FLUOR

Technical Specifications
For
Soil and Disposal Facility Project

Excavation For Remediation

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U.S. DEPARTMENT OF ENERGY
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U.S. DEPARTMENT OF ENERGY

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Excavation For Remediation Technical Specifications

Technical specifications contained in this document detail requirements for soil excavation projects performed under the Soils and Disposal Facility Project. Technical specifications referenced, but not contained herein, are provided in On-Site Disposal Facility (OSDF) technical specification packages. The Legend and General Notes drawing within each excavation design package identify the applicable OSDF technical specification package document.

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02150, Rev C	Issue for 90% SWL/FTF design review	DRR	7/16/02
02150, Rev D	Re-issue for 90% SWL/FTF and 90% 3B/4B/5 design reviews	DRR	8/13/02
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SECTION 02150
TRAFFIC CONTROL

PART 1 GENERAL

1.1 SCOPE

A. This Section includes the traffic control requirements for the excavation areas, Special Materials Transfer Area (SMTA), Stockpile 7 (SP-7) and movement between the following: On-Site Disposal Facility (OSDF), OSDF Material Transfer Areas (OMTA), Bulk Material Transfer Area (BMTA), OSDF borrow area, Waste Pits Remedial Action Project (WPRAP), and designated project operational limits. (Requirements for traffic control within the OSDF and OSDF borrow area are contained in the IMPP and the OSDF Borrow Area Management and Restoration Work Plan.)

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02200 – Earthwork.

B. Section 02205 – Impacted Material Excavation.

C. Section 02206 – Earthwork for Remediation.

1.3 REFERENCES

A. Manual of Uniform Traffic Control Devices (MUTCD) for Streets and Highways, current edition.

B. State of Ohio, Department of Transportation (ODOT): Construction and Material Specifications, current edition.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide materials for traffic control, including stop and yield signs conforming to MUTCD and ODOT specifications.

B. Provide fencing as specified in Section 02200.

PART 3 EXECUTION

3.1 TRAFFIC CONTROL

A. Supply, install, and maintain traffic control devices.

B. Maintain speed limit of construction vehicles and equipment per postings and specific requirements stated in the Construction Traveler Package.

C. Ensure that haul equipment or other equipment traveling between certified and non-certified areas, remains on roads constructed of certified material. Perform wheel-wash activities and decontamination as necessary. The Construction Manager will arrange for radiological monitoring in accordance with Section 02205.

D. Provide entry points to the excavation area free of interference from non-project operations. Ensure that traffic entering haul roads yields to traffic already on the road.

E. Ensure that traffic routes are acceptable for use (stable) daily and after an event (rain) that may have altered the condition of the route.

F. Routes that cause equipment and/or vehicles to operate on inclines shall be evaluated and operational limits stated.

3.2 IMPACTED MATERIAL HAUL ROAD

A. Control the Impacted Material Haul Road (IMHR) as a contamination area during excavation and hauling of above-WAC materials. The Construction Manager must approve IMHR crossings from controlled areas.

B. The Construction Manager may post or reclassify road crossing intersections with the IMHR during periods of inactivity.

3.3 UTILITY CROSSINGS

A. Protect energized or active utility lines outside of existing paved areas that intersect proposed traffic routes. Use a 1 inch thick steel plate or an equivalent alternative. Provide length and width of steel plates as required to protect the existing utilities.

3.4 EQUIPMENT PARKING

A. OSDF Contractor Administration Area

1. Provide non-contaminated equipment parking areas within the OSDF Contractor Administration Area.
2. Restrict personal vehicles from the equipment parking areas.
3. Provide personnel parking at the OSDF Contractor Administration Area.

B. Contaminated Equipment Parking Area

1. Locate the contaminated equipment parking area as close as possible to the Radiological Control Point Facility.
2. Maintain contaminated equipment parking areas free of mud, debris and standing water.
3. Park contaminated equipment utilized in the SP-7 area, or above-WAC areas at the boundary of the area, in accordance with Section 02205, until decontaminated and released from the area.

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C. Parking areas shall be constructed to insure that personnel accessing and servicing the vehicles shall have firm and stable footing. The use of rip rap and other like materials is not acceptable.

END OF SECTION

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SECTION 02205
IMPACTED MATERIAL EXCAVATION

PART 1 GENERAL

1.1 SCOPE

A. This Section includes the requirements for excavating, size-reducing, segregating, stockpiling, loading, hauling, and unloading impacted material. Activities include, but are not limited to, the following:

1. Excavation of impacted materials to the design grade.
2. Segregation of impacted materials for disposition or reuse.
3. Size reduction of remaining structures, utilities, and miscellaneous debris.
4. Loading, hauling and unloading of impacted materials to appropriate disposition.
5. Development and maintenance of project stockpiles.
6. Support of site monitoring and sampling activities.
7. Performance of area management activities.
8. Supplemental excavation beyond the design grade.
9. Excavation of utilities below the design grade.

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02100 – Surveying.

B. Section 02150 – Traffic Control.

C. Section 02200 – Earthwork.

D. Section 02206 – Earthwork for Remediation.

E. Section 02230 – Road Construction.

F. Section 02275 – Surface Water Management and Erosion Control for Remediation.

G. Section 02930 – Vegetation.

H. Impacted Materials Placement Plan (IMPP), On Site Disposal Facility (OSDF), 20100-PL-007, current revision.

1.3 REFERENCES

A. Title 29, Code of Federal Regulations (CFR): 29 CFR 1926 Subpart P – Excavation, current edition.

B. Waste Acceptance Criteria (WAC) Attainment Plan for On Site Disposal Facility (OSDF), 20100-PL-0014, current revision.

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C. RM-0047, Fugitive Dust Control Requirements, current revision.

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1.4 DEFINITIONS

A. Active Stockpile: A stockpile specifically designed to operate for longer than 45 calendar days. This includes interim stockpiles that are older that 45 days and existing stockpiles shown on the Construction Drawings.

B. Debris: Impacted material that is generated during the excavation and removal of building structures, utilities, miscellaneous man-made materials, and natural materials. These materials include floor slabs; foundation walls; sheet piling; foundations; piers; footings; hydraulic ram casings; structural steel, re-bar and miscellaneous metal; electrical duct-bank, manholes, electrical wiring, and power poles; remaining equipment and miscellaneous mechanical items; chain link and other fencing; agricultural drain tiles; and rock, asphaltic pavement, and other aggregate materials not defined as Special Materials.

C. Design Grade: Grade created by excavation of impacted material to the lines and grades shown on Construction Drawings.

D. Final Remediation Levels (FRLs): The permissible concentration of contaminants that may remain in site soil and sediment following completion of remedial actions.

E. Hazardous Waste Management Unit (HWMU): Area shown on the Construction Drawings that has contained hazardous or mixed waste.

F. Impacted Material: Soil with contamination levels above the established FRLs or man-made materials. Impacted materials associated with soil excavation projects are presented in Table 02205-1.

G. Interim Stockpile: An impacted material project stockpile that is intended to be dispositioned in less than 45 calendar days.

H. Process Piping: Piping that is more likely to contain contaminated residue based on process knowledge of previous excavation activities (i.e. sanitary, effluent, or sump liquor lines).

I. Real-time Monitoring: Consists of several alternative methods of utilizing in-situ gamma spectroscopy, to analyze contaminant levels on the excavation surface.

J. Special Materials: Impacted material requiring special handling as specified in this Section and presented in Table 02205-1.

K. Supplemental Excavation: Removal of impacted material encountered beyond design grade.

L. Underground Storage Tank (UST): Tank that was used to contain an accumulation of a regulated substance, of which the volume was 10 percent or more beneath the ground surface.

M. WAC: Waste acceptance criteria (WAC) for disposition of material at the OSDF as defined by the WAC Attainment Plan. This WAC includes radiological/chemical criteria for soil,

physical criteria for debris, and criteria for ancillary remediation waste (i.e., analytical sample returns, PPE).

1.5 SUBMITTALS

A. Maintain a daily record of underground utilities that have been excavated from below the design grade, in the form of a redline drawing mark-up, for review by the Project Engineer every 30 days following the start of excavation beyond the design grade.

B. Submit calculations certified by a registered Professional Engineer ensuring slope stability when using equipment having a gross weight greater than specified for a Caterpillar CAT 350L within the excavation area, as necessary.

