Appendix B

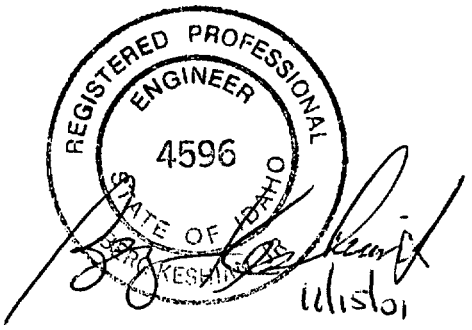
Design Specifications

Appendix B

Design Specifications Index for the Comprehensive RD/RA

Plan V-Tank Remediation Project

The following specification sections were prepared under the direction of the following professional engineer, licensed to practice engineering in the State of Idaho:



Specification Section	Title
Division 1: General Provisions	
Section 01100	Special Project Procedures
Section 01500	Temporary Facilities
Division 2: Site Work	
Section 02050	Demolition
Section 02115	Underground Storage Tank Removal
Section 02200	Excavation and Backfilling
Section 02700	Site Drainage
Section 02760	Utility Repair
Section 02920	Site Restoration
Division 11: Equipment	
Section 11215	Process Pumps and Accessories
Division 13: Special Construction	
Section 13001	Waste Containers
Section 13204	Water Treatment System and Dewatering

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Section 01100: Special Project Procedures

1. GENERAL

1.1 Scope

This section describes the following project-specific requirements and procedures:

A. Project Meetings

B. Project Record Documents

C. Coordination of other Site Work.

1.2 Related Work

(Not used)

1.3 Submittals

(Not used)

2. PRODUCTS

(Not used)

3. EXECUTION

3.1 Project Meetings

A. Weekly Progress Meeting

1. Weekly progress meetings will be conducted onsite between the Bechtel BWXT Idaho, LLC (BBWI) project manager and WESTON.

2. At a minimum, the following items will be discussed at the weekly meetings:

   a. Review of applicable specifications

   b. Review of safety issues

   c. Required equipment and personnel

   d. Weekly progress and production

   e. Three-week look-ahead schedule.

3.2 Project Record Documents

As-Built Drawings and Specifications: Changes will be documented on each page of the specifications and each sheet of drawings and other documents where such entry is required to show all changes. Documentation shall include Change Orders, as appropriate, and shall be initialed and dated by the individual making the entry.

All implemented changes to the construction documents, drawings, and specifications shall be approved in accordance with the project change control process.

3.3 Coordination of other Site Work

A. Demolition (decontamination and dismantlement [D&D]) work will be ongoing by others at Buildings 615 and 616. Work will be coordinated so as not to interfere with D&D operations.

B. A D&D representative will be invited to weekly site meetings, so conflicting work can be coordinated.

3.4 Use of Government-Furnished Equipment

Government-furnished equipment (GFE) shall be used to work in contaminated areas to the extent practical, based upon availability.

Section 01500: Temporary Facilities

1. GENERAL

1.1 Scope

This section covers the installation, maintenance, and operation of all temporary facilities and controls at the project site necessary to support the subcontractor and contractor operations during the course of this project. These temporary facilities and controls shall be removed at project completion and include, but are not limited to, haul roads, staging areas, access controls, utilities, and communications.

1.2 Related Work

Division 2 of these specifications

1.3 Submittals

Dust Retardant: Provide manufacturer's catalog data indicating material to be used. Include recommended application rates and instructions for application.

1.4 References

A. Management control procedure (MCP)-2714, "Safety Signs, Color Codes, and Barriers."

B. MCP-2742, "Temporary Facilities."

1.5 Access/Contamination Control

A. The Subcontractor shall provide temporary access facilities to the project site, as required, to safely execute the work. The Subcontractor shall provide temporary roads and other facilities, as needed, to maintain safe access through uncontrolled areas.

B. As work progresses, the Subcontractor shall maintain contamination-control boundaries between "clean" areas and contaminated areas.

C. Install access-control fencing to restrict, reduce, or eliminate access by unauthorized personnel or wildlife into the work area. Existing fencing around portions of the site may be used to establish the access control boundary.

D. Contamination-control fencing around contaminated areas shall be, at a minimum, colored, plastic, safety fencing or approved equal 4-ft high. Posts and fabric shall be secure and tight at all times.

E. The Subcontractor shall maintain site perimeter fences, gates, and nonradiological signs to prevent intrusion by the public. Maintenance includes keeping fences taut, performing all minor repairs that do not require additional materials, and placement of signs, except radiological postings.

F. Explosives, minors, domestic animals, firearms, alcohol, or drugs shall not be allowed on the site under any circumstances.

G. Private, personal, or government vehicles not used for authorized construction purposes shall not access the controlled areas. Parking of private, personal, or government vehicles shall be restricted to the staging area near the site access.

H. Equipment or vehicles entering controlled areas shall not contain food, beverages, tobacco products, lotions, medications, or any empty containers of the above-mentioned products.

1.6 Dust Control

A. The Contractor shall control dust within the construction boundaries shown on the drawings. Dust suppression shall include all roadways, stockpiles, and other areas, using techniques that include

1. Minimizing disturbance of vegetated areas

2. Enforcing lower speed limits on all vehicles traveling within the project site

3. Suppressing dust generation by spraying the area with water or a dust retardant.

B. Adequate moisture content shall be maintained at all times in contaminated areas where the preexisting surfaces have been removed or disturbed and in materials that have been stockpiled on the job site, so that dust will not be generated.

1.7 Site Water Management

Site water including stormwater, excavation dewatering, decontamination, and dust control shall be managed to prevent the spread of pollutants from work areas according to Section 02700 (Site Drainage).

2. PRODUCTS

Dust Retardant-Calcium Chloride. Acceptable product is LIQUIDOW by DOW Chemical Company or equal.

3. EXECUTION

3.1 Utilities

A. Water

1. The Subcontractor shall provide temporary piping for water transmission, as required, for dust and moisture control during excavation and backfill operations, for the decontamination facilities, and for other requirements.

2. The water source shall be from a local fire hydrant or other source as directed by the Contractor.

3. Water supply hookups shall have a backflow prevention device, acceptable to the water utility supplying water, installed at the service connection to allow cross-connection control.

B. Electricity

1. The Subcontractor will coordinate with the Contractor to arrange for temporary electric service required for remediation purposes.

2. If electrical power cannot be easily facilitated, the Subcontractor shall provide temporary generators.

C. Communications

1. Site communications for remediation operations will be accomplished with Subcontractor provided 2-way radios that comply with the Contractor's onsite requirements. The Contractor will provide additional radios to be used to communicate emergency issues to the Contractor.

2. Offsite communications will be accomplished with telephones.

3.2 Field Offices and Supporting Facilities

A. Subcontractor Facilities—General

1. The Subcontractor shall establish a field office.

2. The office shall be fully equipped and with all utilities in service prior to commencement of any construction activity.

B. Staging Area and Haul Routes

During the project mobilization, the Subcontractor shall develop and establish a project staging area. The staging area shall be used for vehicle parking and to place Contractor facilities, material, laydown yard equipment, storage, and any other temporary items associated with the project.

1. At project completion, demobilize the staging area and reclaim to preexisting conditions.

2. Proposed haul routes for excavated materials, backfill materials, and material to be disposed are shown on the design drawings.

C. Decontamination Facilities

1. All equipment decontamination shall be performed within the Drum Storage/Water Storage/Decontamination Area shown on the drawings.

2. Personnel decontamination shall be performed as required at TAN facilities.

D. Project Information Sign Board

1. Information on the sign board shall be protected from the elements to allow maximum visibility of the sign board contents. The sign board shall be clearly posted at the main entrance of the job site for the duration of the project, at a location approved by the Contractor. The following information shall appear on the sign board.

a. Danger: Construction Area – Unauthorized Personnel Keep Out

b. Location of the nearest telephone

c. A list containing the following emergency telephone numbers:

- 777 and the Warning Communication Center (6-1515)
- Contract administrator (name and telephone number)
- Contractor project manager (name and telephone number)
- Contractor technical representative (name and telephone number)
- Subcontractor's name and main office telephone number, the name of the Subcontractor project manager in charge of the project, and local telephone number

d. Hospital/emergency route map

e. Map showing site contamination (from design drawings).

D. Sanitary facilities

Subcontractor shall provide two portable toilets and shall arrange for weekly service.

E. Trash Disposal and Site Cleanup

The Subcontractor shall maintain the job site free of uncontaminated construction debris and trash.

3.3 Temporary Access and Protection Facilities

A. General Requirements

The Subcontractor shall provide temporary roads and other facilities, as needed, to maintain safe access through uncontrolled areas.

B. Access-Control Fencing

1. The Subcontractor shall install temporary 6 ft chain link access-control fencing around the perimeter of the site to restrict access into the work area.

2. General site control fencing within the boundaries of the site access control shall be, at a minimum, colored plastic safety fencing that is 4 ft high attached to steel T-posts 10 ft on-center that are embedded 1 ft in the ground (or an approved equal). Fabric shall be securely attached to the posts. Posts and fabric shall be secure and tight at all times.

3. High Radiation Areas (HRAs) that meet the criteria requiring controls as specified in the Idaho National Engineering and Environmental Laboratory (INEEL) Radiological Control Manual (RCM), Appendix 3B, shall be access controlled with a 6-ft high chain link fence.

