance programs and processes, will continue through completion of each facility, until equipment and systems are turned over to Operations for continued care, custody, and control (at that point the plant operations maintenance program becomes effective). The ongoing preservation and maintenance of equipment, components, and materials, using a CPM Program, increases the probability of successfully restarting and completing the facilities.

A description of the completion strategy, including the engineering, procurement, construction, startup, and commissioning phases, is provided as follows:

- **Decision to Restart Construction of HLW and PT Facilities:** Direction from DOE to resume the HLW and PT Facilities, at least 6 to 12 months prior to the anticipated restart date, will ensure BNI is provided sufficient opportunity to plan and coordinate resources in preparation for the initial ramp-up of staff and resumption activity.
- **Initial Ramp-Up:** A ramp-up of resources will be necessary to complete an initial assessment of design, procurement, and construction that may have progressed prior to restart, and comparison to new or revised design, permitting, and operating plant interface requirements. The assessment will also support detailed planning and coordination of work necessary to support design completion, and prepare for resumption of procurement, construction, startup, and commissioning activities. The assessment will serve to familiarize staff responsible for completing the facilities.
- **Engineering:** Remobilized engineering activities will complete design and incorporate changes (as necessary) to meet any new or revised requirements and address operating plant interfaces. Design completion will be sequenced based on construction work planning areas, which will be prioritized based on completion of system turnover to commissioning. As the HLW Facility design has progressed further than the PT Facility design, it will be completed earlier.

As procurement and construction complete their respective scope, Engineering will support execution of functional testing (conducted by suppliers and construction) to complete design verification documents. These documents support a determination that systems are designed and procured to perform required functions and that design is complete.

- **Baseline Development:** The initial ramp-up and staff familiarization will support updating the cost and schedule baseline of the HLW and PT Facilities through completion. The baseline effort will result in a detailed execution plan to complete the

facilities, and support updates to the WTP Project performance baseline in alignment with resources provided by DOE.

- **Preliminary Documented Safety Analysis (PDSA):** Based on completion of outstanding technical decisions (expected in calendar year 2018), and progression of design, the PT Facility will have sufficient information to prepare and submit an updated PDSA for review and approval by DOE. Approval of the updated PDSA validates the adequacy of the nuclear safety analysis for the PT Facility, mitigating the risk of design change to ongoing procurement and construction. The updated PDSA for the HLW Facility was recently approved.
- **Permit Modifications:** With progression of design, and completion of technical decisions in the PT Facility, DOE will submit updated permit modifications for both the HLW and PT Facilities to the Washington State Department of Ecology. In addition to design completion, the permit modifications will be essential in sustaining construction activity without delay or resequencing.
- **Procurement:** Remobilized procurement (with the support of engineering and construction) will procure equipment and materials, and will engage suppliers to refurbish or recertify equipment and components.
- **Construction Ramp-Up:** In association with the procurement effort, construction resources (nonmanual and craft labor) will be mobilized to identify field procurements and items that need to be returned to suppliers for refurbishment or recertification. Craft resources will remobilize to complete site safety orientation and training, and to prepare construction facilities, equipment, and tools for regular use. Construction ramp-up activities would support a safe and effective transition to full construction activity.
- **Construction Completion:** As design matures, and physical and safety considerations allow, construction of mechanical systems and commodity installation which includes items such as vessels, fire sprinkler systems, HVAC, cable tray, and piping will resume. Construction will also use preserved, new, and refurbished or recertified equipment and components as needed to complete the facilities.
- **Startup and Commissioning:** Throughout completion of construction, individual systems will be completed and will transition to the commissioning phase. The commissioning phase includes startup testing (component level and system level tests) and proceeds to cold commissioning testing using nonradioactive waste simulant. Each phase of startup and commissioning progressively verifies the functions of components and systems.
- **Documented Safety Analysis (DSA):** Based on successful completion of design (as supported by functional testing and completion of design verification documents), the approved PDSA for each facility will serve to inform the development of the respective facility DSA. Approval of the DSA supports the transition from startup to commissioning.
- **Operational Readiness Review (ORR):** The ORR is a readiness demonstration activity designed to independently verify capability of facilities to start hot commissioning in a safe and effective manner. Following successful completion of the ORR, hot commissioning will introduce radioactive waste.

