

UPF Site Excavation and Backfill



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This document has been reviewed by a Y-12 DC / UCNi-RO and has been determined to be UNCLASSIFIED and contains no UCNi. This review does not constitute clearance for Public Release.

Name: *Neal Mowery* Date: 02/15/19

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## REVISION LOG

Revision	Description	Intent	Non Intent
7	<p>This revision adds the ability to use CFN-1041 in lieu of CFN-1161 when CFN-1041 is used for backfill over underground commodities.</p> <p>This is responsive to the Condition Report 25774-000-GCA-GAM-01191, <i>UPF Site Backfill Notification Form Not Completed on Time</i>.</p> <p>An evaluation determination has been performed confirming this Command Media implements BNI Quality requirements, as tracked in PRMS.</p> <p>Other minor changes throughout to update responsible parties and their roles.</p>	X	
6	<p>Reformatted procedure to the current UPF procedure template. Changes to this procedure in this revision are indicated by change bars located in the right hand margin.</p> <p>This revision clarifies when CFN-1161 needs to be used. Reference Surveillance Report MSR-PM-801768-FY17-023. See Section 4.11.2.4 and 4.11.2.6.</p>	X	
Previous revisions	On record	NA	

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## 1.0 INTRODUCTION

### 1.1 Purpose

This procedure defines the requirements and process for earthwork-related activities at the Uranium Processing Facility (UPF) construction site and supporting facilities (e.g., K-31, K-1065 Warehouse). This procedure addresses work operations associated with site clearing, grubbing, stripping, grading, excavation, backfill, and soil-testing activities.

### 1.2 Scope

This procedure applies to construction work activities under the administrative control of UPF construction organization.

This procedure does not address requirements for large-scale dewatering systems, retaining and tie-back walls, sheet piling, dredging, tunneling, or other specialty subcontractor-type work.

Applicability to subcontractor employees is as specified in subcontract language.

UPF Construction execution of a Graded Approach to Quality for Inspections and Tests will be implemented in accordance with Y17-95-64-807, *UPF Construction Quality Control Process for Inspection, Testing, and Inspection Records*. The quality level will dictate the required level of inspection and the degree of independence of the inspection.

Refer to Y17-95-64-807 for information regarding quality level descriptions and the Technical Evaluation of Critical Attributes and Mitigation (TECAM) process used to identify and document critical attributes and acceptance methods.

## 2.0 RESPONSIBILITIES

### 2.1 UPF Site Manager (SM)

The UPF SM is responsible for ensuring that the requirements of this procedure are properly implemented.

### 2.2 UPF Project Field Engineer (PFE)

The PFE is responsible for ensuring that the requirements of this procedure are properly implemented and supervising field engineering personnel who provide technical support to installation operations.

### 2.3 UPF Project Field Superintendent

The Project Field Superintendent is responsible for ensuring that the requirements of this procedure are properly implemented and supervising superintendents who provide supervision and coordination of craft labor.

### 2.4 Lead Discipline Field Engineer (LDFE)

The Civil LDFE is responsible for managing the overall process, including maintaining a Site Excavation Notification (SEN) log; reviewing, approving, and issuing CFN-1030, *Site Excavation Notification*; and retaining SENs until the work and sign-offs are complete.

## 2.5 Field Engineer (FE)

The FE is responsible for installation quantity tracking, field material requisitions, knowledge of job scope, technical issue resolution, work package development, field changes, configuration control, temporary utility support, and quality verification by means of inspection, test, and nonconformance reporting and control.

## 2.6 Quality Control Engineer (QCE)

The QCE is responsible for quality verification in lieu of the FE for items that have a quality designation of Risk Significant or higher.

## 2.7 Subcontract Technical Representative (STR)

Within this procedure, the STR performs the FE function for subcontract work.

## 2.8 Responsible Superintendent (RS)

The RS is responsible for the quality of work performed and for supervising and coordinating craft labor, tools, and equipment required to complete installation activities in accordance with design drawings, codes, specifications, and standards. The RS is also responsible for developing the work plan and schedule, including fulfilling all safety and quality requirements pertaining to the work.

## 2.9 Competent Person (CP)

The CP is the individual on the construction team who is approved and capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees. The CP also has the authorization to take prompt corrective measures to eliminate them. The CP and the Responsible Person (RP) may be the same individual.