1.6 VERIFICATION OF THE EXISTING CONDITIONS

A. Verify existing conditions as specified in Section 02100.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide 20-mil sheets of Herculite or equal for use in buffer areas.

B. Provide 3/8-inch yellow nylon rope fence. Posts shall be in accordance with Section 02200.

2.2 EQUIPMENT

A. Furnish and maintain equipment to perform required operations in accordance with this Section.

B. Equipment used to haul impacted material over the existing paved IMHR, shall be equal to or less than the gross vehicle weight and axle loading for a Caterpillar CAT D300E haul truck (gross vehicle weight of 120,000 pounds and maximum axle width of 9-feet 10-inches). Pavement width of the existing two-way IMHR is 24-feet. Select equipment and equipment width to ensure safe operation on this road.

C. Equipment used within the excavation area shall be equal or less than the gross weight for a Caterpillar CAT 350L track hoe (112,500 pounds). Heavier equipment may be approved for use in this area pending submittal and approval of calculations certified by a registered Professional Engineer, that ensure slope stability.

D. Equipment used to haul and unload impacted materials shall have enclosed cabs. Enclosed cab is defined as an equipment cab isolated from outside environment (intact windows, doors, panels and floors surrounding driver with windows and doors shut) which provides a barrier from intrusion of outside airborne particles. Heating, ventilating, or air conditioning units associated with the equipment cab must not provide a direct path for outside air to enter (air conditioner on air recirculate mode) unless the air is first passed through a high efficiency particulate air (HEPA) filter pulled directly from outside the cab.

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E. Furnish placards, placard carriers and 3-inch nominal diameter mounted sealable polyvinyl-chloride (PVC) tubes to serve as manifest carriers on haul trucks. Install at locations as directed by the Construction Manager.

F. Assign equipment used to haul material to the OSDF with unique alpha-numeric identifiers. This identifier shall be placed on both sides of the truck cab and shall be visible from 20 feet.

G. Equip trucks used for hauling impacted material with automatic load cover tops or employ Best Available Technology (BAT) methods to ensure that no airborne materials are emitted from the haul truck bed or load, whether empty or full.

H. Provide water tank trucks, water wagons, hydroseeders, portable tanks, pressure distributors, piping, sprinklers or other equipment designed to apply water and/or dust suppressant and crusting agent uniformly and in controlled quantities to variable surface widths to provide fugitive dust control.

I. Provide pressure wash or comparable equipment necessary to clean visible process residue and soil from piping and debris for placement in the OSDF.

J. Provide portable wash equipment to wash vehicle tires and vehicle exteriors as necessary.

K. Provide equipment used for size reducing concrete and asphalt materials for use as temporary aggregate surfaces.

PART 3 EXECUTION

3.1 GENERAL EXCAVATION

A. Prior to performing excavation activities, satisfy the following requirements:

1. Complete preliminary survey and layout work in accordance with Section 02100.
2. Establish dust control methods in accordance with RM-0047, "Fugitive Dust Control Requirements".
3. Install and manage surface water management and erosion and sediment control measures in accordance with Section 02275.
4. Install, modify, and manage construction safety and radiological-control fence and signage. Install posts at spacing recommended by the manufacturer's installation procedures and as required to prevent sagging. Posts with less than 4 feet remaining above the ground after installation shall have safety caps installed.
5. Obtain survey and red line markup of area isolation trench, where applicable, to verify completeness.

B. Perform excavation activities in compliance with 29 CFR Part 1926.650 through 1926.652.

C. Unless otherwise noted on the Construction Drawings, the following slope stability requirements shall apply during excavation activities:

1. Excavation slopes with depths less than 20-feet shall be performed in accordance

with applicable Occupational Safety and Health Administration (OSHA) guidelines.

2. Sloped excavations greater than 20 feet in depth shall be designed by a Professional Engineer (PE) registered in the state of Ohio.
3. Temporary excavation slopes with depths less than 20-feet shall be no steeper than 1.5H:1V with a maximum height of 13 feet between 15 foot benches.
4. Design slopes and slopes created by supplemental excavation shall be no steeper than 2H:1V with a maximum height of 13 feet between 15 foot benches.

D. Install and manage traffic control devices in accordance with Section 02150.

E. Blasting, including use of explosives or explosive devices, is not permitted.

F. As necessary, establish and manage Special Materials Transfer Area(s) (SMTA) as follows:

1. Establish the SMTA on an existing building slab, paved parking area, or new aggregate surface adjacent to the project boundary, accessible from inside and outside the excavation area.
2. Construct ingress/egress to the SMTA, including access roads, ramps, and drainage improvements as required.
3. Install new aggregate surface SMTA in accordance with the Construction Drawings and Section 02230, and provide positive drainage.
4. The SMTA shall not be used as a laydown area.
5. The SMTA shall be controlled as a radiological buffer area in accordance with this Section.

G. Establish controls for removal of ACM in accordance with the approved Construction Traveler Package.

H. Excavate surface material within the limits of excavation to a minimum depth of 2 feet, unless otherwise noted on the Construction Drawings.

I. Excavate fractured materials concurrent with the adjacent above-WAC or below-WAC material, minimizing generation of above-WAC material. Fracturing of at-grade concrete slabs may continue concurrently with above-WAC and/or RCRA hazardous soil removal, but concrete outside of above-WAC and RCRA hazardous areas shall not be removed until above-WAC and RCRA hazardous soil removal has been completed, unless otherwise approved by the Construction Manager.

J. Excavate and load material in such a manner that enables visual observation of excavation and loading operations as required to accurately manifest material for disposition.

K. Excavations shall generally proceed in an up-gradient to down-gradient pattern to the lines and grades shown on the Construction Drawings.

L. Keep excavation equipment in contaminated areas to prevent recontamination of areas excavated to final grade. Excavate an area by methods that prevent drainage of surface water into the area.

M. Unless otherwise noted on the Construction Drawings or directed by the Construction Manager, excavate material from known above-WAC and RCRA hazardous areas in accordance with this Section, prior to excavating below-WAC material

N. Survey and stake excavation areas as shown on the Construction Drawings, in accordance with Section 02100. Perform intermediate and final surveys as specified in Section 02100 for measurement and to confirm attainment of the design grade.

O. Remove material adjacent to structures that extend above the excavation surface, as well as the structures themselves, in a safe manner to ensure that an unstable condition does not exist.

P. Prior to excavating previously trenched and backfilled isolation trenches, physical sampling is required in locations where sanitary and process lines were cut during trenching. Allow 10 working days for physical sampling and analysis.

Q. Design contours and grades shown on the Construction Drawings represent the minimum limits of excavation required to capture contamination and foundations, while maintaining safe slope requirements. Field changes shall be reported to the Construction Manager and approved by the Project Engineer.

R. In the event a historic, prehistoric, or archeological site, feature, or object is discovered, stop excavation in the area and immediately notify the Construction Manager for evaluation by Cultural Resources.

S. Continuously observe excavations for Special Materials or change in materials. In the event a Special Material or change in materials is encountered, stop excavation in the area and immediately notify the Construction Manager for evaluation by WAO. Dispose of Special Materials in accordance with Table 02205-1.

T. In the event solvent saturated soils are encountered, stop excavation in the area and immediately notify the Construction Manager for evaluation by WAO. Excavate, load, and haul the material as directed by the Construction Manager.

U. Prevent damage to adjacent structures, materials, and equipment, including utilities that are to remain, or those installed for performance of this work. Repair damage that occurs due to execution of this scope.

3.2 EXCAVATIONS APPROACHING THE GMA

A. Stop excavation activities in the immediate area and immediately notify the Construction Manager if sands and gravel are encountered, even if the design grade has not been achieved.

B. Use caution when excavations encroach on the 5-feet protective cover over the unsaturated sands and gravel of the GMA. Approximate GMA elevations are shown on the Construction Drawings.

C. Prior to initiating work activities that will breach the 5-feet protective cover of the GMA, but not extend within 2-feet of the GMA, proceed as follows:

1. Excavate to achieve design grades shown on the Construction Drawings or to remove Above-FRL material.
2. Allow 24 hours for coordination of the following: examination of the excavation bottom to determine if GMA sediments are present, real-time monitoring and/or physical sampling of the area to be backfilled, and identification of necessary pumping requirements for ponded water.
3. Immediately following monitoring and sampling, initiate backfilling to protect the GMA in accordance with Section 02206.