Activities within the abovementioned phases may be completed prior to restart, as part of completion of limited engineering, procurement, and construction, as resources are made available. The phases, along with the achievement of critical elements later in this report, provide a framework to support the alignment of expectations and provision of resources to successfully restart and complete the HLW and PT Facilities.

Application of Lessons Learned for Restart

During the application of the CPM Program for the HLW and PT Facilities, enhanced maintenance activities will reduce the impact of degradation of procured and installed equipment, components, and material. The SMEs from other successful projects identified

additional lessons learned applicable to a successful restart, which will be implemented as summarized below:

- **Freezing Design Requirements:** The SMEs indicated freezing design requirements was critical to the success of Watts Bar Unit 2. The implementation of freezing requirements for the HLW and PT Facilities is described later in the report.
- **Document Management:** As the HLW and PT Facilities stopped construction with no knowledge of the potential CPM period, documents were stored in a manner appropriate for active construction activity (i.e., in-process and organized by responsible individuals). The SMEs identified the effort to evaluate and organize such documents is more difficult after time has lapsed and “tribal knowledge” is lost. To support a more effective restart, resources should be made available immediately to organize and package documentation.
- **Configuration Management:** Because the HLW and PT Facilities have been under limited design and procurement activity over the past several years, design is still in-process and procurements are still open. Furthermore, as-built documents have not been prepared because the facilities are not fully constructed. Resources will be needed to organize and prepare design documents for storage, and to close open procurements to facilitate retrieval of supplier-provided design and the status of equipment and components while facility familiarity and knowledge is still available on the Project. Such resources will also support walk-downs and prepare as-built drawings.
- **Supplier Input:** Early involvement of suppliers in the HLW and PT Facilities to effectively manage procurements and storage options would facilitate implementation of efficient strategies to maintain operability and warranties over the CPM period, and would support identification of equipment and components likely to become obsolete.
- **Interfaces:** Execution plans are written to ensure success of DFLAW, and serve to inform restart decisions for the HLW and PT Facilities. For example, several cross-facility systems are “divided,” and the operating portion of the system is isolated to ensure safe operability. The isolations serve as a focal point for future interface evaluations when restarting the facilities. Efforts would be made to expand on the plans to determine compatibility between current design and future operating plant interfaces including the plant control room, critical HVAC systems, and radiological hot cells.

Critical Elements for Success of Completion

Several elements are critical to restarting and completing the HLW and PT Facilities:

- **Resources for CPM Program and Decisions:** Resources must be made available to implement the CPM Program for successful restart. Such resources will be used to implement CPM Program actions and perform essential CPM activities.
- **Resources for Limited Engineering, Procurement, and Construction:** Completion of key activities would enhance the efficiency and overall resumption of the HLW and PT Facilities. The core competencies described earlier in the report, and resources demobilizing from the DFLAW over the next year, may be leveraged to support efficient completion of such activities, which includes the following by function:
 - **Engineering:** A selection of core team engineering resources are necessary to support updates to system design descriptions (SDD) and design documents based on approved revisions to the facility PDSAs and recent technical decisions, package in-process designs, and incorporate design deliverables into engineering automation tools, and complete select mechanical design in the HLW Facility to build on completion of updates to SDDs. Engineering will also support completion of procurement and construction activities.
 - **Procurement:** Suppliers must be informed of the CPM period, and procurements will be modified, terminated, or completed to extend applicable warranties, or facilitate the transfer of property and supplier-completed design.

Such actions will ensure procurements are managed to an adequate condition for the CPM period and restart.