## 2.10 Requester

The Requester is the individual initiating the process to engage in excavation activities.

## 2.11 Responsible Person (RP)

The RP is the individual on the construction team directly responsible for directing excavation work (e.g., RS, craft supervisor, general foreman, or subcontractor).

# 3.0 PROCESS

## 3.1 Site Excavation and Backfill Excavation Plan

3.1.1 The RS and FE shall plan the work before starting major earthwork operation. Planning should ensure that all labor, equipment, materials, and methods are identified and coordinated to maximum efficiency while meeting construction schedule requirements. Elements to be considered in plan development include:

- Scope and magnitude of work to be performed.
- Verification of cut/fill quantities and balance as generated by Engineering.

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- Confirmation of stockpile, spoils pile, and stripping area locations, size, capacity, compaction, covering, storm run-off, and maintenance.
  - Status of qualification of proposed on-site borrow sources.
  - Status of qualification of off-site borrow sources.
  - Promised delivery dates for plant materials.
  - Schedule requirements integrated with other work processes.
  - Equipment needs consistent with the overall construction equipment plan.
  - Other discipline interfaces that may affect the work, including major dewatering systems, retaining and tie-back wall construction, dredging, etc.
  - Identification, marking, and avoidance of existing underground utilities.
  - Labor requirements and resources that will be needed.
  - Implementation of safety measures and methods that are identified in Section 3.3, *Safety Precautions and Requirements*.
  - Worker training requirements.
  - SEN requirements, including:
    - Notifying Tennessee One-Call.
    - Y-12 National Security Complex (Y-12) Permit Approval.
    - Approval by discipline RSs or FEs and others, as necessary.
  - Site logistics regarding the flow of material and equipment.
  - Erosion prevention and sediment control measures (e.g., silt traps, silt fencing).
  - Seasonal weather considerations.
  - Storm water management and drainage.
  - The use of water removal equipment. If water is controlled or prevented from accumulating by the use of water removal equipment, then the water removal equipment and operations shall be monitored by a CP to ensure proper operation.
  - Utilization of Controlled Low-Strength Material (CLSM) in lieu of granular backfill material.
  - Quality requirements.
  - Inspection and testing requirements.
  - Geotechnical verification of subsurface features.
  - Mapping requirements.
  - Environmental considerations, including hazardous or potentially contaminated material.
  - Storm Water Pollution Prevention Plan (SWPPP) requirements.
  - Survey support.
  - Underground utilities.
- 3.1.2 Earthwork operations for minor scopes should give consideration to only those previously listed items that are applicable within a Construction Work Package.

### **3.2 Execution of the Work**

- 3.2.1 The RS, FE or STR, and QCE (as required) shall ensure that all work is performed in compliance with the project specifications, drawings, applicable statutory permits, contract

documents, Occupational Safety and Health Administration (OSHA) regulations, and state and local jurisdictional regulations.

### 3.3 Safety Precautions and Requirements

3.3.1 Effective safety measures and methods will comply and be implemented in accordance with this procedure and OSHA 29 CFR 1926, Subpart P, *Excavations* to protect personnel who are required to work in and around excavations and trenches. Such measures and methods include but are not limited to:

