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Removal Action Work Plan for the CPP-603 Basin Facility

INEEL
Idaho National Engineering and Environmental Laboratory

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Prepared for the
U.S. Department of Energy
DOE Idaho Operations Office

ABSTRACT

This Removal Action Work Plan describes the actions to be taken under the non-time-critical removal action recommended in the *Action Memorandum for the Non-Time Critical Removal Action at the CPP-603A Basins, Idaho Nuclear Technology and Engineering Center*, as evaluated in the *Engineering Evaluation/Cost Analysis for the CPP-603A Basin Non-Time Critical Removal Action, Idaho Nuclear Technology and Engineering Center*. The regulatory framework outlined in this Removal Action Work Plan has been modified from the description provided in the *Engineering Evaluation/Cost Analysis for the CPP-603A Basin Non-Time Critical Removal Action, Idaho Nuclear Technology and Engineering Center*. The modification affects regulation of sludge removal, treatment, and disposal, but the end state and technical approaches have not changed. The *Engineering Evaluation/Cost Analysis for the CPP-603A Basin Non-Time Critical Removal Action, Idaho Nuclear Technology and Engineering Center*—conducted pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act—evaluated risks associated with the sludge and alternatives for addressing those risks. A decision has been made to address the sludge under the Hazardous Waste Management Act/Resource Conservation and Recovery Act.

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ACRONYMS

ALARA	as low as reasonably achievable
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CPP	Chemical Processing Plant
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
EPA	U.S. Environmental Protection Agency
HWMA	Hazardous Waste Management Act
ICDF	INEEL CERCLA Disposal Facility
IFSF	Irradiated Fuel Storage Facility
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
RCRA	Resource Conservation and Recovery Act
SHADO	small high-activity debris object
WAG	waste area group

Removal Action Work Plan for the CPP-603 Basin Facility

1. INTRODUCTION

1.1 Purpose and Objective

This Removal Action Work Plan describes the actions to be taken under the non-time-critical removal action recommended in the *Action Memorandum for the Non-Time Critical Removal Action at the CPP-603A Basins, Idaho Nuclear Technology and Engineering Center* (DOE-ID 2005), as evaluated in the *Engineering Evaluation/Cost Analysis for the CPP-603A Basin Non-Time Critical Removal Action, Idaho Nuclear Technology and Engineering Center* (DOE-ID 2004). The regulatory framework outlined in this Removal Action Work Plan has been modified from the description provided in the Engineering Evaluation/Cost Analysis (DOE-ID 2004). The modification affects regulation of sludge removal, treatment, and disposal, but the end state and technical approaches have not changed. The Engineering Evaluation/Cost Analysis—conducted pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC § 9601 et seq.)—evaluated risks associated with the sludge and alternatives for addressing those risks. A decision has been made to address the sludge under the Hazardous Waste Management Act/Resource Conservation and Recovery Act (HWMA/RCRA) (Idaho Code § 39-4401 et seq.; 42 USC § 6901 et seq.).

The Chemical Processing Plant (CPP) -603A nuclear fuel storage basins are located at the Idaho Nuclear Technology and Engineering Center (INTEC) at the U.S. Department of Energy's (DOE's) Idaho National Laboratory (INL) in Butte County, Idaho. The *Final Record of Decision Idaho Nuclear Technology and Engineering Center, Operable Unit 3-13* (DOE-ID 1999) governs CERCLA sites within the INTEC facility designated as Waste Area Group (WAG) 3. Therefore, this CERCLA removal action is subject to the remedial action objectives established in the Final Record of Decision (DOE-ID 1999).

The recommended action is to perform interim stabilization of the basins. The sludge in the basins will be removed and treated in accordance with the HWMA/RCRA (Idaho Code § 39-4401 et seq.; 42 USC § 6901 et seq.). The scope of this non-time-critical removal action includes removing, treating, and disposing of the basin water; removing a highly radioactive object (SHADO 1); and filling the basins with grout. The basin water will be removed while the basins are filled with grout. Other debris objects containing radioactive cobalt (cobalt-60) will be consolidated and encapsulated in the grout. The position of these debris objects will be noted for future location and removal, if necessary. The grout will provide shielding for the radioactive contamination embedded in the basin walls, thereby minimizing possible migration and airborne contamination. This Removal Action Work Plan uses the term "debris" to refer to both radioactive and nonradioactive materials in the basins. The terms "debris" and "debris objects" are used in the document to refer to 14 discrete, highly radioactive objects sitting on the basin floor as well as a variety of nonradioactive hand tools and general rubbish inadvertently dropped in the basins over the years. The water will be pumped to the INL CERCLA Disposal Facility (ICDF) evaporation pond and evaporated. The final decontamination and disposition of the basin structure will be evaluated when the entire CPP-603 Complex is taken out of service. This non-time-critical removal action is an interim action that will reduce the risks to human health, the environment, and site workers by minimizing the potential for release of hazardous substances. This interim action does not prejudice the final end-state alternative.