D. Prior to initiating work activities which will encroach within 2 feet of or breach the GMA, obtain approval and direction from the Construction Manager to proceed as follows:

1. Excavate to achieve design grades shown on the Construction Drawings or to remove Above-FRL material.
2. Allow for real-time monitoring and physical sampling in the area prior to backfilling.
3. Immediately following monitoring and sampling collection, initiate backfilling to protect the GMA in accordance with Section 02206.

3.3 BUFFER AREA MANAGEMENT

A. Establish excavation boundary and buffer area controls for above-WAC, RCRA hazardous areas, HWMUs, and USTs as follows:

1. Establish excavation area boundaries at surveyed and staked locations, in accordance with this Section.
2. Install T-posts and rope fence at the excavation boundary.
3. Establish the buffer area adjacent to the excavation area to serve as a controlled loading area between the excavation area and the surrounding radiological controlled area.
4. Grade the buffer area to drain into the excavation.
5. Install T-posts and rope fence around the buffer area.
6. Cover the buffer area with a 20-mil sheet of Herculite, or equivalent.
7. Collect water encountered during excavation and pump it as specified in Section 02275 and the construction drawings.
8. Keep the buffer area clean and free of dirt and mud.
9. Remove spillage before releasing haul equipment from the buffer area.

B. Dedicate and restrict equipment required to excavate, load, haul and place above-WAC, RCRA hazardous and HWMU material to that specific use until decontamination rinsing has been completed and approved by the Construction Manager. Upon approval by the Construction Manager that no visible material is present on exterior equipment surfaces, or in haul truck beds, equipment may be used elsewhere.

C. Unless constructability requires that equipment access above-WAC, RCRA hazardous or HWMU excavation areas, excavate these areas by reaching over the excavation area

boundary and dumping directly into haul equipment located in the buffer area. Above-WAC, RCRA hazardous and HWMU excavation boundaries may be adjusted as sampling and/or monitoring demonstrates that constituents of concern have been excavated to levels sufficient to down-post portions of the area.

D. Load haul equipment in a manner that prevents spillage and accumulation of material on the wheels and exterior of the haul equipment. Remove visible material that accumulates on the truck exterior. Multiple loading areas may be established within the buffer area.

E. Wash haul equipment within the buffer area as necessary (using low volume, high-pressure washer or approved equivalent) to remove above-WAC, RCRA hazardous or HWMU material from the exterior of equipment.

3.4 ABOVE-WAC EXCAVATIONS

A. Establish excavation boundary and buffer area controls in accordance with this Section.

B. Remove debris (concrete, asphalt, and miscellaneous structures) from above-WAC areas and pressure wash the debris as directed by the Construction Manager to remove soil/residue. The Construction Manager will visually monitor washing operations to ensure that debris is free of soil/residue and approved for loading and hauling to the OSDF.

C. Debris from above-WAC areas not approved for disposal at the OSDF shall be dispositioned at Waste Pits Remedial Action Project (WPRAP) in accordance with this Section.

D. Excavate above-WAC soil/gravel in 3+/-1 foot lifts to the design grade, as shown on the Construction Drawings. Load and haul above-WAC soil/gravel to WPRAP in accordance with this Section.

E. The Construction Manager will arrange for real-time monitoring on excavated side slopes after each lift is removed and on the excavation floor upon achieving the above-WAC contamination limits shown on the Construction Drawings. In above-WAC areas contaminated with Tc-99, as shown on the Construction Drawings, the Construction Manager will arrange for physical sampling at the design depth. Allow 10 working days for sampling and analysis. Do not proceed with further excavation in this area until directed by the Construction Manager.

F. If initial depth of above-WAC material is below the existing surface, excavate below-WAC material in 2+/-1 foot lifts until above-WAC material has been reached, then proceed in 3+/-1 foot lifts.

G. Pending results of monitoring or analysis, perform supplemental above-WAC excavation beyond design limits shown on the Construction Drawings or in areas not shown on the Construction Drawings, as directed by the Construction Manager.

3.5 RCRA HAZARDOUS EXCAVATIONS

Excavate RCRA Hazardous areas to the limits shown on the Drawings as follows:

A. Establish excavation boundary and buffer area controls in accordance with this Section.

B. Remove debris (concrete, asphalt, and miscellaneous structures) from RCRA hazardous areas and pressure wash the debris as directed by the Construction Manager to remove any soil/residue. The Construction Manager will visually monitor washing operations to ensure that debris is free of all soil/residue and approved for loading and hauling to the OSDF. The Construction Manager may require additional washing as necessary to satisfy visual inspection.

C. Debris from RCRA hazardous areas not approved for disposal at the OSDF shall be stockpiled for treatment by others in accordance with this Section.

D. Excavate RCRA hazardous soil/gravel in 3+/-1 foot lifts to the limits shown on the Construction Drawing. Load and haul material to an appropriate stockpile for treatment by others in accordance with this Section. Do not proceed with further excavation in this area until directed by the Construction Manager.

E. The Construction Manager will perform physical sampling upon confirmation that all RCRA hazardous material has been excavated. Allow 10 working days for sampling and analysis.

F. Perform additional RCRA hazardous excavations, as directed by the Construction Manager, if analysis identifies additional RCRA hazardous material beyond the limits shown on the Construction Drawings.

3.6 HWMU EXCAVATIONS

Excavate material from the HWMU to the limits shown on the Construction Drawings as follows:

A. Establish excavation boundary and buffer area controls in accordance with this Section.

B. Remove debris (concrete, asphalt, and miscellaneous structures) from the HWMU and haul to the OSDF as a discrete waste stream. If the HWMU is considered an above-WAC area, load and haul the debris to WPRAP, or containerize it as directed by the Construction Manager.

C. Excavate HWMU soil/gravel in 3+/-1 foot lifts to the HWMU design grade, as shown on the Construction Drawings. Load and haul HWMU soil/gravel to the OSDF as a discrete waste stream. If the HWMU is considered an above-WAC area, containerize soil/gravel as directed by the Construction Manager.

D. The Construction Manager will arrange for physical sampling on excavated side slopes after each lift is removed and on the excavation floor upon achieving the HWMU design grade shown on Construction Drawings. Allow 10 working days for sampling and analysis required for closure of the HWMU. Do not proceed with further excavation in the area until directed by the Construction Manager.

E. Pending analysis of sample results, perform supplemental HWMU excavation beyond the design grade as directed by the Construction Manager.

F. Upon confirmation from the Construction Manager that the HWMU excavation is complete, remove HWMU boundary fence, load and haul buffer area Herculite as HWMU debris.

3.7 UST EXCAVATIONS

Excavate USTs and areas that previously contained USTs shown on the Construction Drawings, as well as USTs discovered during excavation, as follows:

A. Excavate to expose the top of the tank (UST) to allow the Construction Manager to assess the tank's condition.

B. The Construction Manager and Industrial Hygiene will inspect the tank for the presence of liquid or non-soil residue.

C. If the tank contains liquid or non-soil residue, as determined by the Construction Manager, proceed as follows:

1. Pump remaining tank contents into drums provided by the Construction Manager.
2. Move filled drums from the excavation area to the SMTA.
3. Drums will be removed from the SMTA by others for appropriate disposition.

D. Upon confirmation from the Construction Manager that the tank is empty, proceed with removing the tank. Ensure that water does not accumulate in the tank from the surrounding excavation.

E. During excavation, stage the tank, soil excavated from around the UST, and soil excavated from areas that previously contained USTs separate from other excavated materials.

F. Upon confirmation from the Construction Manager that the tank is free of visible process residue, size-reduce the tank to meet physical WAC and dispose of it in the OSDF as a discrete waste stream.

G. If the tank cannot be cleaned of visible process residue, size-reduce the tank for disposition in accordance with this Section.

H. Over-excavate soil surrounding UST excavations and from areas that previously contained USTs to remove visible stains. Transport this soil as directed by the Construction Manager.

3.8 BELOW-WAC EXCAVATIONS

Excavate below-WAC material to the limits shown on the Construction Drawings as follows:

A. Remove slabs, concrete pads, asphalt, gravel, base and sub-base to sub-grade soil within below-WAC areas. Load and haul this material to the OMTA-Bulk Debris or OSDF. The Construction Manager will arrange for real-time monitoring prior to subsequent excavation in the below-WAC area.

B. Excavate below-WAC areas to the design grade shown on Construction Drawings. Load and haul this material to the OSDF in accordance with this Section.