- Identifying and assigning a CP before the start of work. The CP shall perform and document daily inspections of the work when personnel are working in the excavation/trench. Inspections may be documented on form CFN-1031, *Daily Trench Report* for each inspection performed.
- Inspecting the excavation and adjacent areas on a daily basis before the start of work, as conditions change, and after every rainstorm in order to identify possible cave-ins, failure of protective systems and equipment, hazardous atmospheres, or other hazardous conditions. If any of these conditions exist, then immediately restrict personnel access until the necessary precautions have been taken to ensure safe entry.
- The CP verifies the accuracy of the soil classification.
- For trenches 4 feet (1.2 meters) or more in depth, shoring or cutting back walls to the appropriate slope to protect employees from collapse.
- Providing ladders, stairways, ramps, or other means of egress in excavations 4 feet (1.2 meters) in depth. No more than 25 feet (7.6 meters) of lateral travel shall be required to reach a ladder or other approved safe egress.
- Removing spoil material from an excavation. Any other material storage must be kept at least 2 feet (0.6 meters) away from the excavation edge. If this is not done, then retaining devices must be utilized to prevent materials or equipment from falling or rolling into the excavations. A combination of both methods may be used, as required.
- Appropriately identifying excavations and trenches with signs, warnings, and barricades.
- Keeping barricades at least 6 feet (1.8 meters) from open edges of trenches and excavations.
- Ensuring that no employee is permitted underneath loads handled by lifting or digging equipment.
- Requiring employees to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials.
- Avoiding pedestrian traffic and/or walking around or behind excavation. ALL ground personnel shall establish positive eye contact with equipment operators before moving into the path of equipment.
- Ensuring that the RS and/or FE review daily and/or weekly weather forecasts to properly plan for and stage trenching and deep excavation activities. Adverse weather condition that could affect trench and excavation stability and, therefore, cause changes in ground pressures shall be carefully monitored.
- At all deep excavations where work activities are continuous, establishing monitoring systems to document all entry and egress of all construction personnel and visitors. An accountability roster maintained by the RS is an acceptable method of documentation.

- Ensuring that sloping or benching for excavations greater than 20 feet (6.08 meters) deep are designed by a registered professional engineer.
- Utilizing a warning system when mobile equipment must be operated adjacent to an excavation and the operator does not have clear and direct view of the edge of the excavation (e.g., barricades, spotter, restraining device).
- Installing walkways across excavations where employees or equipment are required to cross over excavations. Guardrails shall be installed where walkways are 6 feet (1.8 meters) or more above lower levels.

### 3.4 Site Excavation Permits

- 3.4.1 The PFE shall ensure that excavation conducted by UPF Construction complies with Consolidated Nuclear Security's (CNS's) procedure Y73-378, *Conduct of Excavation/Penetration Work Manual*, and/or the Authority Having Jurisdiction.

### 3.5 UPF Excavation Notification

- 3.5.1 The UPF Excavation Notification process shall be utilized by any person, party, discipline, or functional group that has a need to engage in excavation activities within the scope of this procedure. As such, the individual initiating the process shall be identified simply as the Requester.
- 3.5.2 Form CFN-1030 must be utilized for initiating any excavation work within the scope of this procedure. The form must be initiated and approved before proceeding with the work.
- 3.5.3 The Civil LDFE (or designee) shall assign a sequential notification number on the CFN-1030 form and maintain a log to control the assignment of these numbers.
- 3.5.4 The Requester shall complete the CFN-1030 form, including:
- The scope of work.
  - The area to be excavated, including depth and approximate location.
  - Trenching ground support systems (as applicable).
  - The date that the excavation is expected to begin.
  - An exhibit depicting work.
  - Other information necessary to fully describe the excavation.
- 3.5.5 The Requester shall also note any special requirements for the excavation (e.g., sloping, shoring, or benching requirements if the excavation is 4 feet [1.2 meters] or more below grade; trenching ground support systems if soil conditions require). Design of support systems, shield systems, or other protective systems shall be in accordance with tabulated data provided by the manufacturer or registered professional engineer.
- 3.5.6 The Requester shall ensure that the CFN-1030 form is routed to each of the Field Engineering discipline reviewers identified on the notification for review. Each reviewer shall verify that the latest revision of relevant design drawings, client as-built, and UPF as-built are used to locate all known underground installations in the area to be excavated. These installations shall be noted on the notification, and copies of the pertinent drawing(s) shall be attached or referenced on the SEN. The reviewer shall note any special requirements or minimum clearances that must be maintained from existing utilities.
- 3.5.7 Discipline reviewers (e.g., electrical, piping, civil, safety) shall take special care to indicate if this excavation will require a Lock-Out/Tag-Out of any plant equipment or utility line. If so,