C. Vehicle/Equipment Parking

All vehicles and equipment associated with the project shall be parked in the area shown on the drawings.

3.4 Temporary Facilities Removal

A. At completion of remediation, all temporary facilities and utilities installed by the Subcontractor shall be dismantled, demolished, or otherwise disposed of as appropriate and removed from the project site.

B. Gravel roadbase placed for onsite access roads and surface containment areas shall be randomly sampled and analyzed to determine whether or not material has been contaminated during remediation activities. Results of sampling shall determine how material will be disposed of. Material determined to be contaminated shall be packaged and stored with other contaminated soils removed during remediation for future disposal by the Contractor. Uncontaminated materials shall be removed and disposed of in accordance with the Waste Management Plan.

C. All disturbed areas shall be regraded as shown on drawings to match existing contours and to promote drainage without erosion. All disturbed areas shall be revegetated as specified within these specifications.

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Section 02050: Demolition

1. GENERAL

1.1 Scope

This section describes the requirements for removing buried piping, the valve pit, the sand filter, and other miscellaneous items as shown on the drawings.

1.2 Related Work

A. Division 1 of these specifications

B. Section 02115—Underground Storage Tank Removal

C. Section 02200—Excavation and Backfillling

D. Section 02700—Site Drainage

E. Section 02760—Utility Repair

F. Section 11215—Process Pumps and Accessories

G. Section 13001—Waste Containers

1.3 Submittals

A. Foam Sealant: Provide manufacturer's catalog data indicating material to be used. Include information indicating cure time of material.

B. Containment System for Pipe Cutting: Provide indication of containers that will be used. Provide manufacturer's catalog data indicating material to be used for absorbent.

C. Pipe Fittings for Line Capping: Provide manufacturer's catalog data indicating material to be used. Information shall include fasteners, gaskets, and other associated hardware required to make a complete unit installation.

1.4 References

Program requirements document (PRD)-2014, "Excavations and Surface Penetrations."

1.5 Salvage Disposition, Storage, and Handling of Property

A. General – All equipment, materials, and other items removed as part of this project are subject to the contaminant screening, decontamination, storage, and disposal requirements of the Waste Management Plan.

B. The Subcontractor shall remove all equipment, materials, and other items to enable access to the work areas.

1.6 Sequencing and Scheduling

(Not used)

2. PRODUCTS

A. Foam sealant shall be an expandable polyurethane foam sealant that will expand and fill voids. Acceptable Product Manufacturer: Great Stuff Polyurethane Foam/Dow Chemical Co.

B. Pipe fittings and flanges for capping pipe shall include fasteners, gaskets, and other hardware necessary to provide a complete seal. Fittings and flanges shall comply with the following standards as appropriate:

AWWA C110	Standard for ductile-iron and gray-iron fittings 3 in. through 48 in. for water.
AWWA C111	Standard for rubber-gasket joints for ductile-iron pressure pipe and fittings.
AWWA C115	Standard for flanged ductile-iron pipe with ductile-iron of gray-iron threaded flanges
AWWA C207	Steel pipe flanges for water works service sizes 4 in. through 144 in.
AWWA C208	Dimensions for fabricated steel water pipe fittings.
ASTM A815	Standard specification for wrought ferritic, ferritic/austenitic, and martensitic stainless steel piping fittings

3. EXECUTION

3.1 General

A. Remove existing site features as indicated on the design drawings. Subcontractor shall perform demolition in a manner to allow segregation and proper disposal of contaminated and uncontaminated debris.

B. Demolition methods and operation procedures shall comply with the following requirements:

1. Blasting, or the use of explosives in demolition operations, is not permitted.

2. Methods and operations used must prevent the spread of contamination from identified areas of contamination to uncontaminated areas.

C. No work shall be performed on lines that are inservice.

3.2 Protection

A. Dust Control

Protect all areas not directly affected by the remedial action from any refuse or dust generated by the work.

B. Structural Bracing

If at any time the stability of the structure or adjacent structures appears to be endangered, cease operations, take precautions to support such structures, and notify the Contractor project manager.

C. Property Owner Notification

Notify the Contractor project manager when any activity that might cause vibration of a structure and its contents will occur (e.g., jack-hammering), and advise the Contractor project manager when items should be protected and/or removed from walls adjacent to the construction activity.

3.3 Segregation and Decontamination of Debris

A. The contaminated and uncontaminated debris shall be segregated during demolition and removal operations.

B. Items such as concrete, asphalt, piping, and demolition debris, and other items in contact with contaminated material within the area of contamination (AOC) shall be considered contaminated and shall be disposed of as contaminated material. For items outside the AOC, a radiological survey and hazardous waste determination shall be performed prior to appropriate disposal.

3.4 Debris Storage and Disposal

A. Uncontaminated materials shall be managed and disposed as stipulated in the Waste Management Plan.

B. Contaminated materials shall be disposed as stipulated in the Waste Management Plan.

C. All uncontaminated and contaminated debris shall be processed to minimize the volume of voids created in the disposal mass.

1. Wood, concrete, asphalt, masonry, and other miscellaneous materials shall be cut or broken up to measure no greater than 3 ft in any direction.

2. Contaminated structural steel members shall be cut or broken into 6-ft lengths or smaller.

3. All contaminated pipes and ducts shall be cut to sizes no greater than 6 ft in length.

4. Crushing asbestos cement pipe is not permitted.

5. Pad all sharp corners and edges. If items are being placed in soil bags, soil may be used for this padding.

3.5 Removal of Existing Items

A. Unless otherwise noted on the design drawings, remove all existing items located within the remedial action area(s).

B. Notify the Contractor project manager before removing an item that cannot be removed without damaging any structure.

3.6 Utility Removal and Terminations

A. The Subcontractor shall observe the following requirements for excavating, cutting, and terminating existing piping.

1. Prior to commencing any pipe excavation, and prior to removal of sludges from the V-Tanks, the Subcontractor shall notify the Contractor project manager and make arrangements for three 6-in. and six 4-in. valves located in the Pump Room of Building TAN-616 to be opened. Valves shall remain open for a minimum of 24 hours before closing and tagging out.

2. After 6-in. diameter drain lines from Building TAN-616 have been allowed to drain, all waste lines to be excavated and removed on the project (including 6-in. drainlines) shall be locked-out by closing and tagging all existing isolation valves.

3. Exploratory excavation shall be conducted to physically locate all lines within the line removal area.

   a. Exploratory excavations shall be performed in accordance with PRD-2014, "Excavations and Surface Penetrations."

   b. Exploratory excavations shall be conducted in maximum lifts of 1 ft.

4. When lines are located, they shall be fully exposed along the entire length of piping within the line removal area before any pipe cutting or removal activities commence.

5. A containment system shall be placed beneath all pipe cuts prior to cutting pipe. A minimum of three containers, each with a minimum capacity of 5 gal each, shall be readily available at the pipe cut location. Each container shall have a wide opening capable of collecting fluids that may be present in pipes and shall have a lid. Absorbent material suitable for hazardous material spills shall be placed beneath container to cover an area twice the area of the container bottom so that if it is necessary to change out the container due to excess liquid present in the pipe, liquids not contained will be absorbed and not contaminate underlying soil. Any liquids collected during pipe cutting shall be disposed of in a water storage container that will be used for liquids removed from the V-Tanks.

6. If lines within the line removal area extend into a building, then lines shall be cut and capped at the building first, as shown on the drawings.

7. All pipe cutting shall be conducted by saw cutting. If line is to be capped, saw cut shall be clean and square with pipe. All pipe cuts shall start at the top of the pipe and shall stop as soon as the pipe wall has been penetrated to determine if any liquids are present in pipe. If liquid is present, an estimate of the amount of liquid within the pipe shall be calculated. Containers adequate to contain the expected volume of liquid in the pipe shall be readily available at the pipe cut location before additional pipe cutting proceeds.

8. Lines to be capped, as shown on the drawings, shall be capped as follows per manufacturer's recommendations.

   a. Lines 4-in. diameter and larger shall be capped with mechanical joint transition fittings and blind flanges

   b. Lines less than 4-in. diameter shall be capped with threaded blind flanges

c. Stainless steel lines shall be capped with stainless steel fittings and flanges. All other lines shall be capped with either cast iron fittings and flanges or with fittings and flanges of the same material type as the pipe to be capped.

9. Pipe shall be removed in the following manner.

a. If pipe connects to an existing tank, pipe removal shall commence at the location farthest away from tank and proceed toward tank so that any remaining fluid within the pipe will drain into the tank

b. If a section of pipe to be removed does not connect to an existing tank, pipe shall be removed in a manner that allows pipe to drain to a container that will allow waste to be transferred to an appropriate waste container.

10. When the pipe is cut between the extreme termination points of removal for the respective pipe being removed, the pipe shall be sealed as shown on the drawings prior to cutting to prevent escape of contaminants. Foam shall be applied in accordance with the manufacturer's recommendations.

B. The Subcontractor shall stop work and evaluate appropriate actions in the event that electrical power lines are encountered.

1. Lockout and tag power panels or breaker boxes.

2. Verify termination of electrical power.

3. Cut lines.

4. Terminate wires with wire nuts and seal with silicon.

C. All termination points shall be measured and tied to fixed features in the field to identify termination points. A minimum of two suing ties measured from different fixed features shall be pulled. Measurements shall be to the nearest 0.1 ft. Depth below grade of terminations shall be noted with a measured down distance from the existing adjacent grade at the top of the trench. All terminations shall be shown on the as-built drawings.

