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REVISION LOG

Revision 13

☐ Intent ☒ Non-Intent Implements PRMS Requirements: ☒ Yes ☐ No

- No forms have been edited as part of this revision
- Added Note to Section 3.5.15, between first and second bullet for JHA storage clarification
- Updated Section 3.5.15, fifth bullet to clarify minimum clearance zone maintenance
- Other changes include:
  - Updated references and acronyms
  - Editorial changes

Revision 12

☒ Intent ☐ Non-Intent Implements PRMS Requirements: ☒ Yes ☐ No

- These changes are in response to Condition Report 25774-000-GCA-GAM-05158, 10-Inch Water Line Struck Near PIDAS Zone 61 Footing During Concrete Demolition Work (ORPS NA-UPO--CNS-UPFPROJ-2025-0004) [*CA]
- This revision incorporates the changes identified in and supersedes PRCN-Y15-95-64-822-R11-01, PRCN-Y17-95-64-822-R11-02, and PRCN-Y17-95-64-822-R11-03
- Updated 2.4 to Civil Lead Discipline Field Engineer/Responsible Field Engineer
- Added new 2.5 Discipline Reviewer
- Expanded responsibilities in 2.2 UPF Project Field Engineer and 2.13 Responsible Person
- Added Section 3.1.2
- Added clarification to Section 3.5 including Table 1
- Added clarification to Section 3.9
- The following forms have been revised as a result of this document:
  - CFN-1299, UPF Excavation Walkdown Checklist
  - CFN-1030, UPF Site Excavation Notification (SEN)
- Added CFN-1251, UPF Construction/Startup Attendance Sheet
- Other changes include:
  - Updated references, acronyms, and definitions
  - Editorial changes

Previous revisions on record

CONTENTS

TABLES

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 including K-31 and K-1065 Warehouse. This Procedure also addresses work operations associated with site clearing, grubbing, stripping, grading, excavation, excavation related to demolition (e.g., sidewalks, slabs), backfill, and soil testing.

1.2 Scope

This Procedure applies to construction work activities under the administrative control of the 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.

Subcontract language specifies this Procedure's applicability to subcontractor employees.

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

The UPF Site Manager is responsible for ensuring the requirements of this Procedure are properly implemented.

2.2 UPF Project Field Engineer

The UPF Project Field Engineer (PFE) is responsible for:

- Ensuring the requirements of this Procedure are properly implemented
- Supervising Field Engineering personnel who provide technical support to installation operations
- Ensures that excavation complies with requirements contained in Consolidated Nuclear Security (CNS) procedure Y73-378, *Conduct of Excavation/Penetration (E/P) Work Manual*

2.3 UPF Project Field Superintendent

The Project Field Superintendent is responsible for:

- Ensuring the requirements of this Procedure are properly implemented
- Supervising superintendents who, in turn, supervise and coordinate craft labor

2.4 Civil Lead Discipline Field Engineer/Responsible Field Engineer

The Civil Lead Discipline Field Engineer (LDFE)/Responsible Field Engineer is responsible for:

- Managing the overall process, including maintaining a Site Excavation Notification (SEN) log
- Reviewing, approving, and issuing CFN-1030, *UPF Site Excavation Notification (SEN)*
- Retaining SENs until the work and signoffs are complete
- Ensure minimum potholing requirements are noted on the SEN in accordance with **Section 3.5.9, Table 1. *Minimum Number of Potholes by Linear Feet of Trench***

2.5 Discipline Reviewer

The Discipline Reviewer (DR) is responsible for:

- Reviewing and approving CFN-1030
- Specifying any special requirements or limitations during the review process
- Ensure minimum pothole requirements are specified on as-built survey exhibit in accordance with **Section 3.5.9, Table 1**
- DR to be a qualified Field Engineer in the respective discipline they are reviewing/approving for

2.6 Field Engineer

The Field Engineer (FE) is responsible for:

- Tracking installation quantities
- Initiating field material requisitions
- Understanding the job scope
- Resolving technical issues
- Developing work packages
- Initiating field changes
- Verifying configuration control
- Confirming temporary utility support
- Performing quality verification by means of inspection, test, and nonconformance reporting and control
- Obtaining Quality Control Engineer (QCE) verification for Quality (Q) and Risk Significant items/activities
- Completing CFN-1299A, *Excavation Release Approval*, to document excavation evaluations (if requested) that determine sufficiency of backfill activities and approving removal of barricades, signage, and daily inspection requirements

2.7 ES&H Representative, BNI

The Environmental, Safety, and Health (ES&H), Bechtel National, Inc. (BNI), Representative is responsible for reviewing completed CFN-1299A forms and providing concurrence if requirements in **Section 3.5.17** are met.