- the Requester and reviewer shall ensure compliance with Y17-95-64-801, *UPF Construction Phase System and Equipment Safety Lockout/Tag Out*.
- 3.5.8 Upon completion of all reviews, the CFN-1030 form shall be sent to the Civil LDFE approver (or designee) for signature approval. Upon approval, a copy of the signed SEN, along with a copy of the applicable plant excavation permit with all pertinent drawings/attachments, shall be provided to the Requester. Turnover of the SEN requires meeting with the Requestor, the Y-12 utility locate team, discipline reviewers, and utility Owners (as needed) to review conditions of the permit, special consideration, existing utility location confidence level, etc. A copy of the SEN shall be retained by the LDFE or designee until the SEN is closed.
- 3.5.9 The Requester shall review the requirements of the CFN-1030 form with the RS to ensure that all special requirements noted on the permit are implemented in the excavation work. The RS shall have a copy of the approved CFN-1030 at the work location before any excavation work is started and shall keep a copy at the excavation site until the work has been completed. Retention of the approved CFN-1030 in the construction work package is acceptable.
- 3.5.10 The RS shall verify that the survey crew has located and physically marked all existing underground commodities and applicable tolerance zones as specified in Y73-378. The RS should arrange for utility locator services to identify any underground public utilities that are located in the excavation work area.
- 3.5.11 Before starting the excavation, the RS and CP shall ensure that all safety precautions and measures are in place or have been readied for implementation.
- 3.5.12 Prior to starting excavation, the Requester shall:
- Inform the Utility Operations Manager of the planned excavation activities and their locations.
  - Notify facility operations managers of planned excavations within 200 feet of a Materials Access Area or Defined Nuclear Facility.
  - Coordinate excavation work with the Y-12 Security Systems Manager when excavation work is in the vicinity of the Perimeter Intrusion Detection and Assessment System or within 20 feet of mandated clear zones.
  - Notify affected facility managers of excavation planned within 20 feet of facilities within limited areas, exclusion areas, and protected areas.
- 3.5.13 After the excavation is completed, the RS shall coordinate with the Requester to document any unexpected materials or components encountered during the excavation and to provide signoffs on any remaining items on the SEN.
- 3.6 Erosion Prevention and Sediment Control**
- 3.6.1 The RS and FE shall review all applicable jurisdictional environmental and construction permits before starting the work. All work operations shall fully comply with the requirements of these permits and their implementing documents (e.g., SWPPP) for soil erosion prevention and sediment control, including dust abatement.
- 3.6.2 The RS shall maintain all erosion prevention and sediment control devices throughout the duration of the work until all jurisdictional requirements have been satisfied.

- 3.6.3 The RS shall then advise the FE to notify the jobsite Environmental Compliance Department when these requirements have been met. Removal of the devices may require a site inspection and concurrence from a representative of the jurisdictional agency.

### **3.7 Clearing, Grubbing and Stripping**

- 3.7.1 Before starting work, the RS and FE shall review and confirm the locations of all wetlands and other related site restrictions. The RS shall ensure that no work is performed in any regulated wetland or other restricted area except as specifically directed by the engineering specifications, drawings, and/or contract documents.
- 3.7.2 Work crews shall clear the land by felling, cutting up, and disposing of trees, downed timber, snags, piles, brush, grass, floatable material, weeds, rubbish, and other objectionable vegetation growth. As a general guideline, cut trees, stumps, and brush in the area to be cleared to no more than 2 feet (0.6 meters) high, measured on the side adjacent to the highest ground, to facilitate grubbing as defined in project specifications.
- 3.7.3 DO NOT use burning as a means of clearing or disposing of material.
- 3.7.4 The RS shall ensure the removal and disposal of all stumps, tree roots 1-1/2 inches (3.8 centimeters) in diameter and larger, and other buried and/or decayed vegetable matter from the area cleared in accordance with the specification requirements. Grubbing shall be performed to a depth of no less than 1-1/2 feet (0.45 meters) below rough grade or natural ground surface or as defined in project specifications.
- 3.7.5 Topsoil and organic material shall be removed within the limits shown on the drawings. Stripping shall be limited to the actual depth of topsoil and organic material at a maximum depth of 2 feet (0.6 meters) below the existing grade, unless directed otherwise by the specification or the Owner.
- 3.7.6 If stripped topsoil is intended to be salvaged for replacement at the project, then mow and/or otherwise remove all heavy grass, weeds, or other vegetation over the areas from which topsoil is to be salvaged before stripping. Stockpile the topsoil on-site for reuse as indicated on the drawings.
- 3.7.7 Dispose the excess topsoil and other organic materials as waste to an on-site or off-site spoils area as directed by the engineering specification or drawings.