C. In below-WAC excavations driven by contamination rather than removal of underground structures, as shown on Construction Drawings, excavate in 3+/-1 foot lifts to the design grade shown on Construction Drawings. The Construction Manager will arrange for real-time monitoring upon removal of each lift. Do not proceed with further excavation in these areas until directed by the Construction Manager.

D. Over-excavate a minimum of 6 inches in areas where impacted material was stockpiled or pushed for load-out during excavation to allow for visual inspection and disposition of debris that may have been tracked into the soil.

E. Coordinate real-time monitoring as necessary to minimize delays.

F. Upon reaching the design grade, notify the Construction Manager for real-time monitoring.

3.9 UTILITY REMOVAL BELOW THE DESIGN GRADE

A. Excavate known utilities as indicated on the Construction Drawings. Prior to removal, cap, drain, purge and/or plug utility lines to be excavated to prevent release of material into surrounding soil. If fluids or hold-up material is encountered in utility lines, stop work and notify the Construction Manager. Plug sanitary and process lines when liquid flow is detected. Material released from sanitary or process lines will be excavated and dispositioned as directed by the Construction Manager.

B. If unidentified utilities or underground structures are encountered, notify the Construction Manager, and proceed in accordance with the applicable Penetration Permit.

C. Process piping that is deformed, closed or otherwise hinders visual inspection shall be managed as above-WAC debris based on it's area of origin.

D. If a utility is suspected of containing ACM, notify the Construction Manager and Industrial Hygiene and manage in accordance with the Construction Traveler Package.

E. Excavate, size-reduce, and handle piping and debris in such a manner so as to minimize the generation of above-WAC debris or friable asbestos.

F. Prior to excavating utilities below the design grade, satisfy the following conditions:

1. Complete the intermediate survey, as specified in Section 02100.
2. Obtain Construction Manager approval that real-time monitoring of the design grade is complete.

G. Excavate and remove utilities in accordance with this Section and details shown on Construction Drawings.

H. Backfill utilities located below the design grade in accordance with the details shown on Construction Drawings and Section 02206.

I. If visual monitoring identifies Special Materials during excavation of utilities below the design grade, perform supplemental excavation in accordance with this Section.

J. Excavate miscellaneous debris encountered below the design grade and disposition in accordance with this Section.

K. Maintain a daily record of underground utilities excavated from below the design grade.

3.10 MATERIAL SEGREGATION

A. During excavation, segregate materials by the impacted material categories as defined in the IMPP. Maximize the volume of Category 1 material.

B. Segregate below-WAC material to support construction of the four zones of each OSDF cell (protective layer, select impacted material layer, impacted material layer, and contouring layer).

C. Segregate existing surface aggregate material and size-reduced concrete and asphalt materials for use as temporary aggregate material.

3.11 SIZE REDUCTION

A. Size-reduce remaining structures (i.e., building foundations, slabs, sumps, hydraulic ram casings) located above the design grade to meet OSDF physical WAC.

B. Size-reduce concrete and asphalt structures (i.e., building slabs, concrete/asphalt pads, roads, parking areas) to maximize the generation of material for temporary aggregate surfaces.

C. Size-reduce piping and debris to meet OSDF physical WAC in accordance with the IMPP, or size requirements for WPRAP in accordance with this Section.

D. Size-reduce metal materials (i.e., structural steel, piping, equipment, re-bar, miscellaneous metal) in accordance with the IMPP. Load metal components in bulk and haul to the OSDF or OMTA.

E. Size-reduction shall be by mechanical means, not by flame or torch cutting unless otherwise approved by the Construction Manager.

3.12 GENERAL LOADING AND HAULING

A. Use paved haul roads designated on the Construction Drawings for hauling where practical or as directed by the Construction Manager. Upon entering the paved haul roads with haul equipment, do not exit except to the excavation area, WPRAP, OMTA Bulk Debris Area, and/or the OSDF, without approval by the Construction Manager.

B. Maintain equipment within the excavation area during periods of non-work (evenings, weekends, and holidays) unless equipment decontamination has been completed. Complete

decontamination activities and request a radiological survey of the equipment prior to moving equipment out of radiological contamination areas.

C. When hauling materials to the SMTA, enter the SMTA from the excavation area only.

D. Load haul equipment in a fashion to minimize load shifting and to prevent spillage during transit.

E. Extend automatic covers on suitably equipped haul equipment, whether full or empty, during equipment movement.

F. Keep equipment cab closed and stay within the equipment cab when inside posted contamination area without appropriate PPE except in emergency situations.

G. Prior to loading and hauling, material designated for the OSDF shall be void of free liquid.

H. Prohibit tracked equipment from hauling, operating, or tracking over the Impacted Material Haul Road (IMHR) or other paved roadways, unless otherwise approved by the Construction Manager.

3.13 GENERAL DISPOSAL

A. Dispose of impacted material in accordance with this Section. Table 02205-1 provides guidance for the disposition of materials that may be encountered which will be disposed at the three destinations identified in this Section. Notify the Construction Manager in the event that materials are discovered that do not appear to be represented in Table 02205-1.

B. Pending coordination between the projects, material designated for WPRAP disposition may be hauled directly to WPRAP. Material hauled directly to WPRAP must comply with WPRAP disposition requirements presented in this Section.

C. OSDF disposition requires the following:

1. Compliance with requirements stated in the WAC Attainment Plan and the IMPP.
2. Piping and debris shall be cleaned of process-related residue in accordance with this Section. Notify the Construction Manager of residue that is not readily removed and manage the debris as directed.
3. Compliance with criteria identified in Table 02205-1 for management of Special Materials for disposition at the OSDF.
4. ACM shall be removed, packaged, loaded and hauled in accordance with the Construction Traveler Package.

D. WPRAP disposition requires the following:

1. Soil, piping and debris exceeds the requirements for OSDF disposition as outlined in Table 02205-1.
2. Piping and debris shall be less than 10 inches in at least one dimension, and no longer than 6 feet in any dimension.

E. SMTA disposition requires the following:

1. Soil, piping and debris exceeds the requirements for OSDF and WPRAP disposition as outlined in Table 02205-1.
2. Materials shall be containerized as directed by the Construction Manager.
3. Loaded containers shall be placed in the SMTA in a manner that protects the containers from damage. Do not stack containers.

3.14 STOCKPILING

A. Install construction safety fence around active stockpiles in accordance with Section 02200.

B. Install appropriate signage around the boundary of active stockpiles as directed by the Construction Manager.

C. Install erosion control measures around active stockpile in accordance with Section 02275.

D. Maintain fencing, signage, and erosion control measures for the duration of the active stockpile's existence.

E. Repair damage to active stockpile support structures (i.e., silt fence, perimeter fence) inflicted during performance of this project to their original condition within 24 hours of damage discovery.

F. Apply crusting agent as specified in Section 02930 within 7 calendar days upon completion of the active soil stockpile or if the active soil stockpile is to be inactive for more than 45 calendar days as directed by the Construction Manager.

G. Compact/seal the surface of the stockpile in use at the close of each work-day to prevent fugitive dust and erosion.

H. Locate interim stockpiles within the limit of excavation upon approval from the Construction Manager. Remove interim stockpiles within 45 calendar days.

I. Establish a separate stockpile for solvent saturated soils, as encountered. Manage the stockpile material to avoid cross-contamination with adjacent soil, and to control surface water and dust.

J. Stockpile excavated surface aggregate materials and size-reduced concrete and asphalt as necessary for use as temporary aggregate material.

K. Stockpiles shall not be located within 30 feet of an excavation top-of-slope.

L. Above-WAC and RCRA material, and material not identified in Table 02205-1 that cannot go to the OSDF as is, which is stockpiled within a larger active stockpile area shall be fenced or roped individually in accordance with Section 02200.

M. In addition to general stockpiling requirements, the following requirements shall apply to the management of above-WAC stockpiles:

1. Use dedicated equipment for the preparation and management of the stockpile.
2. Maintain ingress/egress to the stockpile, including access roads, ramps, and drainage features.
3. Maintain unloading areas to prevent haul equipment tires from coming in contact with stockpile material.
4. Locate the stockpile as directed by the Construction Manager.
5. Decontaminate tools and equipment used to place and manage material within the stockpile prior to requesting release. Following decontamination, the Construction Manager will arrange for a radiological survey to release these tools and equipment.