2.8 Quality Control Engineer

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

2.9 Subcontract Technical Representative

Within this Procedure, the Subcontract Technical Representative (STR) is responsible for performing the FE function for subcontract work.

2.10 Responsible Superintendent

The Responsible Superintendent (RS) is responsible for:

- Ensuring the quality of work performed
- Supervising and coordinating craft labor, tools, and equipment required to complete installation activities in accordance with design drawings, codes, specifications, and standards
- Developing the work plan and schedule, including fulfilling all safety and quality requirements pertaining to the work
- Signing CFN-1031, *UPF Daily Trench Safety Report,* following review of the inspection documented by the Competent Person
- Assigning the Responsible Person (RP)

2.11 Competent Person

The Competent Person is the individual on the construction team who is approved in accordance with **Section 3.3, *Safety Precautions and Requirements***, and is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees. The Competent Person is also authorized to take prompt corrective measures to eliminate these hazards. The Competent Person and the RP may be the same individual.

2.12 Requester

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

2.13 Responsible Person

The RP (assigned by the Responsible Superintendent) is responsible for:

- Informing the Utility Operations Manager of the planned excavation activities and their locations for all Y-12 owned utilities

- Notifying facility operations managers of planned excavations within 200 feet of a Materials Access Area or Defined Nuclear Facility
- Coordinating 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
- Notifying affected facility managers of excavation planned within 20 feet of facilities within limited areas, exclusion areas, and protected areas
- Walking down excavation areas with the RS, Equipment Operator, UPF Survey Group, and excavation workers and signing CFN-1299, *UPF Excavation Walkdown Checklist,* prior to commencement of excavation activities
- Verifying all underground commodities within the Limits of Excavation (LOE) and applicable tolerance zones are clearly marked on the as-built drawings and the survey crew has located and physically marked those commodities
- Notifying Surveying for re-establishment of LOE boundary marks or markings of utilities if they have been lost
- Ensuring with the Competent Person all safety precautions and measures are in place or have been readied for implementation and the Competent Person has signed CFN-1031
- Ensuring the FLHA card has been filled out and signed off appropriately
- Ensuring personnel working under the SEN Permit have been fully briefed on all requirements and restrictions and signed onto CFN-1030 for initial briefing and CFN-1251, *UPF Construction/Startup Attendance Sheet,* for briefing to daily work plan
- Ensuring location of all utilities within the designated daily scope have been positively identified by using hand digging or hydro-excavation prior to use of machine for excavation
- Signing the SEN Exhibit (survey as-built drawing) after confirming requirements of this procedure and the SEN have been met prior to commencement of excavation activities
- Ensuring a copy of the approved CFN-1030 and current JHA are retained at the work location prior to commencement of excavation activities and until excavation activities have been completed
- Ensuring a copy of the survey as-built drawing for the subject excavation is maintained in the cab of the equipment performing the excavation
- Ensuring all special requirements noted on the permit are implemented in the excavation work
- Ensuring the excavation is clear of all trash, organic material, standing water, and other unacceptable materials prior to start of backfilling
- Inspecting stockpile areas to determine the appropriate method for excavation from the stockpile

The assigned RP shall be Construction Discipline Superintendent, Construction Discipline Field Engineer, or Construction Subcontract Technical Representative that is current in their training defined by the Training Position Description (TPD) for their respective position.

3.0 PROCESS

3.1 Site Excavation and Backfill Excavation Plan

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

- Scope and magnitude of work to be performed
- Verification of cut/fill quantities and balance as generated by Engineering
- Confirmation of stockpile, spoils pile, stripping area locations, size, capacity, compaction, covering, storm run-off, and maintenance
- Qualification status of proposed onsite borrow sources
- Qualification status of offsite 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 and resource requirements
- Implementation of safety measures and methods that are identified in **Section 3.3**
- Worker training requirements
- SEN requirements, including:
  - Notifying Tennessee 811
  - Permit Approval by Y-12 National Security Complex (Y-12)
  - Approval by DRs, 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

NOTE: *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 Competent Person to ensure proper operation.*

- Utilization of Controlled Low-Strength Material 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 Work Packages will be developed for each Phase in the overall jobsite excavation planning in accordance with Y17-95-64-800, *UPF Construction/Startup Work Control Program*. The RS will develop a daily work plan for each separate excavation area within each Phase to facilitate communication flowdown to each crew performing excavation activities. The RP signature on the SEN Exhibit (survey as-built drawing containing all data required to accurately communicate the daily work plan) indicates the RP has covered all requirements of this Procedure and the SEN prior to commencement of excavation activities.