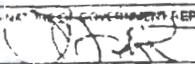
- **Construction:** Support essential construction to achieve an adequate condition for CPM and support organization and packaging of in-process documents and work packages for restart. For the HLW Facility, this includes civil buildout to achieve facility enclosure (e.g., completion of roof and siding).
- **Alignment on Resources Needed to Complete the Facilities:** Similar to commercial engineering, procurement, and construction projects, resources must be made available to support the ramp-up and completion of the design, procurement, construction, startup, and commissioning of the HLW and PT Facilities. DOE must provide the funding support needed for the restart and completion of the facilities.
- **Freezing Design Requirements:** The restart of the facilities would be enhanced if the same technical requirements and objectives are maintained through completion (i.e., customer and stakeholders agree that requirements are frozen).
- **Alignment and Approval of Design:** DOE agreement on facility design based on current technical decisions is critical to avoiding design and construction rework. The HLW Facility has a matured design and a recently updated customer-approved PDSA. The PT Facility is in the process of resolving outstanding technical decisions, and customer agreement is expected in calendar year 2018. Mature design, completion of outstanding technical decisions, and an approved PDSA update for the facilities supports freezing design requirements to enhance restart and completion of the HLW and PT Facilities.
- **Overall Strategy:** The completion strategy of the HLW and PT Facilities will be evaluated and optimized in consideration of resource availability, design decisions, and operating interfaces to achieve success. Long-range planning efforts also will support identification of needed resources to complete the facilities considering the outcomes of the CPM Program and completion of the DFLAW.

Conclusion

The provision of appropriate resources and implementation of a CPM Program is instrumental in enhancing the preservation and maintenance of the HLW and PT Facilities, and associated equipment, components, and material. This strategy supports the effective restart and completion of the facilities. However, a CPM Program is only one of several elements necessary to achieve success. The provision of necessary resources, freezing design requirements, completion of technical decisions, agreement to design of the facilities, and optimization of the execution strategy based on existing conditions are also required to successfully restart and complete the HLW and PT Facilities.

**Attachment 2
18-ORP-0010
(9 Pages Excluding Cover Sheet)**

**U.S. Army Corps of Engineers Interagency Agreement and Statement of
Work**

INTERAGENCY AGREEMENT		1 IAA NO. 89304018SEM00002/P00001		PAGE OF 1 8	
2 ORDER NO		3 REQUISITION NO		4 SOLICITATION NO.	
5 EFFECTIVE DATE See Block 26c		6 AWARD DATE 01/11/2018		7 PERIOD OF PERFORMANCE 11/29/2017 TO 11/30/2018	
8 SERVING AGENCY ENGINEERS, U S ARMY CORPS OF ALC: DUNS: 783724743 +4: 201 North 3rd St Walla Walla WA 99362 POC MARY VAN SICKLE TELEPHONE NO. 5095277204				9 DELIVER TO	
10 REQUESTING AGENCY Office of River Protection ALC: DUNS: +4: 1000 Independence Ave., S.W. Washington DC 20585 POC TELEPHONE NO.				11 INVOICE OFFICE OR for ORP U.S. Department of Energy Oak Ridge Financial Service Center P.O. Box 6017 Oak Ridge TN 37831	
12 ISSUING OFFICE Office of River Protection U.S. Department of Energy Office of River Protection P.O. Box 450 Richland WA 99352				13 LEGISLATIVE AUTHORITY 31 U.S.C. 1535 - The Economy Act	
				14 PROJECT ID	
				15 PROJECT TITLE	
16 ACCOUNTING DATA See Schedule					
17 ITEM NO	18 SUPPLIES/SERVICES	19 QUANTITY	20 UNIT	21 UNIT PRICE	22 AMOUNT
	The purpose of this modification is to revise Part A and the SOW per USACE and DOE.				
23 PAYMENT PROVISIONS Intra-Governmental Payment and Collection				24 TOTAL AMOUNT \$275,000.00	
25a SIGNATURE OF GOVERNMENT REPRESENTATIVE (SERVICING) 			25b SIGNATURE OF GOVERNMENT REPRESENTATIVE (REQUESTING) 		
26a NAME AND TITLE Alan Feistner, Dep Dist Engineer for PM		26c DATE 1/11/18	26b CONTRACTING OFFICER Robert L. Burrier		26d DATE 1-16-18

Section A - General Terms and Conditions

A.1. Purpose

This Part of the IA (hereinafter "Part A") describes the terms and conditions that govern the provision of this interagency transaction between Department of Energy, hereinafter "the Requesting Agency" and Walla Walla - U.S. Army Corps of Engineers, hereinafter "the Servicing Agency."