O. In addition to general and above-WAC stockpiling requirements, the following requirements apply to the management of stockpiled RCRA material awaiting treatment:

1. Install surface water run-on/run-off controls to minimize water within the area in accordance with Section 02275.
2. Establish methods for collection of water from within the area.
3. Install chain link fence immediately around the stockpile to control access.

P. Cover or lock down soil or debris containing non-friable ACM at the end of the day in accordance with the Construction Traveler Package.

3.15 MONITORING AND SAMPLING

A. The Construction Manager will arrange for real-time monitoring of below-WAC areas following removal of surface aggregate, concrete and asphalt slabs, pads, roads and parking areas, and between each lift in contaminated areas until the design grade has been achieved, including the design grade.

B. The Construction Manager will arrange for real-time monitoring after each excavation lift for above-WAC materials.

C. The Construction Manager will arrange for radiological monitoring before equipment is released from a buffer area. Working in rain and/or wet weather will increase scanning time.

D. The Construction Manager will perform visual monitoring during excavation for Special Materials that are not permitted in the OSDF or that will require additional processing to meet WAC. If Special Materials are found, real-time monitoring may be performed to verify removal and determine appropriate disposition of the material.

E. The Construction Manager will visually monitor piping and debris to ensure no visible process residue remains, in order to be placed in the OSDF.

F. The Construction Manager will arrange for real-time monitoring to verify that the excavation area has met the requirements for precertification.

G. When real-time monitoring or sampling is required, excavate in an alternate location within the excavation area while awaiting the results. Excavate alternate locations a minimum of 50 feet from the area being monitored. Allow up to 2 working days for monitoring after

area is ready for monitoring. Extend duration for monitoring at least 1 working day for each day precipitation occurs.

H. The Construction Manager and regulatory agencies may collect samples from the excavation, haul equipment and the OSDF at any time during the project.

I. The Construction Manager will arrange for monitoring of water collected in suspect VOC areas for the presence of volatile organic compounds (VOCs). If VOCs are detected, the water will be sampled and analyzed to determine disposition.

J. The Construction Manager will arrange for magnetometer surveys to verify removal of ferrous debris from areas where former underground utilities and structures were removed.

3.16 PRECERTIFICATION AND SUPPLEMENTAL EXCAVATION

A. The Construction Manager will arrange for real-time monitoring to pre-certify an area as having attained FRL requirements.

B. Perform supplemental excavations beyond the design grade if either of the following conditions exist:

1. Real-time monitoring and/or physical sampling identifies material beyond the design grade that does not meet FRL requirements.
2. Utilities or other impacted materials identified beyond the design grade.

C. Install rope fencing and appropriate signage around the pre-certified area perimeter after precertification has been achieved, as directed by the Construction Manager.

3.17 AREA MANAGEMENT

A. Maintain construction safety fence, radiological-control fence, and stockpile fence as specified in this Section, Section 02200, and as shown on the Construction Drawings.

B. Management of excavation water shall be as specified in Section 02275.

C. Perform stabilization of the excavated areas using crusting agent and temporary seeding in accordance with Sections 02275 and 02930.

D. Notify the Construction Manager prior to removing sediment and debris from ditches, drains and erosion control devices. The Construction Manager will arrange for sampling and analysis of sediment for WAC compliance. Remove and de-water sediment in accordance with the following:

1. Notify the Construction Manager two (2) days prior to removing sediment from ditches, drains and erosion and sediment control devices to determine whether or not sampling and analysis of the sediment is required for disposition.
2. Remove accumulated sediment from ditches, drains and erosion and sediment control devices as directed by the Construction Manager. In no case shall sediment reduce the available depth of the associated feature to less than two-thirds the depth

shown on Construction Drawings.

3. De-water sediment removed from above-WAC or RCRA hazardous areas within the associated above-WAC or RCRA hazardous area.
4. De-water sediment removed from ditches, drains and erosion and sediment control devices adjacent to and up-gradient of the associated feature as necessary to allow water to drain immediately back into the feature.
5. Disposition de-watered sediment to the OSDF unless otherwise directed by the Construction Manager.
6. Place sediments accumulated in above-WAC stockpile surface water control devices in the associated stockpile.

E. Implement seasonal closure methods at the end of each construction season and maintain seasonal closure through winter shutdown. Seasonal shutdown requirements include, but are not limited to:

1. Maintain surface water management and erosion and sediment controls.
2. Maintain dust control, as required.
3. Perform equipment decontamination, as required.
4. Remove water from excavation during seasonal closure, when water depth exceeds 3-foot. Pump water out of the excavations in a manner that maintains the integrity of the design slopes, (i.e., no rapid draw down) and prevents an overflow condition. The pumping priority for open excavations is as follows:
   a. Open excavation areas containing impacted material that are located up-gradient of remediated areas,
   b. Completed excavations, and
   c. Other uncompleted excavations.
5. Remove sediment and debris from sediment control basins and ditches in accordance with this Section.
6. Seed/stabilize stockpiles.

END OF SECTION

Table 02205-1

The table should be interpreted to read that material in column 1 may be dispositioned at the appropriate destination in columns 2-4 if the corresponding criteria are met.

MATERIAL	DESTINATION *		
	OSDF	WPRAP (1)	SMTA (2)
Soil from general/UST excavation	• Meets WAC	• Above-WAC	• Not applicable
Soil from RCRA hazardous excavation	• Prohibited	• Prohibited	• Containerize
Soil from HWMU excavation	• Meets WAC	• From an Above-WAC area	• RCRA Hazardous
Soil requiring treatment	• Prohibited pending treatment and direction by the Construction Manager	• Prohibited pending treatment and direction by the Construction Manager	• Fails treatment
Debris from general/UST excavation	• Meets WAC	• Above-WAC • Visible residue cannot be removed	• Not applicable
Debris from above-WAC excavation	• Meets WAC and free of visible soil/residue	• Visible soil/residue cannot be removed	• Not applicable
Debris from RCRA hazardous excavation	• Meets WAC and free of visible soil/residue	• Above-WAC and free of visible soil/residue	• Visible soil/residue cannot be removed
Debris from HWMU excavation	• Meets WAC	• Above-WAC and free of visible soil/residue	• Above-WAC and visible soil/residue cannot be removed
Asbestos (3)	• Meets WAC and passes visual inspection by CM	• Above-WAC and non-friable • Visible soil/residue cannot be removed and non-friable	• Friable and fails visual inspection by CM
Non-pressurized Containers (3)	• Meets WAC, free of visible soil/residue, and contains no free liquid, product, etc	• Above-WAC and contains no free liquid, product, etc. • Visible soil/residue cannot be removed and contains no free liquid, product, etc. • Has been crushed	• Contains free liquid, residue, etc • Has been crushed
Piping/Pumps (3)	• Meets WAC, free of visible soil/residue, and contains no free liquid	• Interior not visible and contains no free liquid • Visible soil/residue cannot be removed and contains no free liquid	• Above-WAC/HWMU and visible soil/residue cannot be removed • Above-WAC/RCRA and visible soil/residue cannot be removed
Transformers/Electrical Equipment (3)	• Meets WAC and free of visible soil/residue	• Visible soil/residue cannot be removed and drained of all fluid	• Contains fluid • Above-WAC/HWMU and visible soil/residue cannot be removed • Above-WAC/RCRA and visible soil/residue cannot be removed
Brick including Acid Brick (3)	• No acid brick	• Acid brick	• Not applicable
Lead Acid Batteries (3) Medical Infectious Waste (3) Non-soil Residue (3) Pressurized Containers (3) Tires (3) Uranium Metal (3) Sealed radiological calibration sources	• Prohibited	• Prohibited	• Containerize

(1) Must meet WPRAP size requirements per this Section (2) SMTA materials must be containerized. (3) Special Material per this Section.
* These are final destinations beyond which the project bears no responsibility for material movement. The OMTAs are staging areas prior to OSDF disposition.

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SECTION 02206
EARTHWORK FOR REMEDIATION

PART 1 GENERAL

1.1 SCOPE

A. This Section includes requirements for earthwork associated with remediation of the former production area to include, but is not limited to:

1. Excavation of fill material.
2. Excavation and placement of materials for ditches and berms.
3. Placement of fill material in trenches excavated for utility removal in areas below design grade.
4. Placement of plug material over the unsaturated sands and gravels of the Great Miami Aquifer (GMA).
5. Interim grading for drainage and road preparation.
6. Final grading.

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02100 – Surveying.