3.2 Execution of the Work

The RS, FE or STR, and QCE (as required) shall ensure 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.

See **Appendix B, *Typical UPF Site Excavation and Backfill Process Flowchart***, for a more detailed workflow.

3.3 Safety Precautions and Requirements

Effective safety measures and methods shall comply with, and be implemented in accordance with, this Procedure and OSHA 29 Code of Federal Regulations (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, the following:

- Identifying and assigning a Competent Person before the start of work. The Competent Person shall perform and document daily inspections of the work when personnel are working in the excavation/trench. Inspections shall be documented on CFN-1031 for each inspection performed. The RS shall sign CFN-1031 following completion of the inspection by the Competent Person. After the inspection is complete and the area is safe to enter, the Competent Person will initial and date a Daily Excavation Inspection Sign-Off tag (see **Appendix C, *Daily Excavation Inspection Sign-Off Tag***), including a description of existing conditions that will be displayed at each entrance to the excavation area
- Appropriately identifying excavations and trenches with signs, warnings, and barricades and, where required, have a barricade around the entire perimeter with designated access points. A Daily Excavation Inspection sign-off tag (see **Appendix C**) will be clearly posted at each designated access point
- Ensuring a Competent Person inspects the excavation and adjacent areas on a daily basis before the start of work, as conditions change, and after every rainstorm or other hazard-increasing occurrence in order to identify possible cave-ins, failure of protective systems and equipment, hazardous atmospheres,

or other hazardous conditions. If any of these conditions exists, then the RS or designee shall immediately restrict personnel access until the necessary precautions have been taken to ensure safe entry

- Ensuring the Competent Person 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 in accordance with OSHA 29 CFR 1926, Subpart P to protect employees from a potential 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 and any other material the proper distance away from the edge of excavations. Spoils and any other material storage must be kept at least 2 feet (0.6 meters) away from the excavation edge. If this is not completed, 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
- Ensuring no employee is permitted underneath loads handled by lifting or digging equipment, and no employee who is inside the barricaded excavation stands within the swing radius or blind spots of operating 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 and receive positive acknowledgement back from the operator before moving into the path of equipment
- Ensuring 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 conditions 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 sloping or benching for excavations greater than 20 feet (6.08 meters) deep are designed by a registered professional engineer
- Utilizing a warning system (e.g., barricades, spotter, restraining device) when mobile equipment must be operated adjacent to an excavation and the operator does not have a clear and direct view of the edge of the excavation
- 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
- Ensuring Personal Fall Arrest Systems (PFAS) are used to protect personnel from free falling 6 feet or greater to the next level (e.g., excavation floor) where vertical or near vertical excavation walls exist. Personnel are not allowed to walk or work between the excavation barricade and excavation slope if a fall hazard of 6 feet or greater to the next level exists without using a PFAS

3.4 Site Excavation Permits

The PFE shall ensure excavation conducted by UPF Construction complies with Consolidated Nuclear Security (CNS) procedure Y73-378 and/or guidance from the Authority Having Jurisdiction.

3.5 UPF Site Excavation Notification

3.5.1 The UPF Site 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 Forms CFN-1030 and CFN-1299 must be utilized for initiating any excavation work within the scope of this Procedure. These forms must be initiated and approved/completed before proceeding with the work.

3.5.3 The Civil LDFE (or designee) shall assign a sequential notification number on CFN-1030 and maintain a log to control the assignment of these numbers.

3.5.4 The Requester shall complete CFN-1030, including:

- The scope of work
- The area to be excavated, including depth and approximate location
- Trenching ground support systems (as applicable)
- The date 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 comply with tabulated data provided by the manufacturer or registered professional engineer.

3.5.6 The Requester shall ensure the CFN-1030 is routed to the Civil LDFE for evaluation.

3.5.7 The Civil LDFE will review the CFN-1030 and ensure the proposed area is covered by an approved Y-12 Site Excavation Permit in accordance with Y73-378.

3.5.8 The Civil LDFE will review the CFN-1030 and determine if the request falls under the following Discipline Reviewer exempt activities:

A. Excavation to a maximum of 12 inches (12”) will be performed entirely using vacuum extraction, no hand tools and commodity is non-energized or protected (defined in **Section 3.5.9, Step 3**).

B. For grading activities, commodities are exempt from being field located, identified and potholed provided there is a minimum of 18 inches of cover.