This removal action is consistent with the Final Record of Decision (DOE-ID 1999), thus supporting the overall remediation goals at WAG 3. The Final Record of Decision requires that, if contaminated soil exists beneath a building, the building must be maintained to prevent moisture

infiltration and to prevent exposure to current industrial workers. Once decontamination and decommissioning of the building have been completed, and if contaminated soil exists under the footprint of the former building, the soil that exceeds the WAG 3 soil remediation goals must be either excavated or capped with an engineered barrier.

1.2 Scope

The scope of the activities addressed by this Removal Action Work Plan include removing and relocating the small high-activity debris object (SHADO 1), removing and pumping the basin water to the ICDF evaporation ponds, and placing grout in the basins as water is pumped to maintain a relatively constant water level to shield the radioactive contamination near the top of the basin walls.

Other activities will occur in conjunction with the activities described in this Removal Action Work Plan. The removal, treatment, and disposal of the basin sludge will take place in conjunction with this removal action but will be conducted in accordance with the HWMA/RCRA (Idaho Code § 39-4401 et seq.; 42 USC § 6901 et seq.). In addition, further characterization activities may be ongoing during the removal action at the CPP-603A basin facility. Additional hazardous materials and radionuclide contamination may be located or detected, thereby triggering the need for additional characterization.

1.3 Removal Action Objectives

These removal action goals are consistent with the remedial action objectives established in the Final Record of Decision (DOE-ID 1999). As such, the removal action will be consistent with and will contribute to the overall remediation of INTEC under CERCLA (42 USC § 9601 et seq.).

The removal action objectives for this non-time-critical removal action are as follows:

- Reduce the risk to the Snake River Plain Aquifer by removing the basin water. This water, if released, could serve as a driving force for moving existing vadose zone contaminants to the aquifer.

- Provide a mechanism for the permanent, safe disposition of radioactive water currently in the CPP-603A basins while safely stabilizing the cobalt-60 contaminated objects as well as the non-uranium containing debris and rubbish until an end state for the CPP-603 Complex is identified.

- Minimize the risk posed by contaminants remaining at the CPP-603A basins after the removal action so it does not exceed a cumulative carcinogenic risk level of 1×10^{-4} and a total hazard index of one for future residents in 2095 and for current workers.

- Prevent migration of contaminants from the CPP-603A basins at levels that could cause the Snake River Plain Aquifer's groundwater (located outside the INTEC security fence) to exceed a cumulative carcinogenic risk level of 1×10^{-4}, a total hazard index of one, or applicable State of Idaho groundwater quality standards in 2095 and beyond.

The removal action goals are predicated on the current and future land uses established for INTEC in the Final Record of Decision (DOE-ID 1999), which includes industrial land use until at least 2095. The groundwater-ingestion exposure pathway is assumed to be the only viable exposure pathway. A surface exposure pathway does not exist from CPP-603A, since the debris is present 20 ft below ground,

the water will be removed, and the basins will be filled with an inert material. This is consistent with the Final Record of Decision (DOE-ID 1999), where surface pathway risks are assumed to occur for contamination from ground surface to 10 ft below ground surface.

1.4 Facility Background and Description

The INTEC, located in the south-central area of the INL, began operations in 1952. Historically, spent nuclear fuel from defense projects was reprocessed to separate reusable uranium from spent nuclear fuel. In 1992, the U.S. Department of Energy Idaho Operations Office (DOE-ID) discontinued reprocessing. The current mission for INTEC is to receive and temporarily store spent nuclear fuel and radioactive waste for future disposition, manage waste, and perform remedial actions.