3.7 Sand Filter Removal

A. Contents of the sand filter shall be removed and placed in a unique 55-gal drum. The sand filter contents shall not be mixed with other sludges.

B. Demolish and size sand filter structure as specified herein.

3.8 Valve Pit Removal

A. Any liquids present within the valve pit shall be pumped out prior to removal of the valve pit structure and placed in unique 55-gal drums.

B. Valve pit structure shall be demolished and sized as specified herein. Debris shall be placed in unique soil bags.

C. All containers of valve pit materials shall be given to the INEEL Voluntary Consent Order (VCO) program.

3.9 Shipping Preparation

A. All contaminated debris resulting from surface demolition, utility removal, or structure demolition shall be sized as specified herein and placed in either soil bags or waste boxes as appropriate to meet the packaging requirements specified in Specification Section 13001 – Waste Containers, specified herein, and in accordance with DOT regulations.

B. Debris waste containers shall be temporarily stored in the Soil Bag/Debris/Tank Storage Area until shipment to final disposal site.

Section 02115: Underground Storage Tank Removal

1. GENERAL

1.1 Scope

This section describes removal requirements for the following tanks:

A. V-9

B. V-1, V-2, and V-3.

1.2 Related Work

A. Division 1 of these specifications

B. Section 02050—Demolition

C. Section 02200—Excavation and Backfilling

D. Section 02760—Utility Repair

E. Section 02700—Site Drainage

F. Section 11215—Process Pumps and Accessories

G. Section 13001—Waste Containers

H. Section 13204—Water Treatment Systems and Dewatering

I. Waste Management Plan (INEEL/EXT-01-00759)

1.3 Submittals

A. Trench Shields Used for Shoring: Provide manufacturer's catalog data indicating material to be used.

B. Shrink-Wrap Material for Packaging Tanks: Provide manufacturer's catalog data indicating material to be used.

1.4 Salvage Disposition, Storage, and Handling of Property

A. General

All equipment, materials and other items removed as part of this project are subject to the contaminant screening, decontamination, storage, and disposal requirements of the Waste Management Plan.

B. Remove all equipment, materials, and other items that must be removed to access work areas.

1.5 Sequencing and Scheduling

Schedule shall be in accordance with the approved project schedule.

2. PRODUCTS

A. Trench Shields

Trench shields shall be designed and certified by a professional engineer, registered in the State of Idaho. Shields shall be of steel construction and shall have a minimum capacity of 680 lb per square ft with a 24-ft length and shall be suitable for excavations 20 ft deep.

B. Shrink Wrap

Shrink wrap will be used to package the tanks once they have been cleaned, sampled, and approved as Class A waste. Tanks will then be rendered as debris by breaching the integrity of the tanks and then packaged as debris using a shrink wrap material. Material shall be 6.0 mil in thickness, 16 ft width, and 100-ft lengths (VeriPack.com, Part number 06-16100-6 or equivalent).

3. EXECUTION

3.1 General

A. Remove existing site features as indicated on the design drawings.

B. Demolition methods and operation procedures shall comply with the following requirements:

1. Blasting, or the use of explosives in demolition operations, is not permitted.

2. Methods and operations used must prevent the spread of contamination from identified areas of contamination to uncontaminated areas.

3. Protection of all workers is of the utmost importance. Minimization of worker exposure must be considered at all times.

3.2 Tank Removal Procedures

A. Contents shall be removed from the tank before tanks are removed. Inspect tank interior immediately prior to tank removal to verify that only minor amounts of sludge and debris remain (less than 0.3% of the tank volume). For RCRA regulatory purposes, the tanks will be considered to be empty.

B. Remove tanks in the order shown on drawings.

C. Soil shall be excavated from three sides of tank to levels shown on drawings.

D. Tank lifting and removal shall be performed according to the following procedure:

1. After the tank has been unearthed to the tank spring line, the Subcontractor shall visually inspect the tank for evidence of corrosion, cracking, disfigurement, or other failure conditions.

2. If no sign of failure is evident, the Subcontractor shall install a T-bar lifting device into the manway, in preparation for lifting one end of tank.

    a. A crane shall be used for lifting the tanks out of the excavation and onto a flatbed trailer.

    b. Use a T-Bar lifting device rigging rated for the respective lift, install the T-Bar into the manway (Tanks V-1, V-2, and V-3 only).

    c. V-1, V-2, and V-3 Tanks: with the T-Bar in-place, lift one end of the tank approximately 6 ft so that the bottom of the tank is exposed for inspection. Once inspected and integrity verified, install lifting straps at the 1/3rd and 2/3rd points along the tank, by sliding them in place while the tank is lifted with the T-Bar. Once lifting straps are in place, lower the tank and remove the T-Bar.

    d. V-9 Tank: Once inspected and integrity verified, install lifting straps around perimeter of tank.

    e. Temporarily cap all pipe penetrations and secure manways so no leakage is possible from the tanks.

    f. Attach lifting straps to crane and begin lifting the tank. Lift out of the soil cradle and lower onto adjacent soil within the excavation, so that exterior of tank can be cleaned within the excavation and further inspected for integrity.

    g. Surface contamination will be managed in accordance with the INEEL *Radiological Control Manual*. Radiological Technicians shall survey the tanks prior to handling to determine radiological conditions.

    h. Lift the tank, according to the lifting plan, onto the flat bed trailer and secure to trailer with strapping. Place blocking along both sides of the tank to prevent rolling. Prior to placing the tank on the trailer, place plastic sheeting on the trailer bed to prevent contamination of the trailer bed.

    i. Move tank to a secondary containment area and remove residual tank contents, as necessary, to meet packaging and transportation, and disposal requirements. Haul the tank to an interim storage, if needed.

3.3 Shipping Preparation

A. Prior to shipping tank to the final disposal site, the following preparation shall be conducted.

1. Remove all temporary pipe caps and manway cover.

2. Add solidification agent to tank to solidify any free water that may exist in bottom of tank in accordance with the disposal facility Waste Acceptance Criteria (WAC) and in accordance with the manufacturer's recommendation and subsequent verification with a bench scale

pilot test in order to achieve the desired level of solidification. Solidification agent shall be as specified in Section 13204, Water Treatment Systems and Dewatering.

3. Cut hole in tank below spring line to render the tank as debris.

4. After tank has been prepared for shipping and has been loaded onto a trailer for transport to the disposal facility, the entire tank shall be fully enclosed with a poly shrink-wrap. Because the tank could be either an excepted package or require Type A packaging, depending on the final radiological characteristics, final packing will be determined based on radiological surveys and samples. Final packaging will be in accordance with DOT regulations.

Section 02200: Excavation and Backfilling

1. GENERAL

1.1 Scope

This section describes the requirements for excavating, backfilling, compacting, and final grading.

1.2 Related Work

A. Division 1 of these specifications

B. Section 02050—Demolition

C. Section 02115—Underground Storage Tank Removal

D. Section 02700—Site Drainage

E. Section 02760—Utility Repair

F. Section 02920—Site Restoration

G. Section 13001—Waste Containers

H. Waste Management Plan (INEEL/EXT-01-00759)

1.3 Submittals

Vendor data sheets and design factor used to determine sizing if not previously included in the calculations, or if changes are proposed, shall be submitted to INEEL for review and approval prior to purchase and delivery. The following items shall have submittals:

A. 16 oz. Non-Woven Geotextile Fabric: Provide manufacturer's catalog data indicating material to be used.

B. 20-mil PVC Plastic Liner: Provide manufacturer's catalog data indicating material to be used.

C. Trench Boxes: Provide manufacturer's catalog data indicating material to be used.

D. Soil Compactor: Provide manufacturer's catalog data indicating material to be used.

1.4 Quality Assurances

A. Compaction testing will not be required unless excavations are required outside of the shoring and they are within a 1H:1V slope from the bottom of the foundation footing.

B. If soils testing is required, it shall be performed by an independent testing laboratory that meets the requirements of American Society for Testing and Materials (ASTM) E 329 with respect to soil and rock.

1.5 Sequencing and Scheduling

Schedule shall be in accordance with the approved project schedule.

1.6 References

The publication listed below forms a part of these specifications to the extent referenced. The publication is referred in the text by the basic designations only.

- DOE-STD-1090, "Hoisting and Rigging Devices"

2. PRODUCTS

2.1 Geosynthetic Liners

A. Containment areas shall be lined with a 20-mil. polyvinyl chloride (PVC) liner manufactured by Water Saver Co., Inc., or equal.

B. Access roads surfaced with road base shall be lined with a 16-oz nonwoven geosynthetic fabric, as shown on the drawings. The fabric shall be Amoco 4506, Synthetic Industries #1601, or equal.

2.2 Backfill Materials

A. General

1. Backfill materials shall be obtained from the TAN pit.

B. Imported Fill and Backfill Material Specifications

1. Gravel roadbase: This material shall be used to surface onsite gravel areas as shown on the drawings. The material shall have the following gradation:

Sieve Size	Percent passing (by weight)
1-1/2 in.	100
1 in.	90–100
No. 8	35–55
No. 200	0–8

Aggregate shall consist of stone gravel or other inert material of similar characteristics and shall be clean and free from vegetable matter and other deleterious substances.