If the scope of work is covered by an exemption the Civil LDFE will mark “Excavation meets exemption requirements based on described scope of work. Discipline reviews and as-built survey exhibit not required” on the CFN-1030.

3.5.9 If the scope of work described on the CFN-1030 does not meet the exemption criteria then the Civil LDFE shall ensure CFN-1030 is routed to each of the Field Engineering discipline reviewers identified on the notification for review. The Civil LDFE shall ensure:

1. Each discipline reviewer shall verify the latest revision of relevant design drawings, client as-built, and UPF as-built drawings 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) should be attached or referenced on the SEN.
2. An SEN underground exhibit shall be generated by the UPF Survey Group. This shall include a table that shows all installed commodities/utilities depth and location (e.g., northing and easting) within the limits of excavation.
3. The discipline reviewer shall note any special requirements (UPF required and/or as specified in Y-12 Site Excavation Permit). As a minimum, the following clearance zones and quantity of potholes will be noted on the SEN underground exhibit for each utility where potholing is required to locate commodity prior to using mechanical means:

   A. Minimum clearance zones from an installed commodity

      a. Electrical: 5-foot clearance zone unless

         - Protected by concrete envelope (e.g., ductbank)
         - Commodity is protected with a concrete cap and bottom of excavation limit if above the concrete cap

      b. Pressurized pipe: 5-foot clearance zone

      c. Non-pressurized pipe: 2-foot clearance zone

      d. Ground cable: 1-foot clearance zone, unless otherwise specified due to existing conditions (e.g. commodity is encased in controlled low-strength material (CLSM) or planned demo/replacement required for installation)

   B. Minimum potholes for each trench containing an installed commodity

Table 1. Minimum Number of Potholes by Linear Feet of Trench

Linear Feet of Parallel Trench	Minimum Quantity of Potholes
< 15	2
25	3
50	4

NOTE: *Additional potholing requirements shall be specified when an installed commodity changes direction, elevation, or intersects another commodity if within the excavation envelope (e.g., depth).*

The discipline reviewers shall give particular attention and identify any conflicts between the applicable sub-sections of the Y-12 Excavation Permit (Discipline Engineering Reviews and Survey Team Reviews).

4. Discipline reviewers (e.g., electrical, piping, civil, safety) shall specify a lockout/tagout (LO/TO) requirement for any energized plant equipment or utility line within the excavation that cannot maintain the clearances specified in Step 3 (regardless of excavation method). The requester and reviewer shall ensure compliance with Y17-95-64-801, *UPF Energy Isolation Management (EIM) – Lockout/Tagout (LOTO)*.

3.5.10 Upon completion of all reviews, CFN-1030 shall be sent to the Civil LDFE approver (or designee) for final review and approval 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 Requester, the Y-12 utility locating team (if a new/revised Y-12 permit had to be incorporated), discipline reviewers, STR (if applicable), 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 Civil LDFE or designee until the SEN is closed.

NOTE: *The initial walkdown for an approved Site Excavation Notification shall be no sooner than 10 days prior to the schedule start of the work.*

3.5.11 The Civil LDFE shall review the requirements of CFN-1030 and conduct a walkdown of the excavation with the RS, RP, Equipment Operator, UPF Survey Group and workers performing the work (documented on CFN-1299). The RP ensures all special requirements noted on the permit are implemented in the excavation work. The RP shall have a copy of the approved CFN-1030 along with a copy of the current JHA 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.

3.5.12 The RP shall verify all underground commodities within the LOE and applicable tolerance zones are clearly marked on the as-built drawings and that the survey crew has located and physically marked those commodities. The RS should arrange for utility locator services to identify any underground public utilities in the excavation work area. A legible copy of the survey as-built for the subject excavation shall be maintained in the cab of the equipment performing the excavation. The as-built shall be Derivative Classifier/Reviewing Official stamped.

During the excavation:

- If the LOE boundary marks have been lost, the RP shall notify Surveying for re-establishment prior to performing work
- If markings of utilities have been lost, the RP shall notify Surveying for re-establishment prior to performing work

3.5.13 Before starting the excavation, the RP and Competent Person shall ensure all safety precautions and measures are in place or have been readied for implementation.