B. Section 02150 – Traffic Control.

C. Section 02205 – Impacted Material Excavation.

D. Section 02230 – Road Construction.

E. Section 02275 – Surface Water Management and Erosion Control for Remediation.

F. Section 02930 – Vegetation.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1.	ASTM C150	Specification for Portland Cement, current edition.
2.	ASTM D698	Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft), current edition.
3.	ASTM D2216	Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock, current edition.
4.	ASTM D2487	Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System), current edition.

5.	ASTM D2922	Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth), current edition.
6.	ASTM D3017	Standard Test Methods for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth), current edition.
7.	ASTM D4643	Test Method for Determination of Water (Moisture) Content of Soil by Microwave Oven Method, current edition.

1.4 DEFINITIONS

A. Fill Material: Non-impacted soil obtained from within the excavation area, below the design grades, following pre-certification, or from a designated borrow area.

B. Design Grade: Grade created by excavation of impacted material to the lines and grades shown on Construction Drawings.

C. GMA Plug: Non-impacted clay material from the certified Borrow Area used to maintain a minimum protective cover thickness over, and seal breaches into, the GMA unsaturated sands and gravels.

D. Clay Plug: Same material as specified for GMA Plug used to create a protective cover thickness over pilings and/or foundations to be cut off and left in place.

1.5 SUBMITTALS

A. Submit for approval, name, address, and qualifications of an independent soil testing laboratory and resume(s) of field technician(s).

B. Within seven (7) calendar days of obtaining samples and performing field tests, provide copies of lab and field tests performed by the soil testing laboratory and Contractor performing field tests. Soil test results shall include Standard Proctor moisture density tests, sieve analysis, density tests, and Proctor curves for each type of material to be used prior to its use. Field test results shall include a map depicting locations and depth/lift.

C. Submit specification sheet and Material Safety Data Sheet (MSDS) for sodium bentonite grout.

D. Submit specification sheet and MSDS for Portland cement.

E. Submit as-built survey to verify completion of design excavation in accordance with Section 02100.

F. Documentation of nuclear density gauge calibration in accordance with manufacturer's requirements.

1.6 EXISTING CONDITIONS

A. Verify existing conditions as specified in Section 02100.

PART 2 PRODUCTS

2.1 MATERIALS

A. Fill material shall be free of debris, foreign objects, large rock fragments (maximum dimension of 6 inches), organic, and other deleterious materials.

B. GMA plug material shall be non-impacted clay material conforming to CL classification according to Unified Soil Classification System in accordance with ASTM D2487.

C. Use the designated certified borrow area as the source for GMA plug material.

D. Material used to backfill utility trenches located below the design grade and areas where grout plugs are installed into air-gapped storm sewers shall be surrounding soils following pre-certification.

E. Use below-FRL material from the excavation area, following pre-certification, as a source of fill material for supplemental excavations.

F. Portland cement per ASTM C150, normal – Type 1.

G. Sodium bentonite grout.

H. Safety signs around ponds shall be exterior quality signs with minimum 4 inch high letter and shall state, "Life jackets required when working within 5 feet of edge of ponds, use of buddy system required". Hand written signs are unacceptable.

2.2 EQUIPMENT

A. Furnish and maintain equipment to perform required operations in conformance with the requirements of these specifications.

B. Furnish equipment to perform required operations in conformance with this Section. Equipment that results in waste or damage of material, inaccurate work, or is otherwise objectionable shall be promptly replaced.

C. Equipment used to haul non-impacted material over the existing paved Impacted Material Haul Road (IMHR), shall be equal to or less than the gross weight and axle loading for a Caterpillar CAT D300E haul truck (gross vehicle weight of 120,000 pounds and maximum axle width of 9-feet 10-inches). Pavement width of the existing two-way IMHR is 24-feet. Select equipment and equipment width to ensure safe operation on this road.

D. Equipment used within the excavation area shall be in accordance with Section 02205.

E. Furnish compaction equipment, as needed.

PART 3 EXECUTION

3.1 GENERAL

A. Perform intermediate surveys in accordance with Section 02100, to confirm attainment of design grade prior to initiating earthwork activities below the design grade.

B. Stop excavation activities and immediately notify the Construction Manager upon discovery of unexpected cultural resources suspected to be historic, prehistoric, or archeological site, feature or object.

C. Excavate soil below the design grade with equipment that has been cleaned of visible soil from prior above-FRL excavation activities.

D. Use material from the immediate excavation area or a designated borrow area to meet fill material requirements for trenches and supplemental excavations.

E. Perform construction activities such that surface water runoff from non-certified construction areas does not flow into pre-certified areas, in accordance with Section 02275.

F. Maintain slope stability in the area surrounding trenches created to excavate below the design grade in accordance with Section 02205.

G. After certification, perform final grading in accordance with this Section.

3.2 BACKFILL

A. Obtain fill material from areas approved by the Construction Manager. In high-leachability areas shown on the Construction Drawings, obtain fill material from precertified or certified areas meeting the 20 mg/kg total Uranium FRL.

B. Maintain a minimum 5-feet protective cover over the unsaturated sands and gravel of the GMA in accordance with the following. GMA elevations are shown on the Construction Drawings.

1. Following excavation activities that encroach on the 5-feet protective cover but do not extend within 2-feet of the GMA, install GMA plug as follows:

   a. Immediately following monitoring and sampling activities specified in Section 02205, survey the excavation and initiate filling.
   b. Backfill using GMA plug material meeting the requirements of this Section. Complete backfilling within 5 days following sampling.

c. Backfill GMA plug material in 8-inch +/- 1-inch loose lifts until protective cover is returned to a minimum thickness of 5-feet.

d. Compact fill material in each 8-inch loose lift to at least 95% Standard Proctor dry density (ASTM D698) within 0 to +3% of optimum moisture content.

2. Following excavation activities that encroach within 2 feet of or breach the GMA, install GMA plug as follows:

a. Immediately following monitoring and sampling activities specified in Section 02205, survey the excavation and initiate backfilling.

b. Backfill using GMA Plug material meeting the requirements of this Section.

c. If precipitation is likely within the next 24 hours, immediately place a minimum fresh compacted thickness of 2 feet. Otherwise, place the 2 feet of compacted cover within 24 hours of excavating to within 2 feet or breaching the GMA.

d. Place the first lift of GMA plug material in an approximate 18-inch loose lift. Compact the first lift using 4 passes of compaction equipment approved by the Construction Manager.

e. Backfill the remaining lifts in 8-inch +/- 1-inch loose lifts until the protective cover is returned to a minimum of 5 feet. Compact GMA plug material in each 8-inch loose lift to at least 95% Standard Proctor dry density (ASTM D698) within 0 to +3% of optimum moisture content. These lifts must be continuous over the entire breached area.

D. Install clay plug in locations shown on the Construction Drawings in accordance with the following:

1. Backfill using clay plug material meeting the requirements of this Section.
2. Place clay plug material in 8-inch +/- 1-inch loose lifts as necessary to achieve a total compacted thickness of 2-feet.
3. Compact each lift with four (4) passes of compaction equipment approved by the Construction Manager.
4. If clay plug is placed over an open pile, seal void spaces within the pile with sodium bentonite grout and cap the top 2 feet of the pile with Type 1 Portland cement ASTM C150 prior to placing the clay plug. Sodium bentonite grout shall be mixed at a water ratio of 2.1 pounds of sodium bentonite per gallon of water, and have a minimum density of 9.4 lbs./gallon. Grout viscosity shall be field checked periodically to assure proper viscosity of 70 +/- 6 seconds using the Marsh funnel viscometer. Tremie the grout into the open pile to eliminate void space.

E. Excavate, remove utilities, and backfill trenches below the design grade in accordance with the following:

1. Remove utilities located below the design grade in accordance with Section 02205 and details presented on Construction Drawings.

2. Remove water collected in trenches to sump areas and pump it to the appropriate sediment control basin as specified in Section 02275.
3. Backfill utility trenches located below design grade in accordance with the Construction Drawings.

3.3 FIELD QUALITY CONTROL

A. In-place density testing will be performed in accordance with ASTM D2922. Nuclear density gauge (ASTM D2922) will be calibrated in accordance with the manufacturer's requirements. Documentation of this calibration will be provided to the Construction Manager. Register nuclear or radiological sources brought on site.

B. Perform in-place moisture tests in accordance with ASTM D3017, or ASTM D4643 as applicable.

C. Determine moisture-density curves in accordance with ASTM D698 (Standard Proctor). Test results must be reviewed and approved by the Construction Manager.