Pending reprocessing, spent nuclear fuel was stored underwater in basins, including CPP-603A. By the year 2000, all inventoried spent nuclear fuel was removed from the facility's underwater storage basins and placed in newer underwater or dry storage facilities at the INL. The inactive water treatment system used to maintain the quality of the CPP-603 basin water will be closed separately under the INL Voluntary Consent Order in accordance with the requirements of HWMA/RCRA (Idaho Code § 39-4401 et seq.; 42 USC § 6901 et seq.). The CPP-603A basins are no longer needed for fuel storage; however, they are still in use to provide shielding and either must be maintained so the basins do not present a threat to public or worker health and safety or they must be isolated from the environment. The DOE-ID needs to eliminate the risk and costs associated with maintaining this facility and its associated processes because both environmental risk and cost risk will increase as the facility ages. Therefore, the DOE-ID is initiating this non-time-critical removal action to reduce or eliminate the risks associated with maintaining this facility. This action does not prejudice the final end-state alternatives.

1.4.1 Physical Facility

The DOE-ID began construction of CPP-603 in the early 1950s, and the underwater storage basins began operation in 1952. The basins have been used to store spent nuclear fuel from the time they were placed in service and will become inactive through issuance of the Action Memorandum (DOE-ID 2005) for this removal action. The facility was constructed to seismic criteria, construction codes, and safety requirements of the early 1950s. In addition, the basins (which were constructed of reinforced concrete) have no secondary liners. Currently, the basins are maintained full of water to minimize exposure to the radionuclides in the basins' sludge and debris as well as to radioactive contamination affixed to the basin walls.

The storage basins are reinforced concrete structures with most of their volume below grade. Each of the three basins and the transfer canal are filled with water. The combined volume of water in the storage basins and transfer canal is approximately 5.30E+06 L (1.40E+06 gal).

The north and middle basins are 18 m (60 ft) long, 12 m (40 ft) wide, and 6.5 m (21 ft) deep. Each of the basins is 1.28E+03 m^3 (1.67E+03 yd^3) in volume. The basins and transfer canal are covered with fiberglass grating and a radiation shield consisting of lead plate sandwiched between aluminum plates. The shielding is present primarily for activity associated with accumulation of a residue ring on the basins' and transfer canals' walls at the surface of the water. Concrete beams, 0.6 m (2 ft) high and 0.3 m (1 ft) wide on 0.6-m (2-ft) centers, support the grating and radiation shield. Similar concrete dividers are located on the bottom of the basins. The beams, concrete dividers, and other fixtures were designed to sustain the spent nuclear fuel in a safe configuration.

Spent nuclear fuel stored in the north and middle basins was suspended under water from monorails located approximately 3 m (8 ft) above the basin walls. Small, 4-cm (1.5-in.) -wide continuous

slots in the grating under the track allowed the fuel to move to its storage location. The south basin is an open basin, 14 m (45 ft) × 24 m (80 ft) in area and 6.5 m (21 ft) deep. The total volume of the south basin is 2.18 E+03 m^3 (2.80 E+03 yd^3). Fuel was placed in the south basin in aluminum or stainless-steel racks. The racks were accessed using a catwalk crane located above the basin. The racks have been removed from the basins. The south basin contains three storage boxes. The 1 × 1 × 1.2-m (3 × 3 × 4-ft), open-top carbon steel boxes contain miscellaneous basin debris objects.

A 2.5 × 650 × 6.5-m (8 × 200 × 21-ft) transfer canal connects the three storage basins. A floor grating overlaid with lead-plate shielding covers the transfer canal. The monorail track extends overhead on both sides of the transfer canal. In addition, continuous slots are located in the transfer canal's grating to facilitate movement of the fuel to the assigned storage basin.

The floors of the storage basins are covered with a layer of sediment. The sediment (which is referred to in this document as sludge) consists of desert sand, dust, precipitated corrosion products, and residuals from past fuel-cutting operations.

This non-time-critical removal action, which is an interim action, applies to the CPP-603A basins, including the Fuel Element Cutting Facility, the overflow pit, and the transfer channel. Deactivation, decontamination, and decommissioning of the other currently unused portions of CPP-603A will be coordinated with the final deactivation, decontamination, and decommissioning of the CPP-603 Complex. The CPP-603B (Irradiated Fuel Storage Facility) is expected to remain active until approximately 2035. Currently, the basin water treatment system is being closed under the Voluntary Consent Order in accordance with the requirements of HWMA/RCRA (Idaho Code § 39-4401 et seq.; 42 USC § 6901 et seq.). Preparation to close the VES-SFE-106 waste tank system in accordance with HWMA/RCRA requirements also is underway.