### **3.8 Spoils**

- 3.8.1 The RS shall ensure that materials to be spoiled are properly transported to specified storage areas on-site or transported off-site as indicated on the engineering drawings or as directed by the Owner, including all wasted material resulting from clearing, grubbing, and demolition.

### **3.9 Excavation**

- 3.9.1 Review Engineering and Owner drawings for the presence of any existing buried utilities located within the limits of disturbance for excavation/backfill activities. Utilities must be located and physically marked before commencement of any excavation. Hand-digging and/or potholing shall be used within the tolerance zone, which is the approximate location of an underground utility defined by a strip of land at least four feet wide, but not wider than the underground utility plus two feet on either side of such utility line based upon the color coded ground markings. If the utility must be exposed, then ensure that it remains adequately supported throughout the operation.

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- 3.9.2 Perform all excavation and trenching work in accordance with OSHA requirements stated in 29 CFR 1926, Subpart P, *Excavations*. Note that protective systems for use in excavations greater than 20 feet (six meters) in depth must be designed by a registered professional engineer.
- 3.9.3 All excavations shall be provided with a suitable means of access and egress in the form of ramps, stairways, and/or ladders.
- 3.9.4 Excavate all material to the lines and grades shown on the engineering drawings, or required for foundation installation.
- 3.9.5 If hazardous or unknown materials are suspected and/or encountered, then the work shall be discontinued until a qualified individual or group (e.g., environmental compliance lead, Health Physics/Radiation Protection) can identify the suspect material and ensure that it is safe to continue working. If it is determined that the material is hazardous, then all applicable contract requirements and jurisdictional codes and standards must be followed in order to handle these materials.
- 3.9.6 Stockpile, in designated areas, excavated materials that meet the specified requirements for fill material. Transport and dispose of excess/unsuitable material to designated spoil disposal areas. Stockpile and spoil disposal areas may be subject to common fill compaction requirements. Unless otherwise directed, pile slopes shall be no steeper than one Vertical (V) on three Horizontal (H).
- 3.9.7 Ensure that excavations are free from storm water. If necessary, pump and reroute the stormwater. Divert surface drainage from surrounding areas and away from the excavations. Discharge stormwater in a manner that does not produce erosion and is consistent with disposal measures or requirements identified in the SWPPP or other applicable jurisdictional regulations or permits.
- 3.9.8 Excavate in a manner that preserves subgrade below and outside the indicated lines of excavation, precludes weakening of surrounding areas, and prevents damage to structures that are completed or under construction. Protect existing structures and utilities adjacent to excavations and support to preclude settlement.
- 3.9.9 If the existing subsoil is soft or otherwise unsuitable at the subgrade elevation under foundations, roads, railroads, or other planned project facilities, then consult with Engineering, and excavate the unsuitable materials as directed.
- 3.9.10 Maintain the excavation surface within tolerances shown on the drawings.
- 3.9.11 Where identified on the drawings or in the specification, engineering verification of subsurface conditions may require investigation, mapping, and logging by the Geotechnical Engineer. For this case, the RS, FE, and QCE shall ensure that a hold-point in work operations is observed until the Geotechnical Engineer has completed this verification and has provided Construction with a release to proceed with the work.

### **3.10 Borrow Material**

- 3.10.1 The RS shall obtain borrow material only from previously approved borrow areas or other sources.
- 3.10.2 Before opening any borrow pit or initiating transport of materials from an approved off-site source, the FE shall review with the RS the requirements for performing additional, periodic soil tests on this material. For fill materials approved for use in "Q" Quality Level, the QCE shall participate in this review. A plan shall be developed to ensure that a proper quantity

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count of the transported material can be maintained for this purpose. For off-site sources, the RS shall coordinate with the FE regarding collection of trucking docket/trip tickets. The tickets are used for quantity verification and supplier payment.

- 3.10.3 The RS shall immediately notify the FE if the soil characteristics of any borrow or off-site materials exhibit any visible changes.