3. EXECUTION

3.1 General

A. Prior to beginning any excavation, the Subcontractor shall locate utilities in accordance with Section 02760 (Utility Repair) of these specifications.

B. Use the required lines, levels, contours, and datum established by the Contractor, and shown on the construction drawings, before excavating and backfilling.

C. Keep work involving contaminated materials separated from uncontaminated earthwork. Stockpile contaminated materials only in contaminated areas. Control surface-water runoff from contaminated areas so that it does not flow onto uncontaminated areas.

D. Provide adequate safe working space for personnel within the limits of excavations. Excavations greater than 4 ft shall have sloped sidewalls, shall be shored, or shall utilize trench boxes to protect personnel within the excavation.

E. Keep excavated spoil, equipment, and materials at a sufficient setback (at least 5 feet) from excavations to prevent cave-ins or bank slides.

F. Protect the following from damage by traffic or construction activities:

1. Benchmarks and survey monuments
2. Utilities not specified for removal
3. Monitoring wells
4. Buildings.

3.2 Dust and Moisture Control

A. Watering for moisture control during compaction and for dust control during the project shall consist of furnishing equipment, accessories, and incidentals necessary to apply water.

B. Water for compacting stockpile material, sub base, base, and surfacing material and for dust suppression shall be applied by means that ensure a uniform application.

C. All equipment used for the application of water shall be equipped with a positive means of shut off.

D. Water shall be free of oils, acids, alkalis, salts, or any substance injurious to human, animal, or plant life.

E. Use of dust retardants shall be in accordance with the requirements of Section 01500.

3.3 Excavation

A. General

Prior to beginning excavation or demolition work in an area, construct temporary site drainage facilities, as needed, to control surface runoff as required in Section 02700 (Site Drainage) of these specifications.

1. Conduct operations in a manner to prevent contamination of uncontaminated materials.

2. The limits of excavation are shown on the design drawings.

3. Excavations and excavated materials shall follow current Occupational Safety and Health Administration (OSHA) requirements.

B. Site Preparation

1. Lockout and tag all known utilities including waste lines, water lines, and electrical power according to Section 02050 (Demolition).

C. Piping and Tank Excavation

1. Excavation shall proceed according to the Mandatory Removal Sequence shown on the drawings.

2. Excavations shall be shored as shown on the drawings.

3. Excavations greater than 4 ft in depth shall be shored with trench boxes, trench shields, or have sides of excavation sloped so they do not exceed 2H:IV.

3.4 Soil Handling, Removal, and Storage

A. Excavated soil shall be loaded into soft sided polyester bags or rolloff boxes. If soil bags are used, the loading should not exceed 84% of the available bag volume and shall not exceed the load rating of the bag.

B. Filled bags shall be lifted by crane onto a flatbed truck for hauling to the soil storage area shown on the drawings.

C. Bags shall be screened for contamination, labeled, and stockpiled at the storage location shown on the drawings. All documentation and procedures for handling contaminated materials shall be performed according to the Waste Management Plan and Decontamination Plan.

3.5 Backfilling

A. Backfilling shall not commence until soil sample results have been received and the Contractor has authorized backfill to commence.

B. When uncontaminated backfill must be placed next to the boundary of a contaminated material deposit, install geotextile material to segregate contaminated materials from backfill materials. Care shall be taken to avoid damage or displacement of the barrier during backfill operations.

C. Fill materials shall be placed and compacted to the lines and grades shown by the final contour lines and grade-control points shown on the design drawings.

D. All finish grades shall be graded uniformly, as necessary, to maintain drainage patterns. All areas shall have positive drainage away from structures and shall have complete positive drainage.

3.6 Compaction

A. Compaction, if necessary, shall be performed according to the following method.

1. Subgrades for onsite access roads and secondary containment areas shall be scarified to a depth of 12 in. and moisture conditioned so that subgrade moisture is uniform and adequate to facilitate compaction, but not to the point that soil either "pumps" or has free water after compaction. Subgrade shall be compacted with 3 complete passes of a vibratory self-propelled compactor having a minimum weight of 12,000 lb. Use of smooth drum rollers will not be allowed.

2. Backfill shall be placed in maximum 1-ft lifts (uncompacted).

3. Each lift shall be compacted with 3 complete passes of a vibratory self-propelled compactor, having a minimum weight of 12,000 pounds. Use of smooth drum rollers will not be allowed for any backfill materials except roadbase material.

4. During compaction, the moisture content of fill material shall be maintained uniform and shall be such that backfill material dust does not occur during compaction and that there is enough water so the soil is wet but not to the point that the soil either "pumps" or has free water after compaction.

5. If backfilling is required within a 1H:1V slope from the bottom of a building footing, compaction testing will be required. Material shall be compacted to a maximum dry density of 95% per ASTM D 698. Moisture content of the fill shall be within ±2% of optimum moisture, as determined by ASTM D 698. Material shall be tested at a frequency of two tests per lift, using a nuclear density gauge to expedite test time. If an area fails compaction, the area from the failed test to ½ the distance between the failed test and the closest passing test shall be reworked, recompacted, and retested until specified compaction is met.

6. Compaction testing or method specification compacting shall not be required for any temporary installations installed by the Subcontractor. The Subcontractor shall be responsible for compacting material to a density and moisture content that will allow the temporary installation to perform for the duration of the subcontract.

3.7 Release of Equipment for Unrestricted Use

A. All non-government furnished vehicles and equipment that have worked in a contaminated area must be decontaminated and must have a release survey prior to release for unrestricted use (e.g., hauling clean backfill, returning to shop for maintenance, or hauling materials for other customers).

B. Government furnished equipment shall be surveyed, decontaminated to the extent practical, and released for conditional use.

C. The Contractor will perform all release surveys.

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Section 02700: Site Drainage

1. GENERAL

1.1 Scope

A. This section describes the requirements for the control of site drainage during excavation and other construction activities.

B. Work related to the construction of temporary facilities, including temporary ditches, culverts, and ponds.

1.2 Related Work

A. Division 1 of these specifications

B. Section 02050—Demolition

C. Section 02200—Excavation and Backfilling

D. Section 02920—Site Restoration

E. Section 13204—Water Treatment Systems and Dewatering

1.3 Submittals

A. Culvert Pipe: Provide manufacturer's catalog data indicating material to be used.

B. Raingutters and Downspouts: Provide manufacturer's catalog data indicating material to be used.

1.4 Delivery, Storage, and Handling

(Not used)

1.5 Quality Assurance

(Not used)

1.6 References

The publications listed below form a part of these specifications to the extent referenced. The publications are referenced in the text by the basic designations only.

A. American Association of State Highway and Transportation Officials (AASHTO), AASHTO M36, Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains.

B. National Pollutant Discharge Elimination Systems (NPDES) Regulations for Construction Stormwater Discharges.

C. DOE-ID, 1998, *INEEL Stormwater Prevention Plan for Construction Activities.*

1.7 Site Water Management

A. During the contract performance period, and prior to completion of permanent runoff control features, prevent runoff water from leaving contaminated areas of the project site. The Subcontractor shall comply by using techniques such as the following:

1. Excavation of temporary swales, ditches, and/or retention ponds.

2. Construction of temporary diversion dikes and berms.

3. Pumping water to runoff water storage tanks located in Drum Storage/Water Storage/Decontamination Area. Water removed from contaminated excavations or runoff ponds will be considered to be contaminated.

B. Adequate runoff water control shall be maintained at all times in contaminated and/or controlled areas where the preexisting surfaces have been removed or disturbed and in stockpiles of materials on the project site, so that water is prevented from flowing from contaminated areas to uncontaminated areas.

C. Establish controls to keep runoff water from noncontaminated areas from entering the site and any contaminated area.

D. Install temporary drainage piping to control overland flow, route natural drainage under temporary roadways, and intercept groundwater flows, if necessary. The Subcontractor shall select the size and type of piping to be used and shall be responsible for the performance of the temporary piping. The Subcontractor shall adequately compact materials around the drainage piping to ensure protection of the piping and adequacy of fill over the piping. Perform regular maintenance of any temporary piping, as necessary, to prevent plugging or reduced capacity.

2. PRODUCTS

2.1 Materials

A. Culverts

1. Culvert pipe, where required on the drawings, shall be corrugated metal pipe and shall be provided with fittings, coupling bands, coupling gaskets, and all required accessories.

2. Diameter of pipe shall be no less than 6 in. or as shown on the design drawings. Unless otherwise indicated on the design drawings, the thickness of the pipe shall be 16-gauge minimum.

B. Fill material for installation in areas verified as uncontaminated shall be as specified in Section 02200 (Excavation and Backfilling).

C. Raingutters, downspouts, and fittings shall be vinyl or PVC.

3. EXECUTION

3.1 Drainage Ditches

A. Temporary drainage ditches shall be excavated true-to-line and graded, as shown on the design drawings. Ditches shall have positive drainage away from the excavation, decontamination areas, and exclusion areas.

B. Drainage ditches shall be maintained until final acceptance of the work.

1. Temporary Drainage Ditches: Temporary drainage ditches and ponds shall be excavated, as needed, to collect storm runoff and water-borne contaminated material during remediation. Upgradient and perimeter diversion ditches and berms shall be constructed to direct storm runoff from entering the job site or excavations where work is in progress.

2. Permanent Drainage Ditches: The subgrade of each permanent drainage ditch shall be restored to original grade and dimensions. All rocks, brush, roots, large clods, and other objects shall be removed.