1.5 Contaminants of Concern

In 1993, sludge was sampled from the south basin. In addition, sludge samples were taken from distributed locations throughout all three basins in 1994. Analyses from these sampling activities indicated the presence of silicon, aluminum, and iron as the major constituents. The high percentage of silicon and aluminum seems to indicate that a large portion of the sludge is soil particulate that has entered the building as a result of wind and weather events. Sample analyses did not indicate a significant amount of neutron poisons such as boron, cadmium, or chlorine. However, sampling results indicated the presence of cadmium above 1 part per million. Uranium-235 content and the major elements essentially determined the neutron reactivity. The Engineering Evaluation/Cost Analysis (DOE-ID 2004) estimates that approximately 6.96 kg $\pm$ 3.22 (15.34 lb) of U-235 that is less than 0.125 in. in diameter and that 3.8 kg (8.38 lb) of U-235 that is greater than 0.125 in. in diameter are contained in the sludge and distributed over the basin floor area.

In 1997, additional samples were collected of the basin sediments. Cadmium, chromium, lead, and barium were detected in one sample from the south basin. This indicates that a significant contribution to the basin sludge originates from the spent nuclear fuel previously stored there. In addition, elevated concentrations of cadmium may indicate a higher neutron flux in some areas.

Extensive radiological surveying has been conducted throughout the CPP-603A basin facility. Basin floor surveys of the north basin detected levels ranging from 100 to 900 mR/hr. Basin floor surveys of the middle basin detected levels ranging from 100 mR/hr to 10.2 R/hr near the southeast corner. Basin floor surveys of the south basin detected radiation levels from 100 to 600 mR/hr. A floor survey of the transfer canal detected radiation levels ranging from 100 mR/hr to 32 R/hr near the south end of the canal.

Generally, the radiation levels in the basins are approximately 5 to 15 mR/hr on the top of the basin and 100 to 150 mR/hr at the scum ring around the basin walls.

The building contains asbestos materials in the form of transite siding in the roofing and walls. The exterior walls consist of an outer layer of transite siding and an inner layer of transite siding with fiberglass insulation in between. Low levels of radiological contamination also are in the painted carbon steel superstructure and the interior transite siding. A false ceiling over the north and middle basins also is made of transite panels. In addition, the insulation on the steam and condensate piping throughout the facility contains asbestos.

Lead shielding is present throughout the CPP-603A basin facility. The deck plates over the north and middle basins and the transfer canal contain a 0.64-cm (0.25-in.) lead plate riveted between two aluminum plates. In addition, shielded areas adjacent to the water treatment areas and the Fuel Element Cutting Facility contain lead blankets and lead bricks. Lead also was found on the transite panel fastener system. Lead washers were used to hold the transite walls together.

Further characterization activities will be ongoing during the removal action at the CPP-603A basin facility. Additional hazardous materials and radionuclide contamination may be located or detected. A health and safety plan, including descriptions of the contaminants of concern, will be prepared by the yet-to-be-determined subcontractors to reflect any additional characterization information.

2. REMOVAL ACTION WORK ACTIVITIES

The actions addressed in this Removal Action Work Plan are consistent with Alternative 3, as described in the Engineering Evaluation/Cost Analysis (DOE-ID 2004). The sludge in the basins will be removed and treated in accordance with HWMA/RCRA requirements (Idaho Code § 39-4401 et seq.; 42 USC § 6901 et seq.). The non-time-critical removal action includes removing a highly radioactive object (SHADO 1); removing, treating, and disposing of the basin water; and filling the basins with grout. The tasks to be accomplished at the removal action site are described below, including a brief discussion of the sludge removal, treatment, and disposal to be accomplished in accordance with HWMA/RCRA requirements.