### **3.11 Fill, Structural Backfill, and Grading**

- 3.11.1 Upon completion of excavation activities, the FE shall inspect and accept the subgrade for backfill, and arrange for compaction testing as required. For subgrades designated for use in Quality Level Q or Risk Significant applications, the QCE shall provide an inspection and acceptance of the surface to be filled in accordance with UPF Project Specifications. Some surfaces directly underneath a foundation may be designated to receive a concrete mud mat.

- 3.11.2 Prior to the start of backfilling:

- 3.11.2.1 When backfilling over installed commodities or adjacent to concrete foundations, the individual requesting the backfill activity (typically the RS) shall complete the backfill notification request portion of CFN-1161, *UPF Site Backfill Notification*. Alternately, CFN-1041, *UPF Concrete Operations Pour Card* may be used if concrete or CLSM is used to cover the commodity.

- 3.11.2.2 The FE shall verify that structures and utilities affected by the backfill activity have been inspected, surveyed, tested (as required), and accepted. UPF Construction will provide as-built survey data to the Y-12 underground utility group. For form CFN-1041, Survey shall sign on the "Other" line in "Section B, Pre-Placement Checklist", with "As-Built" written as the description. The SEN number shall be recorded in the "Reference Documents" section.

- 3.11.2.3 The RP shall ensure that the excavation is cleaned of all trash, organic material, standing water, and other unacceptable materials.

- 3.11.2.4 The FE/QCE, as required by quality levels, shall determine if the subgrade is ready for backfill. FE will then arrange for compaction testing as required.

- 3.11.2.5 The RP will inspect the stockpile area to determine the appropriate method for excavation from the stockpile.

- 3.11.2.6 Fill shall not be placed against concrete until the concrete has achieved the required cure duration or attained a minimum specified compressive strength as defined in project drawings and specifications. The RS shall obtain concurrence from the FE that concrete has obtained the minimum specified compressive strength before allowing crews to place fill against concrete.

- 3.11.3 Upon acceptance, the FE ensures that CFN-1041 and/or CFN-1161 is completed and approved by the affected disciplines then releases the area for backfill.

- 3.11.4 The FE arranges to have backfill materials tested as required and shall ensure that the test results are documented.

- 3.11.5 Place the fill so that, when compacted, it forms a homogeneous mass that is free from lenses, pockets, streaks, and layers of material differing substantially in texture and gradation from surrounding fill materials.

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- 3.11.6 As required by engineering design output, moisture-condition the material to be compacted, as far as practicable, in the stockpile or borrow sources. If the material does not have the required moisture content uniformly distributed throughout, then condition the material by flooding, sprinkling, aerating, harrowing, disking, draining, or other means.
- 3.11.7 Place all fill material in loose lift heights that do not exceed specification requirements. Compact the soil to the dry densities specified.
- 3.11.8 In the case of railroads or public roads, verify with Engineering that the project specification requirements are equal to or exceed the jurisdictional requirements before beginning those compaction activities.
- 3.11.9 Uniformly grade and compact all areas covered by the project, including excavated and filled sections, to the grade and elevations shown on the drawings. Finish ditches and gutters to permit adequate drainage with provisions to protect against erosion.
- 3.11.10 Place and spread topsoil as indicated on the drawings and in accordance with the specification requirements.
- 3.11.11 Finish the surface of excavated and filled areas under roads, railroads, and other surfaces on which a base course or pavement is to be placed within the location, grade and cross section in accordance with project specifications. Finish other surfaces at the designated grade and cross section in accordance with project specifications.

### **3.12 Aggregated and Riprap Construction**

- 3.12.1 The RS shall construct road subbase, aggregate surfacing, and riprap in accordance with the details provided on the drawings. Maximum loose lift heights for the various materials shall not be exceeded. Materials shall be compacted in accordance with specification requirements.

### **3.13 Seeding, Fertilizing, and Mulching**

- 3.13.1 The RS shall seed, fertilize, and mulch all disturbed areas not identified on the drawings for aggregate surfacing or paving in accordance with specification requirements.
- 3.13.2 The RS shall maintain the areas seeded, including watering (as necessary), to ensure proper germination of the seed, replacing mulch where degraded, and reprocessing of areas where seed fails to germinate, and deleting weeds.