3.2 Raingutters

A. Raingutters shall be installed on roofs downsloping to the excavation area. Raingutters shall be vinyl and slope at a minimum of 1% away from the excavation area.

B. Downspouts shall be installed where shown on the design drawings. Corrugated flexible drainage piping shall divert the stormwater away from the excavation areas, as shown on the design drawings.

3.3 Culvert Installations

A. The Subcontractor shall construct temporary culverts where vehicle routes will impact existing or temporary drainage ditches.

B. Excavation: Excavate trenches to the lines and grades indicated on the design drawings to provide a firm and uniform bearing for the entire length of the pipe.

C. Backfill: Backfill and compaction of drainage installations shall be in accordance with Section 02200 (Excavation and Backfilling).

3.4 Maintenance

A. Maintain site drainage and erosion-control systems during excavation, demolition, and site restoration activities.

B. Culverts and ditches shall be kept free of sediment deposits, debris, and other materials that may restrict or prevent drainage.

C. Remove sediment deposits from behind erosion-control systems when the deposits reach approximately one-half the height of the fence, hay bale, or rock pile. Sediment deposits from contaminated areas are assumed to be contaminated and shall be handled as contaminated material.

D. Ponded water within secondary containment areas shall be removed within 24 hours after a rainfall. Water shall be pumped into containers and treated, as required, for ultimate disposal. Any onsite runoff that collects in other areas of the site and that does not infiltrate into the ground within 24 hours of the storm event, shall be removed. Water removed from secondary containment areas and from other areas of the site shall be pumped into the 10,000-gal water storage tank designated for the respective water source. Water storage tanks shall be located in the Drum Storage/Water Storage/Decontamination Area shown on the drawings. When the respective storage tank is full, it shall be sampled and analyzed to determine if hazardous constituents are present. Water that is determined to be non-hazardous shall be hauled and disposed of at a location designated by the Contractor.

If sampled water contains hazardous constituents, and the concentrations of the hazardous constituents exceed LDR levels on the TSDF's WAC, the water shall be treated with the Backup Water Treatment Process shown on the drawings until the LOR/TSDF WAC levels are achieved. Water shall then be solidified and prepared for shipment to the TSDF.

Section 02760: Utility Repair

1. GENERAL

1.1 Scope

This section describes the general requirements for the protection, removal, and repair of existing site utilities that may be encountered during site excavation.

1.2 Related Work

A. Division 1 of these specifications

B. Section 02050—Demolition

C. Section 02200—Excavation and Backfilling

D. Section 02700—Site Drainage

1.3 Submittals

(Not used)

1.4 Quality Assurances

(Not used)

1.5 References

The publications listed below form a part of these specifications to the extent referenced. The publications are referred to in the text by the basic designations only.

A. International Association of Plumbing and Mechanical Officials (IAMPO)

IAMPO IS-1 Installation Standard for Non-Metallic Building Sewers

IAMPO IS-8 Installation Standard for PVC Cold Water Building Supply and Yard Piping

B. National Electric Code (NEC)

2. PRODUCTS

2.1 Backfill Materials

A. Embedment Materials: All embedment materials shall meet the requirements of ASTM C33 for sand.

B. Other Materials: Backfill materials from 1 ft above top of pipe to finished grade shall be general fill.

2.2 Utility Repair Materials

A. Sewer Service Lines

1. Pipe: PSM polyvinyl chloride sewer pipes and fittings with electrometric gasket or rubber ring type compression joints. SDR 35 conforming to ASTM D 3034 and IAMPO IS-1.

2. Couplings: Couplings from new to old piping shall be mechanical couplings capable of aligning the inside diameters of new and old pipe. All clamps and related hardware shall be stainless steel. Caulder couplings, or equal, are acceptable.

B. Potable Water Service Lines

1. Repair with pipe materials compatible in size, grade, and material type to existing service lines, unless specified otherwise on design drawings.

2. Copper Tubing: Type K, annealed seamless copper water tubing shall conform to ASTM B 88. Joints with a 3/4-in. inside diameter and smaller shall be made with flared fittings conforming to American National Standards Institute (ANSI) B16.26. Joints with an inside diameter larger than 3/4 in. shall be silver brazed with wrought copper fittings conforming to ANSI B16.22.

3. Galvanized Piping: Conform to ASTM A 53, Type S, Grade A or B, Schedule 40 with galvanized malleable iron screwed fittings.

4. Plastic Piping: PVC that conforms to ASTM D 1785, Schedule 80, 160 psi, SDR 26 with socket solvent cement fittings per IAMPO IS-8.

C. Buried Electric Lines: Repair with wire type equivalent to existing lines that is suitable for direct bury, or conduit and wire per NEC. All splices shall be made with approved waterproof connectors. Lines owned by the electric utility company shall be repaired by the utility company and not by the Subcontractor.

D. Gas Lines: Repair lines as required by utility company or INEEL.

E. Telephone Lines: Repair lines as required by utility company or INEEL.

F. Water Distribution and Sewer Collection: Repair as required by INEEL.

3. EXECUTION

3.1 Location

A. Locations, sizes, depths, clearances, and identification of utility lines and pipes shown on the design drawings are considered approximate, not all inclusive, and subject to change. Determine locations, sizes, depths, clearances, and identify all main utility lines in all work areas prior to beginning construction. Arrange to have underground utilities in work areas located by INEEL facilities.

B. Actual excavation on the site shall not be allowed until the known utility lines have been located.

C. Work beneath energized overhead electrical lines shall not be allowed without shielding and the required safe working distance defined by OSHA.

3.2 Underground Utilities Encountered During Excavations

A. Damage to identified utilities shall be repaired under the supervision of the respective utility service or agency having jurisdiction.

B. Abandoned utilities encountered during excavation shall be cut and removed between the outer extents of the excavation. If open pipe ends are encountered or an abandoned utility line is broken during excavation creating open pipe ends, the pipes shall be capped. Capping may be accomplished by crimping, pouring concrete around, or plugging the open pipe end in such a way as to prevent leakage. Locations of abandoned utilities left in place at the extents of the excavation shall be documented on the project record drawings.

C. Active utilities shall be supported in place or removed and replaced. In place support or removal and replacement shall comply with the specifications of the affected utility service or INEEL. Active utilities left in place shall be cleaned of any contaminated material before backfilling.

3.3 Installation

A. General

1. Coordinate interruptions of utility services with INEEL facilities.

2. Areas must be graded, as necessary, to prevent surface water from flowing into trenches or other excavations, and water accumulating therein must be removed by pumping or by any other approved method.

3. Trench width at the pipe shall be limited to the pipe diameter plus 2 ft. Any unauthorized excavations below the levels indicated for utility structures or pipes must be filled with common backfill material.

B. Pipe Subgrade

1. If disturbed, the subgrade shall be compacted. For pipes 3 in. in diameter and larger, the subgrade shall be graded to conform to the curvature of the pipe or a minimum of 4 in. of embedment material shall be placed between the bottom of the pipe and the subgrade in accordance with Section 3.6 of Specification Section 02200.

C. Pipe Embedment

1. Backfill material shall be deposited in maximum 6-in. layers and shall be thoroughly compacted. Care shall be taken not to disturb either the horizontal or vertical alignment of the pipe. Embed both sides of pipe simultaneously to avoid lateral displacement in accordance with Section 3.6 of Specification Section 02200.

2. All temporary supports shall be removed, if possible, after embedment. If supports must be left in place, they must be inert and nonorganic and they must not place the pipe under stress or cause excessive point loading that could damage the piping.

D. Trench Backfilling and Compacting: Trenches shall be backfilled and compacted using hand operated compaction equipment such as jumping-jack compactors. Applied effort shall be that required to achieve 90% of a maximum dry density standard proctor.

E. Tests

1. Test systems that are repaired or replaced to ensure the utility functions properly. Tests shall be repeated until each system is proven acceptable.

2. Plumbing System Testing: Waste, vent, and rainwater conductors shall be visually inspected for damage or leaks, then tested by water or air in accordance with the provisions of the Uniform Plumbing Code.

   a. Domestic water piping shall be tested under a water pressure not less than the working pressure under which it is to be used. All domestic water transmission and distribution installations shall be disinfected in accordance with the Plumbing Code. Test duration shall be 1 hour with no leaks.

Section 02920: Site Restoration

1. GENERAL

1.1 Scope

A. This section addresses work associated with restoration of areas that have been disturbed by construction activities related to excavation activities, construction of haul roads, and equipment staging areas.

1.2 Related Work

A. Division 1 of these Specifications

B. Section 02200 – Excavation and Backfilling

C. Section 02700 – Site Drainage

1.3 Submittals

A. Seed Mix: Provide manufacturer's certificate of formulation of the seed mix to be used.

B. Fertilizer: Provide manufacturer's data of material to be used.

C. Erosion Control Materials: Provide manufacturer's catalog data indicating material to be used.

1.4 Quality Assurances

(Not used)

1.5 References

A. American National Standards Institute, Inc. (ANSI), *American Standards for Nursery Stock*.

B. United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) (formerly the Soil Conservation Service).

2. PRODUCTS

2.1 Topsoil Materials

Excess uncontaminated onsite soils that are available after construction of the temporary facilities shown on the drawings shall be used as the first source of the topsoil material; additional topsoil material needed shall be obtained from overburden material from the TAN Pit.