Basin water will be removed while the basins are filled with grout. The water will be pumped to the ICDF evaporation pond and evaporated. The highly contaminated scum ring on the basin walls will not be exposed during water removal and grout pumping operations. The SHADO 1, a small high-activity debris object, will be removed and managed in a facility designed to manage the high levels of radiation. Debris objects containing radioactive cobalt will be consolidated and encapsulated in the grout. The position of the debris objects will be noted for future removal, if necessary. The grout will provide shielding for the radioactive contamination embedded in the basin walls, thereby minimizing possible migration and airborne contamination. The final decontamination and disposition of the basin structure will be evaluated when the entire CPP-603 Complex is taken out of service. Before completion of the removal action, DOE-ID will implement "INTEC SP-6 Field Sampling Plan for the CERCLA New Site Identification Investigation of PLA-100115 Near CPP-603 (Draft)"[a] to conduct soil sampling and analysis around the failed drain line (3 1/2" PLA-100115). This action is a commitment made in the *HWMA/RCRA Less Than 90-day Generator Closure Report for the VES-SFE-126* (INEEL 2000). When the water is removed from the basins and the threat to the integrity of the basin is mitigated, a characterization plan specifying methods for determining the nature and extent of contamination will be developed and implemented as a separate action.

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a. DOE-ID, 2005, "INTEC SP-6 Field Sampling Plan for the CERCLA New Site Identification Investigation of PLA-100115 Near CPP-603 (Draft)," DOE/NE-ID-11219, Rev. 0, U.S. Department of Energy Idaho Operations Office, February 2005.

The DOE-ID compared the alternatives described in Section 5 of the Engineering Evaluation/Cost Analysis (DOE-ID 2004) and prefers Alternative 3 because it complies with regulations and is cost effective. In addition, this action was selected because:

- Removal of the water from the basins is the most effective action to eliminate the threat of a release to the environment.

- This removal action is consistent with the Final Record of Decision (DOE-ID 1999). As such, it supports the overall remediation at WAG 3.

- Placing grout in the basins implements DOE-ID's management policy for controlling worker radiation exposure to levels as low as reasonably achievable (ALARA) by minimizing exposure to the highly contaminated scum line on the basin walls and encapsulating the non-uranium-235 containing debris and rubbish on the bottom of the basins.

- This removal action is an interim action and does not prejudice the future end-state alternative.

Activities will be performed using currently accepted practices and standard operating procedures listed in the health and safety plan, which will be written by the yet-to-be-determined subcontractors.

2.1 Sludge Removal, Treatment, and Disposal

The CPP-603A basin contains an estimated 49,300 kg of sludge. The sludge is composed of desert sand, dust, precipitated corrosion products, and metal particles from past cutting operations. The sediment also is known to contain radioactive contamination and hazardous constituents, including cadmium and uranium-235. A decision has been made to manage the sludge in accordance with the requirements of the HWMA/RCRA (Idaho Code § 39-4401 et seq.; 42 USC § 6901 et seq.). The HWMA/RCRA regulations under 40 *Code of Federal Regulations* (CFR) 268.7(a)(5) and 40 CFR 262.34 allow a generator of hazardous or mixed waste to treat waste within 90 days without having a permit as long as certain guidelines are followed. Sludge removal, treatment, and disposal will be conducted under a subcontract issued to Duratek Federal Services, Inc. The sludge from the CPP-603 basins will be removed and treated prior to implementation of the removal action. Removal will occur while the basins remain in service. The sludge will be removed and treated to meet RCRA Land Disposal Restriction standards and waste acceptance criteria for the selected disposal site. The sludge will be treated to meet Universal Treatment Standards in 40 CFR 268.48 under HWMA/RCRA authority.

This overview outlines the activities required to remove, treat, characterize, package, and transfer sludge from the CPP-603A basins to an approved disposal facility. The initial step will be preparation of a statistically defensible process control program to ensure that optimal solidification is achieved for all waste types. A sampling approach designed to collect sample matrix from randomly selected areas in the basins in sufficient quantities to ensure the data yield statistically valid representative data will be employed. Data decisions will be based on calculations provided in SW-846 Chapter 9 (EPA 2002) to ensure that the data adequately represent a 90% certainty that 90% of the waste falls below the Universal Treatment Standards. The tests and calculations will determine the required amounts of additives needed to develop a "recipe" for the full-scale treatment process. The process will treat the sludge to meet Universal Treatment Standard requirements and statistically demonstrate that the resulting waste product will meet the appropriate disposal facility's waste acceptance criteria. Once the process control program is developed and confirmed using a surrogate waste and calculations, the sludge will be removed from the north, south, and middle basins; north and south transfer stations; and transfer canal by vacuuming the material from the floors and horizontal surfaces. This activity may be accomplished by either underwater nuclear divers and/or from the surface of the basins using long-reach tools, depending on personnel

exposure and ALARA considerations. The sludge will be pumped from the vacuum unit and passed through a radiation monitor to protect workers from inadvertent exposure to highly radioactive material. It will then be pumped to approximately 1,500-gal, high-integrity containers where excess water will be removed by filtration and returned to the basins. The dewatered sludge will be stabilized using the treatment process developed by the process control program by mixing specific amounts of grout and additives designed to meet HWMA/RCRA Land Disposal Restriction requirements. The treated waste will be allowed to cure in the high-integrity containers and then stored pending transport to the selected disposal facility. Treatment will occur under a generator treatment plan in batches, and all batches of waste will be treated within required 90-day periods.