No fiscal obligations are created through the execution of Part A. A fiscal obligation arises when the Requesting Agency demonstrates a bona fide need, provides the necessary requirements and funding information to the Servicing Agency and both parties execute a funding document using Part B of this IA or an alternate funding document.

A.2. Authority

The parties' authority to enter into this interagency agreement is:

- The Economy Act (31 U.S.C. 1535)
- Franchise Fund (e.g., 31 U.S.C. 501 note) or Revolving Fund (e.g., 40 U.S.C. 321)
[Insert specific statutory authority]
- Other [Insert specific statutory authority or authorities]

A.3. Part A Identifier

DOE-WTP COST ENGINEERING / ESTIMATING SUPPORT SERVICES

A.4. Scope

a. The following organizations in the Department of Energy are authorized to obtain assistance from the Servicing Agency.

DOE, ORP

b. The organizations in the Servicing Agency are authorized to provide assistance to the Department of Energy.

Walla Walla - U.S. Army Corps of Engineers

c. The following types of services or products may be acquired through this interagency transaction pursuant to this IA.

SEE ATTACHED STATEMENT OF WORK (SOW)

d. The following DOE terms, conditions, requirements or restrictions apply:

The Servicing Agency shall not incur any costs in excess of the amount of funds obligated to this IA. If the Servicing Agency is required to adjust original forecasts because actual costs exceed the amount of funds available under the MIPRs, it shall promptly notify the Requesting Agency of the amount of additional funds. The Servicing Agency shall either provide funds to the Requesting Agency or require the Scope of Work to be modified to that which can be paid for by the then-available funds, or direct termination of services.

A.5. Period of Agreement

The terms and conditions described in Part A of the IA become effective when signed by authorized officials of both agencies and remain effective until November 30, 2018, unless amended in accordance with Section A.11 or terminated in accordance with Section A.12.

A.6. Roles & Responsibilities of Servicing Agency & Department of Energy

The effective management and use of this interagency agreement and related actions is a shared responsibility of the Requesting Agency and the Servicing Agency. The parties hereby agree to Roles and Responsibilities provided in the attached SOW.

A.7. Billing & Payment

The Department of Energy (DOE) will pay the Servicing Agency for costs of each interagency transaction. Billings may include the amounts due under the interagency transaction identified in Part B of this IA. The DOE obligating document number should be included on all documentation related to the agreement. The DOE obligating number will serve as the common agreement number (interagency agreement (IA)).

The Department of Energy's preferred method for reimbursing the Servicing Agency is via the Intra-Governmental Payment and Collection (IPAC) System. When the reimbursement for products and/or services furnished under this agreement will be effected by means of IPAC, the Servicing Agency shall provide the Department of Energy with the appropriate instructions for transmitting the Agency Location Code (ALC), Treasury Account Symbol (TAS), Business Event Type Code (BETC), Business Partner Network (BPN) number (usually the Data Universal Numbering System (DUNS) number), Line of Accounting (LOA), points of contact, and other information identified in Part B of this IA.

If IPAC is not a satisfactory billing method, a mutually agreeable alternative should be negotiated before acceptance of this agreement and documented in Part B whether IPAC or alternative will be used.

Questions regarding payment should be directed to:

U.S. Department of Energy
PO Box 500
Germantown, MD 20875
Attn: Charles Steve Trischman

Phone: 301-903-7478
Email: steve.trischman@em.doe.gov

Reimbursable billings are delinquent when they are 30 or more calendar days old (from date of the billing). When billings remain delinquent over 30 calendar days and the Department of Energy has not indicated a problem regarding services, the Servicing Agency may choose not to award any new contract/orders or modifications to existing contract/orders for the Requesting Agency (or the client within) and termination of existing services will be considered and negotiated with the Requesting Agency.