2.2 Soil Amendments

A. Chemical fertilizer shall be formulated as sulfur coated urea (16-48-0) with 80% of the nitrogen by weight, defined as slow release, and containing 5% iron and 10% sulfur.

1. Quality

a. Fertilizer shall be a standard commercial grade and shall provide the minimum percentage of available nutrients indicated in these specifications. A liquid form of fertilizer containing the minimum percentage of available nutrients may be used. Fertilizer shall be stored in a dry location.

2.3 Seed Material

A. Quality

Seed shall be furnished in accordance with the following provisions:

1. All seed shall be clearly tagged or labeled showing the type of seed, purity, germination, test date, and weed content.

2. A certificate of formulation from the manufacturer shall accompany each container of seed. Seed shall be delivered to the site either in individual seed containers by species or combined according to the table below.

3. Application rates of seed as specified are for Pure Live Seed (PLS).

4. Weed content of seed shall not exceed 0.5%.

B. Seeding

1. Seed mix shall be INEEL specific, meeting the following specifications:

Common Name	Botanical Name	PLS Pounds per Acre
P-27 Siberian wheat grass	—	5
"Vavilov" Siberian wheat grass	—	5
"Ephraim" Crested wheat grass	—	4
"Sodar" Stream bank wheat grass	—	5
TOTAL		19

2. Seed Sources:

a. Granite Seeds (801) 768-4422

b. Grimm Growers (208) 785-0830

c. Wind River Seed (307) 568-3361

d. Maple Leaf (800) 287-3162.

2.4 Erosion-Control Materials

A. Straw Mulch

1. Quality: Straw mulch shall consist only of barley or wheat straw and shall be certified to be free of noxious weeds.

2. Quantity: Straw mulch shall be applied at a rate of 1 ton per acre.

B. Erosion-Control Matting

1. Quality

a. Erosion-control matting shall be 100% wood or straw fiber, 11 to 12 oz/yard^2, 0.5 (+/- 1/8 in.) in. thick, with lightweight biodegradable or polypropylene netting on top side, for use on 5:1 to 3:1 slopes. Erosion-control fabric shall be American Excelsior Company CURLEX® I, or approved equivalent.

b. Erosion-control matting shall be shipped in rolls. Each roll shall have a label bearing the material type, weight, thickness, length, width, manufacturer's name, and date of manufacture. Erosion-control matting shall be stored in a dry location.

C. Hydromulch

1. Wood Cellulose Fiber Mulch

a. Wood fiber mulch shall be from mechanically processed wood, processed to contain no growth or germination inhibiting factors. The mulch shall be manufactured and processed so the fibers will remain in uniform suspension in water under agitation to form a homogenous slurry.

b. Hydromulch shall be American Excelsior Company Excel® Fibermulch II with tackifier, or approved equivalent.

2. Quantity: The mulch shall be applied at a rate of 1,500 lb/acre.

3. EXECUTION

3.1 Subcontractor Qualifications

(Not used)

3.2 Seed Bed Preparation

A. In place subsoils shall be ripped or tilled to a minimum depth of 3 in.

1. Tilling shall be accomplished with a ripper bar or with other equipment, which will provide thorough soil cultivation.

2. Tilling shall be performed parallel to the contour. No work shall be done when the soil is saturated or moisture content of the soil results in clumps or clod unfavorable to seeding.

3. After tilling, the soil shall be left in roughened condition.

3.3 Soil Amendments

A. Fertilizer shall be applied by broadcasting at the rate of 50 lb per acre.

3.4 Seeding Methods

A. Seeding shall occur on all areas that have been disturbed by construction work.

B. Areas to be seeded that have been damaged by erosion, vehicle tracks, or other causes shall be restored prior to seeding.

C. Seeding shall follow fertilizing within 24 to 48 hours. Seeding shall not be performed when weather conditions are not favorable (high winds or precipitation events).

D. Broadcast Seeding: Broadcast seeding shall only be performed on sites too rugged or inaccessible for hydroseeding equipment, when approved by the Contractor. Refer to Section 2.3B. for seeding rates.

1. A centrifugal-type broadcaster shall be used. Broadcasting shall not be performed when wind conditions exceed 10 miles per hour.

2. Seed shall be raked into the soil immediately following broadcast seeding covering the seed to a depth of 0.25 to 0.75 in.

E. Hydroseeding: Seed planted by this method shall be covered by straw mulch or hydromulched. Upon completion of the initial tilling operation, all areas to be hydroseeded shall have a uniform application of seed slurry mix. The slurry mix shall consist of the proper PLS pounds of seed per acre, with 200 pounds of wood fiber mulch and 50 pounds of tackifier per acre to act as a carrier for the seed, and 100 pounds per acre of sulfur coated urea fertilizer (25-4-8). Fertilizer and seed shall not be in the slurry more than 30 minutes prior to application.

F. Mulching: Mulch shall be spread uniformly at a rate of 1 ton per acre. Mulch shall be anchored into the soil to a depth of at least 2 in. with no more than one pass of the equipment. Mulching shall not be performed when wind speeds exceed 10 miles per hour.

3.5 Application of Erosion-Control Materials

Erosion-control materials shall be used when designated on the design drawings.

A. Straw Mulch: Straw mulch, as specified in Section 2.4A., shall be applied on all seeded areas flatter than a 3:1 slope. Within 24 hours after each area is seeded, straw mulch shall be uniformly applied at the rate of 2-½ tons per acre. Mulching shall not take place when wind velocities exceed 15 miles per hour.

B. Erosion-Control Matting: Erosion-control matting shall be installed on slopes 3:1 or greater. Matting shall be placed over the seedbed and tacked. Installation shall be per the manufacturer's written recommendations.

C. Hydromulch: On slopes equal to or steeper than 3:1, 2,000 pounds per acre of wood fiber mulch shall be put into a slurry with 200 pounds of tackifier. On slopes flatter than 3:1, hydromulching shall be applied at 1,500 pounds of wood fiber mulch per acre and 75 pounds of tackifier in the slurry.

3.6 Seeding and Planting Dates

A. Seeding shall be performed as soon as practical after final grading and when directed by the Contractor.

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Section 11215: Process Pumps and Accessories

1. GENERAL

This section specifies pumps, hoses, valves, and devices for tank solution processing operations that include water polishing, dewatering, and V-Tank content removal.

1.1 Related Work

Section 13001—Waste Containers

Section 13204—Water Treatment System and Dewatering

1.2 Sequencing and Scheduling

Prior to pumping tanks, a readiness assessment will review all safety aspects of the tank sludge removal.

1.3 Submittals

A. Hoses and Couplings: Provide manufacturer's catalog data indicating material to be used.

B. Level Controllers and Pressure Gauges: Provide manufacturer's catalog data indicating material to be used.

C. Double Containment for Piping: Provide manufacturer's catalog data indicating material to be used.

D. Pumps and Pressure Washers: Provide manufacturer's catalog data indicating material to be used.

E. HEPA Filter/Carbon Adsorber: Provide manufacturer's catalog indicating equipment and fillers/adsorbers to be used.

F. Process Dosimeter: Provide manufacturer's catalog data indicating equipment to be used.

2. PRODUCTS

2.1 Recirculation Pump (P1 & P5)

Tank solution processing pumps shall be self-priming, peristaltic operation and shall be able to handle flows up to 80 gpm and capable of passing solid particles up to 3/4 in. Pumps shall be Bartlett Services Inc. Nuclear Master-Pump.

Component	Specification
Motor power supply	100 scfm @ 125 psig

Pump Rating Curve

Component	Specification
Maximum flow	80 gpm
Maximum discharge head	67 ft
Maximum negative suction head	27 ft

2.2 T-4 Turbo Flow Wilden Plastic Pump (P2 and P3)

The T-4 air operated double diaphragm pump shall have polypropylene wetted housing and polyurethane diaphragm. Pump shall have a 1.5-in. inside diameter discharge.

Component	Specification
Air operated	Double diaphragm
Max. air supply operating pressure	125 psi

Pump Rating Curve

Component	Specification
Maximum flow	86 gpm
Maximum discharge head	0 psig @ air pressure of 100 psig with an SCFM of 60
Maximum negative suction head	26 ft

2.3 Model 3138k26 Heavy Duty Gasoline-Powered Cold-Water Pressure Washers (P4)

Pressure washer shall be a heavy-duty portable unit with a thermal relief valve to protect the pump from overheating if left in the bypass mode. Pressure washer shall include a 36-in. wand with trigger gun.

Washers shall have a heavy duty, tubular chassis with pneumatic tires. Unit shall include a low-oil alert to protect the engine and a 3/8-in. diameter × 50-ft long braided wire high-pressure hose.

High-pressure nozzles with spray angles of 0 degrees, 15 degrees, and 25 degrees shall be available.

2.4 Hoses, Couplings, Valves, and Strainers

2.4.1 General

All couplings shall meet MIL-C-27487 specifications.

All valves shall be Underwriters Laboratories, Inc. (UL) listed and meet Federal Specification WW-V-35C. Threaded sizes up to 2 in. shall be FM approved and Universal Plumbing Code (UPC), as tested by IAPMO. Switches with UR ratings shall be UL recognized; those with UL ratings shall be UL listed. Hoses shall be made of polyethylene or hypalon materials.

All sludge or contaminated water hoses shall be 3/4 to 2 in. inside diameter. All hoses, valves, and other fittings shall be poly sleeved to meet the requirements of double containment using super sleever secondary containment. Acceptable product: Bartlett Services, Inc. Super Sleever.