The removal, treatment, and disposal of the sludge will be completed in preparation for the CERCLA removal action at the CPP-603 facility. The task's primary objective is to remove the sludge from the basin facility, thereby reducing the environmental hazard. This effort will be performed in accordance with the activities described in the Engineering Evaluation/Cost Analysis (DOE-ID 2004), in compliance with HWMA/RCRA standards, and as agreed upon by the DOE, the State of Idaho Department of Environmental Quality, and the U.S. Environmental Protection Agency (EPA), Region 10. Once the sludge is removed from the basins and successfully treated, it will be temporarily stored until the stabilized waste is transported to the selected disposal site.

2.2 Removal of the Small High-Activity Debris Object (SHADO 1)

The small high-activity debris object (SHADO 1) identified in the south basin during basin scanning will be removed from the basin under this Removal Action Work Plan. The SHADO 1 was described in detail in the Engineering Evaluation/Cost Analysis (DOE-ID 2004). The sequence of events that will be implemented by Bechtel BWXT Idaho, LLC, Operations personnel to manage SHADO 1 are as follows:

- While the SHADO 1 is still in the south basin, Operations personnel will manually transfer it using long-reach tools to a basket suitable for dry storage in the Irradiated Fuel Storage Facility (IFSF)
- The basket will be transferred to a transport and interim storage package
- The transport-storage package with the basket containing SHADO 1 will be removed from the CPP-603 south basin
- The SHADO 1 object will be transported to the IFSF according to the IFSF fuel transfer schedule
- The SHADO 1 will be placed into an IFSF fuel storage canister with similar material and stored in the IFSF for the foreseeable future.

2.3 Consolidation and Location of Cobalt-60 Containing Debris

Before water removal and grout placement in the basins, all discrete, high-activity cobalt-60 containing metal pieces identified will be collocated to a single location in the south basin with that location recorded for future reference. The highly radioactive debris objects will be consolidated in the existing "hot boxes" and the location will be noted for future reference. The "hot boxes" are located approximately 20 ft from the east wall and 8 to 12 ft from the north wall of the south basin. The debris objects will be encapsulated and shielded by the grout placed in the basins. The debris objects measure up to 300 R/hr because of activation products. The primary contaminant is cobalt-60. Cobalt-60 decays rapidly and has a half-life of 5.27 years. The total amount of cobalt-60 in all debris objects will decay to

approximately 19.5 Ci by 2035, when operations in the CPP-603 Complex are expected to end. If the end state selected for the CPP-603 Complex includes removal of the debris objects, the location of the objects will be recorded and will allow workers to readily locate them for removal in the future.

2.4 Basin Water Removal, Treatment, and Disposal and Filling the Basins with Grout

A subcontractor will remove, treat, and dispose of basin water and will fill the basins with grout. At this time, a subcontractor has not been selected for the basin water removal, treatment, and disposal and basin grouting portion of the removal action. The successful subcontractor will be selected based on the best proposal submitted to accomplish the scope of work described in the Request for Proposal scheduled to be issued in April 2005. Upon issuance of the contract for this activity, the details of how the tasks will be accomplished will be provided to the Agencies. The best information available at this time describing the scope of the subcontract includes the following work:

- Design, fabricate, test, deliver, install, and operate a concrete/grouting system to fill the CPP-603 basin facility (north, middle, and south basins), transfer stations (north and south), and the transfer canal with concrete/grout. The approximate total volume of the CPP-603 basins is 7,500 yd^3.

- The concrete/grout system also shall be capable of filling the three existing metal "hot boxes" containing highly radioactive debris objects with concrete/grout. The concrete/grout design shall minimize the effects of washout and shrinkage and shall be capable of being placed underwater without excessive segregation. The cured concrete/grout shall be capable of being removed from the basins, if necessary, utilizing conventional excavating equipment.