D. If in-place density and/or moisture tests indicate that work does not meet specified requirements, replace or re-compact to specified requirements.

E. Perform soil classification in accordance with ASTM D2487.

F. Frequency of Tests: Frequency of in-place density and moisture testing shall be whichever of the following requires the greatest number of test:

1. Once each day when compacting GMA plug material.
2. Once each compacted lift of GMA plug material.
3. Once every 3,000 sq. ft. of compacted GMA plug material.

G. Notify the Construction Manager of activities requiring testing/inspection a minimum of 24 hours prior to the start of such activities.

3.4 EARTHEN BERMS

A. Install earthen berms at locations shown on the Construction Drawings using soils from surrounding area following pre-certification.

B. Place material in 8-inch loose lifts.

C. Compact each lift of berm with four (4) passes of compaction equipment approved by the Construction Manager.

3.5 INTERIM GRADING

A. When the design grade has been achieved, perform interim grading as follows:

1. Correct washouts or other similar irregularities to maintain the design grade slopes of 2H:1V or less.

2. Grade to maintain smooth continuous slopes.
3. Finish ditches so they drain readily.
4. Perform temporary seeding in accordance with Section 02930.
5. Repair damage within 3 working days.

3.6 FINAL GRADING

A. Obtain verification that the area to be graded has been certified.

B. Provide, maintain and operate temporary drains, ditches, pumps, drainage lines or other equipment to intercept, divert, or remove water from excavations.

C. Provide and maintain stormwater management measures that assure isolation of stormwater between certified and non-certified areas.

D. Regrade the certified area design grades to achieve grades no steeper than 5H:1V. As the 5H:1V excavation proceeds, the cut material shall be placed in the bottom of existing excavations and graded level.

E. Final grading shall be achieved with minimum five (5) foot radii at contour direction changes, and smooth transitions between grade breaks and depressions.

F. Perform permanent seeding in accordance with Section 02930.

G. Stabilize 2H:1V slopes along excavation boundary with erosion control blankets in accordance with Section 02275.

3.7 SURFACE WATER MANAGEMENT

A. Manage surface water in accordance with Section 02275.

B. Perform excavation in a manner that promotes positive drainage.

C. Install earthen berms as shown on Construction Drawings. Apply temporary seed and fertilizer on earthen berms in accordance with Section 02930.

3.8 SEASONAL SHUTDOWN

A. Perform seasonal shutdown activities in accordance with Section 02205.

END OF SECTION

SECTION 02207
AREA ISOLATION TRENCHING

PART 1 GENERAL

1.1 SCOPE

A. This Section includes the requirements for trenching and backfilling an isolation trench around the project excavation limits, as shown on the Construction Drawings.

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02205 – Impacted Material Excavation.

B. Section 02275 –Surface Water Management and Erosion Control for Remediation.

1.3 REFERENCES

A. Title 29, Code of Federal Regulations (CFR): 29 CFR 1926 Subpart P – Excavation, current edition.

B. RM-0021, "Safety Performance Requirements Manual".

C. RM-0047, "Fugitive Dust Control Requirements".

D. SPR 3-5, "Barricades".

E. Applicable Construction Traveler package(s)

1.4 DEFINITIONS

A. Special Materials: Impacted material requiring special handling as specified in Section 02205 and presented in Table 02205-1.

B. Trencher: Specific equipment used in trenching around the area excavation limits.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide rope fence consisting of 3/8-inch yellow nylon rope as shown on the Construction Drawings.

B. Provide T-posts in accordance with Section 02200.

C. Provide construction area signage in accordance with SPR 3-5.

D. Provide crusting agent as specified in Section 02275.

2.2 EQUIPMENT

A. Furnish and maintain trencher equipment, manufactured by Vermeer or an approved equivalent, to perform trenching in accordance with this Section. The trencher must meet the following requirements:
   1. Trencher must be capable of cutting to a minimum depth of 12 feet, with a tolerance of 0 to 6 inches.
   2. Trencher must be capable of cutting a trench no greater than 30 inches wide.
   3. Trencher must be capable of maintaining a trench centerline lateral tolerance of +/- 1 foot over the entire trench depth.
   4. Trencher digging mechanism must be capable of being removed for turnover to Fluor Fernald at the completion of the project.

B. Furnish and maintain equipment to perform trench backfilling in accordance with this Section.

C. Equipment used within the trenching exclusion zone shall have enclosed cabs. Enclosed cab is defined as an equipment cab isolated from the outside environment (intact windows, doors, panels and floors surrounding driver with windows and doors shut) which provides a barrier from intrusion of outside airborne particles. Heating, ventilating, or air conditioning units associated with the equipment cab must not provide a direct path for outside air to enter (air conditioner on air recirculate mode) unless the air is first passed through a high efficiency particulate air filter pulled directly from outside the cab.

D. Furnish and maintain equipment to perform compaction in accordance with this Section.

E. Provide water tank trucks, water wagons, hydroseeders, portable tanks, pressure distributors, piping, sprinklers or other equipment designed to apply water and/or dust suppressant and crusting agent uniformly and in controlled quantities to variable surface widths to provide fugitive dust control.

F. Furnish and maintain portable wash equipment to wash vehicle tires and vehicle exteriors as necessary.

G. Equipment used within the excavation area shall meet weight requirements in accordance with Section 02205, to ensure slope stability.

PART 3 EXECUTION

3.1 GENERAL

A. Survey and layout the isolation trench centerline as shown on Construction Drawings. Remove or relocate surface obstructions that may impede trencher operations prior to trenching, as approved by the Construction Manager.

B. Prior to trenching activities, install and manage rope fence and appropriate signage to establish safe distances around the trench and excavations during equipment operation and while the trench remains open.

C. Excavate known above-WAC and RCRA areas in the path of the isolation trench in accordance with Section 02205 prior to performing trenching activities in those areas.

D. Install radiological-control signs as required.

E. Install and maintain surface water management and erosion and sediment control measures in accordance with Section 02275.

F. Trench and backfill in accordance with the Construction Drawings and this Section.

G. Blasting, including use of explosives or explosive devices, is not permitted.

H. Maintain equipment in a safe condition within the trenching/excavation area during periods of non-work (evening, weekends, and holidays).

I. Prohibit tracked equipment from hauling, operating, or tracking over or on the Impacted Material Haul Road (IMHR) or other paved roadways unless otherwise approved by the Construction Manager.

J. In the event a historic, prehistoric, or archeological site, feature, or object is discovered, stop work immediately in the area and immediately notify the Construction Manager.

K. Excavation performed in support of trenching activities shall be in accordance with Section 02205.

L. L. Material removed from the utility isolation trench shall be backfilled daily to avoid stockpile requirements.

3.2 TRENCHING

A. Trench at locations, as shown on the Construction Drawings, using approved trencher equipment. Trenches shall be cut to a minimum depth of 12 feet, with a tolerance of 0 to 6 inches. Trench centerline shall have a lateral tolerance of +/- 1-foot. Deviation beyond the

+/- 1-foot lateral tolerance requires prior review and approval by the Construction Manager, Project Engineer, and Utility Engineer to evaluate potential impacts to surrounding structures and utilities.

B. Trench in such a manner that enables the Construction Manager to visually observe trenching activities.

C. In areas inaccessible to the trencher, excavate around utilities and structures as directed by the Construction Manager, to verify no active utilities are present. Air gap active utilities found in areas inaccessible to the trencher using methods and equipment as approved by the Construction Manager, in accordance with the Construction Drawings. Dispose of pipe sections removed during air-gapping in accordance with Section 02205.

D. Stop trenching and immediately notify the Construction Manager if unidentified utilities are encountered.

E. Continuously observe trenching for the presence of Special Materials or change in materials. Stop trenching in the area and immediately notify the Construction Manager if Special Materials are encountered. Dispose of Special Materials in accordance with Section 02205.

F. Stop trenching operations and notify the Construction Manager if fluid is detected flowing into the trench from a utility line cut during the trenching operations. The Construction Manager will note the location of the leakage for future remediation of the trenching corridor by others.

G. Perform trenching activities in such a manner as to minimize water accumulation in the trench.

H. Backfill trenches and excavations daily unless otherwise approved by the Construction Manager. Trenches or excavations remaining open after working hours shall be barricaded in accordance with requirements stated in the approved Construction Traveler(s).