A.8. Small Business Credit

Any contract actions executed by the Servicing Agency on behalf of the Department of Energy will allocate the socio-economic credit to the Requesting Agency at the lowest FIPS 95-2 Agency/Bureau component as identified by the Requesting Agency. If the code is not provided, the Servicing Agency will allocate the credit to the highest Requesting Agency FIPS 95-2 Code.

A.9. Contract Termination, Disputes and Protests

If a contract or order awarded pursuant to this IA is terminated or cancelled or a dispute or protest arises from specifications, solicitation, award, performance or termination of a contract, appropriate action will be taken in accordance with the terms of the contract and applicable laws and regulations. The Department of Energy shall be responsible for all costs associated with termination, disputes, and protests, including settlement costs, except that the Department of Energy shall not be responsible to the Servicing Agency for costs associated with actions that stem from errors in performing the responsibilities assigned to the Servicing Agency. The Servicing Agency shall consult with the Department of Energy before agreeing to a settlement or payments to ensure that the Servicing Agency has adequate time in which to raise or address any fiscal or budgetary concerns arising from the proposed payment or settlement.

A.10. Review of Part A

The parties agree to review jointly the terms and conditions in Part A at least annually if the period of this agreement, as identified in Section 5, exceeds one year. Appropriate changes will be made by amendment to this agreement executed in accordance with Section A.11. The parties further agree to review performance under this IA to determine if expectations are being met and document a summary of their assessment. The responsible reviewing official at each agency shall sign and date the assessment.

A.11. Amendments

Any amendments to the terms and conditions in Part A shall be made in writing and signed by both the Servicing Agency and the Department of Energy.

A.12. IA Termination

This IA may be terminated upon thirty (30) calendar days written notice by either party. If this agreement is cancelled, any implementing contract/order may also be cancelled. If the IA is terminated, the agencies shall specify the terms of the termination, including costs attributable to each party and the disposition of awarded and pending actions.

If the Servicing Agency incurs costs due to the Department of Energy failure to give the requisite notice of its intent to terminate the IA, the Department of Energy shall pay any actual costs incurred by the Servicing Agency as a result of the delay in notification, provided such costs are directly attributable to the failure to give notice.

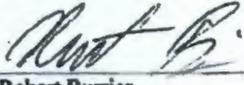
A.13. Interpretation of IA

If the Servicing Agency and Department of Energy are unable to agree about a material aspect of either Part A or Part B of the IA, the parties agree to engage in an effort to reach mutual agreement in the proper interpretation of this IA, including amendment of this IA, as necessary, by escalating the dispute within their respective organizations.

If a dispute related to funding remains unresolved for more than thirty (30) calendar days after the parties have engaged in an escalation of the dispute, the parties agree to refer the matter to their respective Agency Chief Financial Officers with a recommendation that the parties submit the dispute to the CFO Council Intragovernmental Dispute Resolution Committee for review in accordance with Treasury Financial Manual (TFM) Volume 1, Part 2, Chapter 4700, "Agency Reporting Requirements for the Financial Report of the United States Government:" Appendix 10 - Intragovernmental Business Rules, or subsequent guidance.

A.14. Signatures

DEPARTMENT OF ENERGY OFFICIAL:

Signature:  Date: 1-16-18
Robert Burrier
Contracting Officer

Agency: Department of Energy, Office of River Protection

Address: 2440 Stevens Center Drive
Richland, WA 99352

Phone: 509-376-6987

E-mail & fax: Robert.L.Burrier@eom.doe.gov

SERVICING AGENCY OFFICIAL:

Signature:  Date: 1/11/2018
Alan Feistner
Deputy District Engineer for Project Management

Agency: Walla Walla District, U.S. Army Corps of Engineers

Address: 201 N. third Ave.
Walla Walla, WA 99362

Phone: 509-527-7301

E-mail & fax: Alan.W.Feistner@usace.army.mil

STATEMENT OF WORK

COST ENGINEERING / ESTIMATING SUPPORT FOR THE US DEPARTMENT OF ENERGY HANFORD WASTE TREATMENT AND IMMOBILIZATION PLANT PROJECT (WTP)