2.4.1.1 Suction hoses

A. Suction hoses shall be flexible.

B. Hoses shall be capable of working temperatures of -40 to +140°F.

2.4.1.2 Discharge Hoses

A. Discharge hoses shall be heavy-duty flexible hoses with a maximum working pressure of 200 psi.

B. Hoses shall be capable of working temperatures of -40 to +140°F.

2.4.1.3 Couplings, Reducers, and Fittings

A. Couplings shall be fiberglass reinforced nylon CAM-LOC couplings. Reducers and fittings shall meet MIL-C-27487 specifications and shall be interchangeable with other couplings meeting this standard. All couplings, reducers, and fittings shall be rated for a maximum working pressure of 250 psi for 1/2 to 2 in. sizes.

2.4.1.4 Control Valves (HV)

A. Valves shall be full port valves with a waterway through the valve equal to the valve's pipe size. Valves shall have threaded connections and shall be rated for 600 psi.

2.4.1.5 Metal Basket Strainer (S)

A. Strainer shall have the following characteristics:

1. Wire mesh welded construction
2. 2-in. NPT connection
3. 3/8-in. screen
4. 50 GPM capacity.

B. Type 304 stainless steel construction.

2.5 Level Controllers, Pressure Gauges, and Submersible Level Transducers

A. Level Sensors

1. (LV1) Flowline Ricorelay Bulk Tank Ultrasonic Level Controller, LA21-5001

   Range: 0.5 to 12 feet, Frequency: 50 hz, Pulse Rate: 3/sec, Beam Width: 8 degree conical, Voltage: 1-120 VAC, Temperature Range: -40 to 140 degrees F, Pressure: 30 psi @ 25 degrees C.

2. (LV2 and LV3) McMaster Carr P/N 46515K81

   Sensor shall be rated for 100 psi maximum pressure and shall have a maximum resistance full load amp rating at 120 VAC of 0.28 amps.

B. Pressure Gauges PZ3

Gauges are Type 315 stainless steel bourdon tube, NPT male adapter, range 0 to 200 psi.

C. Transducers

1. Flush mounted pressure transducer PZ1, PZ2

2. Accuracy ±1%, power supply 10-30 VAC, over pressure limit 200%, 1/2 metric pipe threads, range 0–200.

2.6 HEPA Filter/Carbon Adsorber (APCH)

D. The HEPA filter/carbon adsorber ventilation system shall be a portable ventilation system with a 1,000 cfm capacity capable of operating on 115 V power. System shall include a demister and bag-in/bag-out housings.

E. HEPA filters shall be encapsulated filters having a minimum efficiency of 99.97% on 0.3 micron size particles when D.O.P. tested at 100% and 20% of rated capacity. Test data and serial numbers shall be attached to each filter.

F. Carbon filters shall contain coconut shell activated carbon granules with a 4 × 8 particle size. Minimum tetrachloride activity shall be 60 and minimum iodine number shall be 1,050.

G. Acceptable HEPA Filter System: Bartlett Services Inc. AP-1000B
Acceptable Carbon Adsorber System: Barlett Services Inc. CH-1000.

2.7 Process Dosimeter (R)

A. Process dosimeter shall have a dose range of 0.001 mR to 999 R and a dose rate range of plus or minus 20 mR/h from 0 mR/h to 500 R/h. Unit shall have a 3 digit LCD readout for dose and dose rate. Operating frequency shall be 902-928 mHz. Unit shall be battery powered with standard 9 V alkaline battery. Acceptable manufacturer/product: SAIC/model PDE-4, Radio Transceiving Extremities Dosimeter.

3. EXECUTION

3.1 Simulated Mock-Up Setup and Testing

Tank contents removal operations, sludge dewatering, and water treatment and ventilation systems shall be set up and tested at the STAR Center in Idaho Falls, Idaho. The mock-up shall be set up at full scale and shall be tested with materials that simulate the texture and consistency of water and sludge that are expected to be encountered in the field.

Adjustments to equipment and operations shall be performed, as necessary, until the operator is capable of operating consistently and reliably under the field conditions that are expected. All changes to specified equipment, layouts, and operations shall be documented and shall be incorporated into revised plans and specifications.

3.2 Field Operations

A. Pumps, hoses, and devices shall be aligned, connected, and installed at the locations specified in the design drawings and in accordance with the manufacturer's recommendations.

B. Pumps, hoses, and devices shall be aligned, connected, and installed to match the mock-up, revised drawings, revised documents, and in accordance with Operating Procedures VT-2.

C. Leak detection paper shall be placed at each hose joint.

D. Hoses shall be continuous from tank to pump and shall be secured with leak-proof couplings.

E. All electrical connections to motors shall be in accordance with 29 CFR 1926.400–449 and the National Electric Code (National Fire Protection Association [NFPA] 70).

F. Conduct prestartup testing with clean water after assembly of equipment to check for leakage and proper operation of equipment. Repair all leaks and deficiencies prior to pumping contaminated materials.

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Section 13001: Waste Containers

1. GENERAL

1.1 Scope

A. This section describes the product requirements for waste containers used to store and transport contaminated materials from tank dewatering operations and demolition work.

1.2 Related Work

A. Section 02050—Demolition

B. Section 02200—Excavation and Backfilling

C. Section 11215—Process Pumps and Accessories

D. Section 13204—Water Treatment System and Dewatering

E. Waste Management Plan (INEEL/EXT-01-00759)

1.3 Submittals

A. Waste Boxes: Provide manufacturer's catalog data indicating material to be used.

B. Soft Side Bags: Provide manufacturer's catalog data indicating material to be used.

C. Water Storage Containers: Provide manufacturer's catalog data indicating material to be used.

D. Additional submittals

2. PRODUCTS

2.1 Shipping Casks

Shipping casks shall be Duratek, or equal, meeting the following specifications:

Duratek transport container	CNS 8-1208
Classification Certificate of Compliance	Type B USA/9168/B
Internal dimensions	62 in. dia × 75 in. height
Pb shielding equivalent	4.50 in.
Approximate maximum rad-levels	880 R/hr
Liner capacity	130 ft^3
55-gal drum capacity of cask	8 drums
Empty weight	49,300 lb
Max payload	14,680 lb

2.2 High-integrity containers

High-integrity containers (HICs) shall be Department of Transportation (DOT)-certified in accordance with 49 Code of Federal Regulations (CFR) 173.

2.2.1 Sludge HICs:

- Duratek PL-120-FP/FEDX, or equal, with internal 10 micron filters
- 60-in. diameter
- 73.5-in. height
- 725-lb weight
- 107.6-ft^3 internal usable volume

2.2.2 Water HICs:

- Duratek PL-8-120 MT, or equal
- 60-in. diameter
- 73.5-in. height
- 600-lb weight
- 107.6-ft^3 internal usable volume

2.3 Waste Boxes

Steel waste boxes with approved liner materials to prevent cross contamination shall be used to store and transport contaminated materials from demolition work including piping, fittings, concrete, and other debris. Boxes shall be DOT-certified in accordance with 49 CFR 173 to meet a minimum of IP2 packaging requirements, and shall meet all sizing and loading requirements of INEEL specification SPC-145.

2.4 Drums

Drums shall be steel construction and shall have a 55-gallon capacity. Drum body shall be 18-gauge steel and head shall be 14-gauge steel minimum with a gasket. Drums shall be DOT-certified in accordance with 49 CFR 173 and shall meet a minimum of UN-1A2 packaging requirements

2.5 Drums Filters

Each drum that will be used for storage of sludge shall have a NucFil® Filter installed in the drum cover, once the drum is filled to specification and is ready to be placed in interim storage. The filter can be purchased from Nuclear Filter Technology, Inc. or Gravatom, Inc.

2.6 Soft-Side Bags

A. Soil Bags

1. Excavated soil from within the contaminated area will be loaded, transported, and stored in Lift-Liner™ System (88 in.) bags manufactured by Transport Plastics, Inc., Sweetwater, Tennessee (800-603-8277).

2. The bags shall be woven and coated polyester material with 18 polyester lift straps. The bags shall be closed and secured with 4 flaps–2 full overlapping and 2 centering. The bags shall be fitted with 20 polyester webbing securing straps with corresponding receiver straps.

3. Each bag shall meet the following specifications:

Property	Specification
Overall size	96 × 88 × 60 in.
Weight capacity	24,000 lb
Lift capacity	24,000 lb

B. Loading Frame

1. The bag lifting frame shall be of square tube steel. Walls shall be 10-gauge sheet steel. The bottom shall be square tube steel grid.

2. The frame shall be lifted by forklift or crane and have a lifting weight capacity per DOE-STD-1090 of 24,000 lb.

3. Lifting hooks shall be 3-ton carbon steel. Design capacity shall be 40,000 lb.

2.7 Water Storage Containers

A. Water storage containers shall be vertical polyethylene storage tanks. Tanks shall be one-piece molded with no joints or seams. Tanks shall meet ASTM D1998 standards. Minimum size: 10,000-gallon capacity. Acceptable product: American Tank Company, product #085-210, or equal.