### **3.14 Inspection and Testing**

- 3.14.1 The RS and FE are responsible for ensuring that material qualification tests (e.g., gradations, laboratory moisture, density) are performed as required by the following project specifications:
  - All proposed on-site and off-site sources of fill material shall be pre-qualified by proper testing and documentation.
  - Material stockpiles and borrow areas (on-site and off-site) may require periodic testing as identified in the project specifications.
  - An historic record of the results of these tests shall be maintained, including identification of the approximate location and elevation of each test within the source.
- 3.14.2 The RS and FE shall perform in-process monitoring of the earthwork operations, as required by applicable quality levels, and ensure that quality is maintained. In-process

monitoring activities may be documented on any suitable daily report type of form or other project-designed Inspection Record, if so desired. Consider the following activities when performing in-process monitoring:

- Limits, boundaries, and elevations of the excavation
  - Safety precautions being provided
  - Storm water removal/dewatering
  - Personnel and equipment access
  - Inspection and acceptance of sub-grade condition
  - Proper material selection
  - Adequate material consistency
  - Backfill loose lift height
  - Proper compaction equipment and methods
  - Condition of adjacent facilities/utilities
  - Observation of sampling and test activities
- 3.14.3 The FE (and QCE, depending on the quality level of the work) is responsible for ensuring that in-process sampling and testing (e.g., field moisture, density) of all compaction operations is performed at the proper locations and intervals throughout the course of the work.
- Ensure that the testing agency has adequate qualified staff to perform the necessary tests on a frequency that supports the construction schedule.
  - The RS should ensure that the testing agency is not hindered by work operations in its effort to collect samples and perform field tests.
  - The testing agency shall document the sampling and test results on its own forms, which must be signed and dated by a qualified representative.
  - An historic record of the results of tests shall be maintained as part of the construction quality records. An ongoing, daily summary of sampling and test results shall be kept, and may be compiled on CFN-1032, *Daily Soil Compaction Test Record(s)*. In addition, a Field Sketch developed from one of the Plant drawings may be useful for marking up and identifying test locations and elevations.
  - Failed test results will necessitate that rework and retests be performed. The FE and QCE shall ensure the agency test form indicating the failure is marked up to indicate which new test report is being used for the re-test, and subsequent acceptance of the work. Likewise, the (re)test form shall be marked up to indicate which of the failed tests this (new) report is intended to replace. These same cross-references must be made in the Comment block on the Daily Soil Compaction Test Record(s).
- 3.14.4 The RS shall replace materials that do not conform to the material requirements of the drawings and Specifications. The RS shall rework areas that do not conform to the execution requirements of the Specification. All replaced materials and reworked areas shall be retested before acceptance.

## 4.0 RECORDS

Records generated by this procedure shall be submitted to the Document Management Center (DMC) for logging, issuance, distribution, and records retention to meet project

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records management requirements. Record types and their designations are identified in ML-PS-801768-A001, *Uranium Processing Facility Project Master Document Type List*. Records generated during the performance of this procedure include:

Record Number	Record Title	Record Holder	System/ Location	Quality Type
CFN-1030	UPF Site Excavation Notification	UPF DMC	InfoWorks	QA-L
CFN-1031	UPF Daily Trench Safety Report Form	UPF DMC	InfoWorks	QA-L
CFN-1032	UPF Daily Soil Compaction Test Record	UPF DMC	InfoWorks	QA-L
CFN-1041	UPF Concrete Operations Pour Card	UPF DMC	InfoWorks	QA-L
CFN-1161	UPF Site Backfill Notification	UPF DMC	InfoWorks	QA-L

## 5.0 REFERENCES

### 5.1 Source References

4MP-T81-03202, Site Excavation and Backfill

PL-CM-801768-A001, Construction Management Plan and Execution Strategy

PL-QA-801768-A001, Bechtel National Incorporated (BNI) Uranium Processing Facility (UPF) Project Quality Assurance Plan

UPF-3DP-G04B-00918, Technical Evaluation of Critical Attributes and Mitigation

Y15-95-800, UPF Document Management

Y60-95-102PD, UPF Quality Assurance Program Description

### 5.2 Interfacing References

29 CFR 1926, Subpart P, *Excavations*

ML-PS-801768-A001, Uranium Processing Facility Project Master Document Type List

Y15-95-200, UPF Graded Approach to Quality

Y17-95-64-801, UPF Construction Phase System and Equipment Safety Lockout/Tag Out