- The subcontractor shall perform a demonstration test at the subcontractor's facility on the concrete/grouting system prior to delivery to verify the design meets the requirements of the contract specification.

- Design, fabricate, test, deliver, install, and operate a water removal and filtering/treatment system to remove the water from the basins and transfer it to the ICDF evaporation pond(s). The water removal pumping operation will be coordinated and scheduled with the concrete/grouting placement operation such that the water level in the facility basins does not go above the maximum depth of 20 ft or below the minimum depth of 19-ft water levels. This is to prevent exposure of the scum line and the possible release of airborne radioactive contamination.

- The water removal and filtration of the approximately 1.4 million gal of radiologically contaminated basin water will include filling the basins with grout to within 4 in. of the top of the parapet wall depending on the radiation fields observed during grouting.

- The pump suction shall be installed in a manner that will minimize the possible intake of any of the particles greater than 0.5 in. in diameter that exist in the basins or that may be created as a result of the grouting activities. It shall be located no deeper than 2 ft under the water surface. The water may be pumped from a clean well, suction screens, or other selected methods to minimize intake of sediment and sludge into the pumping system.

- The entire length of the water transfer system shall be able to be visually inspected on a daily basis. If any piping is concealed, leak detection devices and methods shall be incorporated and checked daily. The system must be watertight and protected against the weather.

- The water pumped to the ICDF evaporation pond must meet all the requirements of the waste acceptance criteria.

3. COST AND SCHEDULE

The estimated cost of the CPP-603 basin facility's removal action is $12 to $15 million. This estimate covers the work specified in this Removal Action Work Plan and is based on the current cost estimate.

The actual start date for the removal action found in the Action Memorandum is early in 2005, but the actual schedule will depend on subcontract execution and approval of the required documentation. Required documentation includes this Removal Action Work Plan and the health and safety plan (which will be prepared by the yet-to-be-determined subcontractors), as well as subcontract documents, other applicable safety documentation, work orders, and work permits. The scheduled completion date for the first action in this Removal Action Work Plan, which is consolidation of the cobalt-60 activated debris, is currently mid-January 2005. Removal and management of the SHADO 1 is to be completed by the end of March 2005. Preparation, issue, and award of the dewatering/grouting subcontract will be completed by the end of April 2005 with mobilization of the subcontractor by mid-May 2005. The management self-assessment for dewatering and grouting will be completed by the end of May 2005. Water removal to the ICDF and grout placement will begin approximately June 1, 2005, and will be completed by September 30, 2005. Removal action closeout and the final removal action report will be completed by approximately the end of October 2005. A summary of the proposed schedule is provided in Table 1 below.

Table 1. CPP-603A removal action schedule.

Task	Estimated Completion Date
Consolidate cobalt-60 activated debris	January 2005
Remove and relocate SHADO 1	March 2005
Prepare, issue, and award dewatering and grout placement subcontract	April 2005
Mobilize subcontractor	May 2005
Complete the management self-assessment for dewatering and grout placement	May 2005
Complete the water removal/disposal and grout placement	September 2005
Complete the removal action closeout and final removal action report	October 2005
SHADO = small high-activity debris object	

4. PROJECT CLOSEOUT

At the conclusion of the removal action activities, a final removal action report will be issued. The final removal action report will include a complete documentation of the response operation and the actions taken. It will include a summary of events; an analysis of the effectiveness of the removal action activities; a list of problems impacting the response, if applicable; and any DOE recommendations. The report will contain characterization data, a description of the final facility status, and photos of the removal action project.

This report will summarize all phases of the removal action. The final removal action report will provide a formal overview of project activities, accomplishments, final status, and lessons learned.

5. REFERENCES

40 CFR 262.34, 2004, "Accumulation Time," *Code of Federal Regulations*, Office of the Federal Register, October 2004.

40 CFR 268.7, 2005, "Testing, Tracking, and Recordkeeping Requirements for Generators, Treaters, and Disposal Facilities," *Code of Federal Regulations*, Office of the Federal Register, January 2005.

40 CFR 268.48, 2005, "Universal Treatment Standards," *Code of Federal Regulations*, Office of the Federal Register, January 2005.

42 USC § 6901 et seq., 1976, "Resource Conservation and Recovery Act (Solid Waste Disposal Act)," *United States Code*, October 21, 1976.

42 USC § 9601 et seq., 1980, "Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA/Superfund)," *United States Code,* December 11, 1980.

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