1.0 GENERAL PURPOSE AND SCOPE

Because of funding limitations, the U.S. Department of Energy, Office of River Protection (DOE-ORP), is exploring options to preserve the capabilities of the Waste Treatment and Immobilization Plant (WTP) High-Level Waste (HLW) Facility and Pretreatment Facility (PT) in order to focus the efforts of DOE-ORP in bringing the Direct Feed Low-Activity Waste (DFLAW) capability on-line by the end of 2021, while maintaining DOE-ORP's ability to achieve the existing Amended Consent Decree¹ milestones. The purpose of the support requested in this Statement of Work is to provide an analysis of options examining how best to preserve DOE-ORP's capabilities to meet the following milestones:

A-2	HLW Facility Construction Substantially Complete	12/31/2030
A-14	PT Facility Construction Substantially Complete	12/31/2031

Because construction of these facilities must be complete before cold commissioning and hot commissioning can occur, it is not necessary for this analysis to address the cold or hot commissioning milestones for these facilities at this time.

The US Army Corps of Engineers (USACE) shall perform a parametric evaluation of the options and funding scenarios set forth in Section 3.1 below for the HLW and PT Facilities to evaluate the likelihood of achieving Amended Consent Decree milestones A-2 and A-14, as set forth above.

2.0 BACKGROUND

Based on annual funding limitations and the priority to start treating LAW by the end of 2021, DOE-ORP is considering several options to allow the WTP contractor to focus its attention on completing and commissioning the Low-Activity Waste (LAW) Facility with DFLAW configuration.

OFFICIAL USE ONLY	
May be exempt from public release under the Freedom of Information Act	
(5 U.S.C. 552), Exemption number: <u>5</u> , Category: <u>5, Privileged Information</u>	
Department of Energy <u>WTP</u> <u>WTP</u> required before public release	
Name/Org: <u>Wahed Abdul Qadir - WTP</u>	Date: <u>12/11/2017</u>
Guidance (if applicable): <u>N/A</u>	

~~Official Use Only~~

¹ State of Washington v. Dept. of Energy, No. 2:08-CV-05085-RMP (March 11, 2016) (E.D. Wa.).

**DOES NOT CONTAIN
OFFICIAL USE ONLY INFORMATION**

Name/Org: MDO/Hagan PI-DCC Date: 2/13/18

Due to funding limitations, the Primary Option under consideration involves putting the HLW and PT Facilities into a preservation mode while the WTP Project focuses on bringing DFLAW into operation to produce glass by the end of 2021. The other options being considered are variations of the Primary Option.

3.0 TASK DESCRIPTION

The USACE will perform parametric evaluations on the options described in Paragraph 3.1 below based on different funding and operational scenarios for the HLW and PT Facilities to evaluate the probability of achieving Amended Consent Decree (CD) milestones A-2 and A-14, as set forth above. Each of these options incorporates the Primary Option. The USACE will determine the adequacy of DOE-ORP provided data, advise DOE-ORP of any necessary additional data, and will perform the evaluations based on its independent analysis.

The evaluation shall be performed at a rough order of magnitude cost estimate using a parametric evaluation of existing information. The USACE effort shall be performed on-site to ensure DOE-ORP oversight and timely transfer of data and any necessary interactions.

3.1 Provide support for the following activities:

Perform a parametric evaluation for each of the following scenarios to determine the annual funding need (or utilize the funding scenario given) for completion of HLW and PT Facilities, and the probability of the facilities being completed in accordance with the Amended Consent Decree milestones set forth above. Work directly with the DOE-ORP staff to obtain information necessary to perform this evaluation.