Y17-95-64-807, UPF Construction Process for Inspection, Testing, and Inspection Records

Y73-378, Conduct of Excavation/Penetration Work Manual

## 6.0 SUPPLEMENTAL INFORMATION

Appendix A, Acronyms and Definitions

Appendix B, Typical UPF Site Excavation and Backfill Process Flowchart

## APPENDIX A Acronyms and Definitions

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### ACRONYMS:

<b>CLSM</b>	Controlled Low-Strength Material
<b>CP</b>	Competent Person
<b>DMC</b>	Document Management Center
<b>FE</b>	Field Engineer
<b>LDFE</b>	Lead Discipline Field Engineer
<b>OSHA</b>	Occupational Safety and Health Administration
<b>PFE</b>	Project Field Engineer
<b>Q</b>	Quality
<b>QCE</b>	Quality Control Engineer
<b>RP</b>	Responsible Person
<b>RS</b>	Responsible Superintendent
<b>SEN</b>	Site Excavation Notification
<b>SM</b>	Site Manager
<b>STR</b>	Subcontract Technical Representative
<b>SWPPP</b>	Storm Water Pollution Prevention Plan
<b>UPF</b>	Uranium Processing Facility
<b>Y-12</b>	Y-12 National Security Complex

### DEFINITIONS:

<b>Benching</b>	A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.
<b>Borrow Area</b>	An area or pit, generally close to the work site, from which native materials may be excavated from the ground and used for selected backfill operations. Materials must be tested and pre-qualified before use.
<b>Clearing, Grubbing, and Stripping</b>	Clearing, Grubbing, and Stripping
<b>Deep Excavation</b>	Per OSHA 1926, Subpart P, a bell-bottom pier hole or other similar deep and confined footing excavation.
<b>Grading (Rough, Finish)</b>	Rough & Finish grading (Grade) are terms that refer to the excavation/backfill elevation. Rough Grade is normally used to indicate the underside elevation of a foundation, a roadway base course, or underside of the topsoil. Finish Grade is used to indicate the topside or finished/final elevation of a road surface or land profile.



## APPENDIX A Acronyms and Definitions

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### DEFINITIONS

<b>Hold Point</b>	A mandatory verification point in the sequence of work. The hold point may not be passed without being release by the identified person or organization based on confirmation that specified conditions have been met or completed. Hold points are steps in a process that due to safety, technical, or work process importance may need to have additional oversight, verification, or documentation.
<b>Inspection Record</b>	A record used to document the occurrence of an independent inspection of an item, product, or activity, so as to acknowledge the acceptance and compliance to specified criteria.
<b>Interferences</b>	An installed commodity that is exposed during the excavation process.
<b>Potholing</b>	The process of locating and exposing an installed commodity using hand digging or vacuum equipment.
<b>Quality Level (QL) Designator</b>	Used to indicate the level of control(s) and independence that must be applied to an item in order to mitigate risk associated with the critical characteristics designated by Engineering or risk attributes designated by the Owner. Quality level designators should be obtained from Y15-95-200, <i>UPF Graded Approach to Quality</i> .
<b>Sloping</b>	A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.
<b>Soil Classification</b>	A method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. Reference CFR 1926, Subpart P, Appendix A, <i>Soil Classification</i> , for a complete definition, requirements, and description of acceptable visual and manual tests for use in classifying soils.
<b>Spoil Area</b>	An area generally close to the work site where unwanted or unneeded, excavated soil or rock may be disposed.
<b>Stockpile Area</b>	An area generally close to the work site where excavated soil or rocks may be deposited/stored for later re-use as backfill.
<b>Stripping Area</b>	This term refers collectively to the following three things. Structures are elements that provide support or enclosure such as buildings, freestanding tanks, basins, dikes, and stacks. Systems are collections of components assembled to perform a function such as piping; cable trays; conduits; and heating, ventilation, fire protection, and air conditioning. Components are items of equipment such as pumps, valves, relays, dollies, or carts and elements of a larger array such as computer software, lengths of pipe, elbows and reducers.

## APPENDIX B Typical UPF Site Excavation and Backfill Process Flowchart