I. Verify and record "as-built" trench locations and depths every 50 feet, and at intersections, along the trench centerline.

3.3 BACKFILL

A. Backfill trenches and excavations using material removed during trenching and excavation activities. The final 24 inches of backfill placed shall be free of debris, foreign objects, large rock fragments (maximum dimension of 6 inches), organic matter, and other deleterious materials so as to obtain adequate compaction. Spread these materials within the adjacent excavation area.

B. Backfill trenches to within 24 inches of grade. Backfill and compact the remaining 24 inches in 8-inch lifts compacted by four passes of compaction equipment suitable for use in the trench.

C. Use remaining material removed during trenching to construct a diversion berm along the trench centerline as shown on the Construction Drawings. Construct diversion berm in 8-inch lifts compacted by four passes of equipment approved by the Construction Manager. Obtain supplemental material to construct the diversion berm as necessary from the surrounding areas as directed by the Construction Manager. Spread excess material in place.

D. After completion of backfilling and diversion berm construction activities, install and modify rope fence to locations as shown on the Construction Drawings unless otherwise directed by the Construction Manager.

E. Upon completion of trenching, backfilling and diversion berm construction, stabilize the disturbed area using crusting agent in accordance with Section 02275.

END OF SECTION

SECTION 02275
SURFACE WATER MANAGEMENT AND EROSION CONTROL FOR REMEDIATION

PART 1 GENERAL

1.1 SCOPE

A. This Section includes, but is not limited to, the following:

1. Installation of erosion and sediment control measures.
2. Maintenance of existing and new erosion and sediment control measures installed under this activity, including removal of temporary erosion control facilities.
3. Management of excavation water in excavation areas, including pumping water to the appropriate sediment basin during general excavation and management of volatile organic compound (VOC)-contaminated water.
4. Modification of existing storm sewer system.
5. Installation and maintenance of runon/runoff controls along the perimeter of the project boundary.
6. Protection of the unsaturated sands and gravels of the Great Miami Aquifer (GMA) from runon within the excavation areas, including installation and maintenance of runon controls.
7. Management of area for precertification.
8. Stabilization of disturbed excavation areas or stockpiles.
9. Inspection requirements.

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02100 – Surveying.

B. Section 02205 – Impacted Material Excavation.

C. Section 02206 – Earthwork for Remediation.

D. Section 02270 – Surface Water Management and Erosion Control

E. Section 02930 – Vegetation.

1.3 REFERENCES

A. State of Ohio, Department of Natural Resources (ODNR), Rainwater and Land Development, Ohio's Standard for Stormwater Management Land Development and Urban Stream Protection, current edition.

B. State of Ohio, Department of Transportation (ODOT), Construction and Material Specifications, current edition.

C. Surface Water Management Plan (SWMP) for the applicable soil excavation project.

1.4 DEFINITIONS

A. Excavation Water: The combination of surface water and perched water that collects in the excavation.

1.5 SUBMITTALS

A. For each product proposed for use, submit the following:

1. Manufacturer's product data and recommended methods of installation and maintenance.
2. Certification from manufacturer that the product meets the material requirements of this Section, including test results.
3. Material Safety Data Sheet (MSDS), if applicable.

B. Records of inspection of erosion and sediment control measures as specified herein shall be submitted monthly upon completion of the inspection report.

PART 2 PRODUCTS

2.1 MATERIALS

A. Furnish silt fence in accordance with ODNR, composed of, at a minimum, strong rot-proof polymeric fibers formed into a woven fabric having fabric and fence post properties as shown on the Construction Drawings.

B. Furnish woven yarn blanket-like erosion mat that will resist degredation for a minimum of 6-months after installation, having a permissible velocity of 7 feet per second, with the following material properties:

1. Yarn content: 100 percent jute or coconut fiber.
2. Weight: minimum 11.5 ounces per square yard.
3. Open Area: maximum 65 percent.
4. Mesh Opening: minimum 0.5 inches.

C. Furnish metal staples specifically made to anchor erosion control blankets. Anchors will be 11 gauge wire formed into a staple shape with minimum dimensions of 6 inches by 1 inch by 6 inches.

D. Furnish dust suppression/crusting agent in accordance with Section 02930.

E. Furnish backfill in accordance Section 02206.

2.2 EQUIPMENT

A. Furnish portable tank (minimum 3,000 gal.), as needed to hold water contaminated with volatile organic compounds (VOCs).

B. Furnish pumps, filters, hoses and other appurtences required to execute work specified in this Section.

PART 3 EXECUTION

3.1 GENERAL

A. Construct and maintain erosion and sediment control measures as specified in this Section and shown on Construction Drawings. Maintain existing erosion and sediment control facilities and measures in accordance with this Section.

B. Minimize runon into disturbed excavation areas by grading the surrounding area away from the disturbed area and/or by constructing temporary diversions as shown on Construction Drawings.

C. As the excavation progresses, excavate sumps at resulting low points used for water collection of excavation water. Do not penetrate to within 5 feet of the GMA with sump excavations.

D. Dewater excavations in accordance with the Construction Drawings, if applicable. Excavation water collected within active excavations and below design grade utility removal shall be pumped to the appropriate sediment control basin as shown on Construction Drawings. Collected water shall be pumped down to a depth of less than one foot remaining in the bottom of the excavation within 3 days of the last rainfall.

E. The Construction Manager will arrange for sampling and analysis of excavation water present in suspect VOC areas prior to a discharge event. Following sampling and analysis, pump collected VOC-contaminated water to the appropriate treatment and/or disposition.

F. Plug storm sewers at the excavation boundary prior to removal of storm sewer piping located within the excavation area. Plug storm sewer system in such a manner to minimize water collected in abandoned portions of the system.

G. Remove erosion and sediment control measures after the disturbed excavation areas are stabilized as specified in Section 02930.

3.2 SILT FENCES

A. Install silt fence at locations down-gradient of areas to be disturbed until drainage and erosion control structures have been established as shown on the Construction Drawings. Remove and dispose accumulated sediment as specified in Section 02205.

B. Install breaks and overlaps in silt fence as necessary to allow equipment access to construction areas.

3.3 EROSION CONTROL BLANKETS

A. Install and maintain erosion control blankets in accordance with manufacturer's recommendations. Install additional staples as necessary to maintain erosion control blankets taut to the ground surface.

3.4 SEDIMENT BASINS AND DITCHES

A. Remove accumulated sediment and debris from sediment basins and ditches. In no case shall sediment build up to a depth greater than 18 inches in the sediment basin or to a depth greater than one-half the constructed depth of the ditch.

B. Dispose of sediment and debris as specified in Section 02205.

3.5 GMA PROTECTION

A. When possible, limit excavations within 5 feet of the GMA to periods of dry weather.

B. Construct bench terrace or interceptor ditch directly above the excavation extending within 5 feet of the GMA, observing slope stability requirements for the excavation. Slope bench terrace directly above the GMA toward the excavated slope as shown on the Construction Drawings. Grade the bench terrace or interceptor ditch to a sump for pumping to prevent runon into the GMA.

C. Size and locate pumps for sumps above the GMA such that no water within the excavation area shall overflow into the GMA from a 10-yr, 24-hr or lesser storm event. Sump bottoms shall not extend to within 5 feet of the GMA.

D. For excavations extending to within 5-feet of the GMA elevation shown on the Construction Drawings, maintain less than three foot of standing water in the excavations by pumping excavation water to a sediment basin or an adjacent excavation, as necessary.

E. Backfill over the GMA in accordance with Section 02206.

F. In areas where 2 feet of compacted cover has been recently restored following excavation which has extended to within 2 feet of or breached the GMA, pump ponded water from the affected excavation as soon as practical (but within 24 hours or by the direction of the Construction Manager) following a precipitation event.

3.6 PRECERTIFICATION

A. Pipes that daylight at the excavation face shall be plugged at the excavation face prior to precertification in accordance with Section 02205 and the Construction Drawings.

B. Install run-on controls along perimeter of precertification boundary, as shown on the Construction Drawings, to prevent surface water from non-certified areas from flowing into precertified areas.

C. During precertification, direct drainage from precertified areas to the sediment basin. Routing of surface water pump lines must be approved by the Construction Manager.

D. Maintain surface water management within the area to be precertified in accordance with this Section until precertification is complete.

3.7 INSPECTION

A. Inspect erosion and sediment control measures in accordance with Section 02270.

B. File records of inspections in accordance with Section 02270.

END OF SECTION