Scenarios for the options

- **Case 1- Amended Consent Decree (CD) compliant - Facility Lay-up: Primary Option with funding levels for the HLW and PT Facilities minimized (to maximize DFLAW funding) to cover only preservation and maintenance, material storage, and procurement liabilities, during the years of high DFLAW funding demand (3 – 5 years).**
 - **Case 1a: Primary Option with PT and HLW Facility completion.**
 - Can DOE achieve compliance with the Amended Consent Decree milestones set forth above for both the PT and HLW Facilities with the current \$690M annual funding level?
 - If DOE cannot achieve compliance with the Amended Consent Decree milestones set forth above with the current \$690M annual funding level, what funding level would be required to meet those milestones?
 - **Case 1b: Primary Option with only HLW Facility completion with the Direct-Feed HLW Facility (DFHLW) configuration concept, and PT Facility in lay-up.**

- Can DOE achieve compliance with the Amended Consent Decree milestone set forth above for the HLW Facility with the current \$690M annual funding level?
 - If DOE cannot achieve compliance with the Amended Consent Decree milestones set forth above for the HLW Facility, what funding level would be required to meet this milestone?
- **Case 2 – Primary Option with optimum funding to maintain continuity and recoverability of HLW Facility with the DFHLW configuration concept, and PT Facility in lay-up:**
- In addition to case 1b, maintain key engineering and nuclear safety expertise, advance critical designs and complete rebaseline during the lay-up period, which allows higher confidence for effective completion of the HLW Facility. Can DOE achieve compliance with the Amended Consent Decree milestone set forth above for the HLW Facility with the DFHLW configuration concept?

4.0 DELIVERABLES:

USACE shall provide the Evaluation Report to the HLW-PT Federal Project Director (FPD) (or designee), DOE-ORP FPD, and Contracting Officer within six weeks of the award of the task order. The Evaluation Report shall include:

- The basis, cost estimates, and funding profiles, and
- USACE analysis of DOE-ORP's ability to achieve the applicable Amended Consent Decree milestones set forth above.
- The Evaluation Report shall be marked as "Official Use Only (OUO)".

5.0 RESPONSIBILITIES

5.1 USACE (Servicing Agency)

Team Leader: The designated USACE Team Leader will serve as the primary point of contact for USACE execution of the product development, format, quality assurance, and deliverables. The Team Leader is responsible for maintaining OUO protections for this document and any documents or other communications prepared regarding this Statement of Work or any work done by the USACE or any of its subcontractors throughout the performance of this Statement of Work.

5.2 DOE ORP (Requesting Agency)

Point of Contact (POC): The DOE-ORP FPD for the HLW and PT Facilities will serve as the POC for this task.

Office & Supplies: DOE will provide all necessary office space, office equipment such as computers, software, phones, and office supplies for the

on-site work.

5.3 Qualification of USACE Personnel:

USACE shall provide the following qualified personnel for the support functions identified in this statement of work:

- **Team Leader:** The designated USACE Team Leader will serve as the primary point of contact for USACE execution of the product development, format, quality assurance, deliverables, and personnel security concerns. The USACE lead will coordinate all project scope changes that will require a contract mod with the DOE HLW-PT FPD and CO.
- **Cost Engineers / Estimators:** USACE shall be responsible for estimating all scope of work as defined in Paragraph 3. The scope, as explained in Paragraph 3 of this Statement of Work, is discrete and limited.
- **Security and Site Access:** USACE shall treat all products as OOU and provide the necessary security and protection of all data, existing and under development, related to this Interagency Agreement (IAA), whether in hard copy or electronic formats. The security handling shall comply with USACE and DOE-ORP security requirements and processes. ORP will coordinate site access, security clarifications, and instructions with the designated USACE Lead. This task order work will be performed in DOE-ORP offices.
- **Safety and Security:** USACE personnel shall complete site-specific safety and security training requirements prior to beginning onsite work, including Hanford general employee training (HGET). DOE will provide a cost code for the training.

6.0 TECHNICAL POINT OF CONTACT

Walla Walla District Address:
U.S. Army Corps of Engineers Walla Walla District
201 N. 3rd Ave.
Walla Walla, WA 99362
FAX: 509-527-7809
Nickolas McHenry
(Supervisor NWW's DOE-Hanford Office)
Phone: 509-373-9333
Email: Nickolas.L.McHenry2@usace.army.mil

7.0 COSTS

\$275,000.00 is the amount of funds obligated under this IA. Please see paragraph A.4.d. in Part A of this IA if costs need to be increased.