B. Water storage transport containers shall be polyethylene horizontal leg tanks. Tanks shall be one-piece, seamless, watertight tanks that are impact and chemical resistant. Tanks shall meet ASTM D 1998 standards and shall be ultraviolet (UV) stabilized. Tanks shall include necessary bands to secure tank during transport and a metal base platform with forklift sockets that will allow a full tank to be lifted and loaded. Maximum size: 1050 gal capacity. Acceptable product: American Tank Company product #205-175.

2.8 Sludge HIC Shielding

Sludge HIC shielding shall be fully enclosed concrete storage containers with a hinged lid that allows HIC to be inserted and removed from containers. Containers shall have a minimum wall thickness of 23 in. Acceptable product/manufacturer: Rad-Vault 8-120/Duratek or equal.

2.9 Shielded Overpacks for Dewatered Sludge Drums

Shielded overpacks shall meet the following requirements:

1. Capable of containing 55-gal UN-1A2 drums.

2. Compatible with V-Tank dewatered sludge.

3. Must shield TAN V-Tank dewatered sludge drums such that area general body radiation dose rates are less than 10 mR/hr with all sludge drums stored in the Interim Sludge Storage Facility (ISSF) and no single overpack containing a 55-gal drum with dewatered sludge will be greater than 20 mR/hr.

4. Must be sized such that 100 shielded overpacks can be stored within the ISSF secondary containment (67 ft 6 in. long by 27 ft 6 in. wide) and allow for movement of equipment to place and remove filled overpacks, perform routine inspections of the overpacks, and respond to emergency.

5. Maximum gross weight of overpacks with waste shall not exceed 6,000 lbs each.

6. Must have the capability to be vented to prevent release to the atmosphere.

7. Capable of being moved with a forklift (i.e. individual pallets or integral pallets).

8. No radiologically contaminated materials shall be used to fabricate overpacks or for shielding for the overpacks.

9. Considerations for lead shielding to be used to construct the shielded overpacks should first be given to Department of Energy (DOE) Moratorium lead for recycle before any new lead is procured.

10. Capable of preventing the spread of contamination to the external surfaces of the shielding over pack in the event the inner 55-gal dewatered sludge drums should leak.

2.10 Roll-off Bins

Roll-off bins shall be of steel construction with maximum outside dimensions of 8 ft wide by 20 ft long by 6 ft high. Roll-off bins shall meet LSA-1 packaging requirements specified in 49 CFR 173.24 and 49 CFR 173.410.

Section 13204: Water Treatment System and Dewatering

1. GENERAL

This section specifies resin and filter media used to treat water removed from the V-Tanks. The systems described in this specification are for the primary water treatment and a back up water treatment. In addition, this specification addresses the dewatering of sludge placed in 55-gal sludge dewatering drums.

1.1 Related Work

Section 02115—Underground Storage Tank Removal

Section 13001—Waste Containers

Section 11215—Process Pumps and Accessories

1.2 Sequencing and Scheduling

Prior to placing sludge in 55-gal drums, a comprehensive waste stream analysis for each sludge HIC will be performed to assess the constituents and characteristics of the sludge for dewatering purposes and for shipping and disposal purposes. The water storage tanks will also be sampled to determine if additional treatment will be required.

1.3 Submittals

A. Solidification Agent: Provide manufacturer's catalog data indicating material to be used. Include information indicating compatibility with the waste to be solidified.

B. Vibrator Table: Provide manufacturer's catalog data indicating specifications of unit to be used.

2. PRODUCTS

A. Water Treatment Drums

1. 55-gal, standard dimensions
2. 24-in. dia. × 35-in. height
3. Outlet fitting 1 in. FPT with flow distributor
4. Inlet fitting 1 in. FPT with flow distributor
5. Drain fitting 1 in. FPT
6. GPM max. 10
7. Max. pressure 10 psig

8. Lid 16-gauge lid ring and bolt, poly clad gasket

9. Acceptable product/manufacturer: water pollution control barrels/General Carbon Corp.

B. Granulated-Activated Carbon (CH)

Granular-activated carbon shall be virgin activated carbon derived from bituminous coal and granular in form with the following specifications:

Specifications	
Mesh size – 8 × 30	90% (min)
Less than No. 8	5% (max)
Greater than No. 30	5% (max)
Iodine number (mg/g)	1,000 (min)
Surface Area (m^2/g)	1,000 (min)
Hardness	90% (min)
Abrasion number	80 (min)
Moisture (as packaged)	5% (max)
Typical density (lb/ft^3)	27–30
Acceptable product/manufacturer	GC 8 × 30/General Carbon Corporation

C. Ion Exchange (IX)

Ion exchange treatment shall be a 360,000 grain commercial water softener with a strong acid cationic resin that can be regenerated with salt. Acceptable product: MacLean model #KS12000.

D. Oil and Grease Filter Media (F1)

Filter media shall be a polymeric hydrocarbon with very fine interlaced synthetic fibers containing no metals or halides. Filter media shall contain only carbon and hydrogen atoms. Filter media shall have a capacity of up to 25 lb of oil per pound of fiber. Media shall be suitable for placement in water treatment filter drums and shall be capable of handling up to 10 gpm pumping rates. Acceptable product/manufacturer: Bonifibers H/Selective Adsorption Associates, Inc. or equal.

E. Bag Filter (F2)

Bag filter shall be a heavy duty polyester felt filter bag capable of fitting inside a filter bag housing. Bag shall have a 1 micron filter size and shall be capable of up to 40 gpms flows. Bag size shall be 7 inch diameter by 16.5 inches long. Acceptable Product: McMaster-Carr 6835K11.

F. Solidification Agent

Solidification agent shall be a polymer capable of virtually instant adsorption of liquids. Solidification agent shall be capable of working within pH ranges of 3 to 12 and shall have an adsorbent capacity of 100–200 times its weight in clean water at ambient pressure. Solidification

agent shall not increase volumes by more than 0.5%. Material shall be nontoxic and nonbiodegradable. Acceptable product/manufacturer: WaterWorks SP-400/WaterWorks America, Inc. or equal.

G. Total Organic Carbon (TOC) Analyzer

1. TOC 2 ppbC to 125 ppmC

2. Precision greater of ±2% or 2 ppbC

3. Loop sampling

4. Analysis time 6–9 minutes (typical)

5. Acceptable product: OI Corporation, Model 1010 Wet Oxidation Analyzer

H. Day Tank

1. Polyethylene construction

2. 100 gal minimum capacity

I. Vibrator Table

1. Table shall be pneumatic powered capable of vibrating at greater than 3,000 vibrations per minute.

3. EXECUTION

A. Pumps, Hoses, Devices

Pumps, hoses, and devices shall be aligned, connected, and installed at the locations specified in the design drawings and in accordance with the manufacturer's recommendations.

Water from the V-Tanks may be combined. Transfer water into water storage tanks in water storage area shown on drawings. Each water storage tank shall be sampled for compliance with Land Disposal Restrictions (LDRs). If sample results are not below LDR requirements, perform backup water polishing as shown on the drawings. Water shall be cycled through the backup water polishing treatment train as many times as necessary to comply with LDR requirements.

The TOC of the exit of the filter drums shall be monitored to allow changing out filter drums that are prematurely exhausted.

B. Sludge Transfer and Drum Dewatering

1. Sludge Transferring from HIC to Drum

Contents of sludge HIC shall be recirculated for a period of time adequate to recirculate 3 HIC volumes. This recirculation mixing shall be performed prior to transferring sludge into drums and continuously during the drum filling process. Verify that contact dose rate measurements on the recirculation line have reached a steady state.

Calculate the volume of sludge and water that will not exceed 4 Curies of Sr-90 or 15 grams of fissile material. Drum shall be marked to allow operator to visually verify the level of sludge in the drum. Drum shall be filled with the lid off.

While monitoring for flow restrictions and exposure rates within the HIC, throttle open metering pump service air to a flow rate (minimum service air 80 psig) not to exceed a sludge transfer rate of 10 gpm. Communications shall be established between pump operator and waste receiving station at all times. High-efficiency particulate air (HEPA) ventilation shall be placed in the vicinity of drums being filled.

2. Dewatering Process of 55-Gallon Drums

A drum dewatering procedure shall be developed during the simulated mock-up setup and testing, that when followed, will ensure consistent results for the water concentrations in the 55-gal sludge drums. The process plan shall result in a free water content of < 1% by volume that meets the 10 CFR 61.56, "Waste Characteristics," at the completion of the dewatering cycles.

Prior to filling and dewatering drums, each drum shall be verified to have the proper dewatering filter installed inside of the drum. The drum dewatering lid shall be in place during the dewatering process. Drum shall be on vibrator table during filling and dewatering. At the end of the dewatering cycle, the drum dewatering lid shall be removed and solidification agent shall be placed on the sludge surface and in the filter cartridge assembly of the drum. Quantity of solidification agent to be added shall be determined during development of Operating Procedure VT-04.

The discharge of the dewatering pump shall be captured in a water HIC and transferred to the 1,000-gal water storage containers in the Drum Storage/Water Storage/Decontamination Area for subsequent treatment, as required.

C. Solidification of 1,000-gal Water Storage Containers

Water within the 1,000-gal water storage containers shall be solidified within each tank with solidification agent after the water within the tank has been sampled and analyzed for hazardous constituents. If analytical results from the sampling indicate that the water exceeds the TSDF WAC or the LDRs, water shall be further treated until it meets disposal standards. The amount of solidification to be used shall be based upon the manufacturer's recommendation and subsequent verification with a bench scale pilot test in order to achieve the desired level of solidification.