3.5.14 Prior to starting excavation, the RP shall:

- Inform the Utility Operations Manager of the planned excavation activities and their locations for all Y-12 owned utilities
- 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

3.5.15 At the start of each shift the RP shall ensure the following:

- A copy of the SEN and the current JHA is present at the excavation work area

NOTE: *It is permissible to store the JHA in the mechanical equipment being used in that work area for protection from elements.*

- A marked-up copy of the SEN survey exhibit that clearly shows the scope of work to be performed for that shift is maintained in the cab of the equipment performing the excavation and is confirmed on the FLHA card
- The excavation has been inspected and signed off by the Excavation Competent Person
- All utilities within the designated daily scope are clearly marked
- The location of all utilities within the designated daily scope have been positively identified by using hand digging or hydro-excavation prior to use of machine for excavation if the minimum clearance zone cannot be maintained
- All personnel working under the SEN Permit have been fully briefed on all requirements and restrictions and signed onto CFN-1030 for initial briefing and CFN-1251 for briefing to daily work plan
- The survey as-built for the SEN is maintained in the cab of equipment performing the excavation
- Superintendent and Foreman sign off on the FLHA card for work start. Additional sign off by Superintendent and Foreman is required between pauses (i.e., Lunch/new personnel)

NOTE: *Hold additional walkdowns in the event of work suspension, or incrementally if the work scope outlined in the SEN has been sub-divided into sequential steps. In these instances, revisions to the Survey-supplied as-built drawings may be necessary. Complete a CFN-1299 to document each walkdown. This must be completed prior to resuming work.*

3.5.16 During excavations, if changes to the scope and/or boundary limits occur, the SEN shall be revised.

3.5.17 When an excavation has achieved sufficient backfill/grading and no longer presents hazards that require barricade, signage, and daily inspections in accordance with this Procedure, CFN-1299A shall be completed by the appropriate BNI Field Engineer to approve removal of the barricades, signage, and daily inspection requirements. The

BNI ES&H Representative shall perform a visual inspection of the excavation and provide concurrence signature if it is determined that hazards have been sufficiently mitigated. Completed CFN-1299A forms shall be submitted to InfoWorks.

3.5.18 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 group 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 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 will 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 1½ 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 1½ 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 onsite for reuse as indicated on the drawings.

3.7.7 Dispose of the excess topsoil and other organic materials as waste to an onsite or offsite spoils area as directed by the engineering specification or drawings.

3.8 Spoils

3.8.1 The RS shall ensure materials to be spoiled are properly transported to specified storage areas onsite or transported offsite as indicated on the engineering drawings or as directed by the Owner, including all waste 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 within the limits of disturbance for excavation/backfill activities. Utilities must be located and physically marked before commencement of any excavation. Potholing shall be used within the minimum clearance requirements listed on the as-built survey exhibit prior to machine excavating. Depths to the installed commodity must be provided on the Survey supplied as-built drawings exhibit. If the utility must be exposed, then ensure that it remains adequately supported throughout the operation.

3.9.2 Perform all excavation and trenching work in accordance with OSHA requirements stated in 29 CFR 1926, Subpart P. Note that protective systems for use in excavations greater than 20 feet (6 meters) deep 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 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. The area shall be barricaded with red barricade tape and danger tags meeting requirements of UPF-CP-214, *Barricades and Signs*, prior to the end of shift. After suspected hazardous material has been identified as “hazard free” by a qualified person, the RS shall contact the CNS ES&H Oversight Lead for further instruction regarding disposition of legacy material.

When suspected hazardous material is identified as “rad free” by the Radiation Protection Supervisor, the RS shall contact the CNS ES&H Oversight Lead for further instruction regarding disposition of legacy material.

Suspected hazardous material shall be barricaded or segregated (e.g., bagged and tagged appropriately) prior to end of shift.

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 on three horizontals.

3.9.7 Ensure excavations are free from storm water. If necessary, pump and reroute the storm water. Divert surface drainage from surrounding areas and away from the excavations. Discharge storm water 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 of 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. In this case, the RS, FE, and QCE shall ensure 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. Borrow areas shall be approved by the Geotechnical Engineer.

3.10.2 Before opening any borrow pit or initiating transport of materials from an approved offsite 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 Quality Level Q, the QCE shall participate in this review. A plan shall be developed to ensure a proper quantity count of the transported material can be maintained for this purpose. For offsite 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 offsite 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, the following steps shall be completed:

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 Permit*. Alternately, CFN-1041, *UPF Concrete Operations Pour Card*, may be used if concrete or Controlled Low-Strength Material is used to cover the commodity in accordance with Y17-95-64-828, *UPF Concrete Operations*.
2. The FE shall verify 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 CFN-1041, Survey personnel shall sign on the “Other” line in “Section B, Pre-Placement Releases,” with “As-Built” written as the description. The SEN number shall be recorded in the “Reference Documents” section.
3. The RP shall ensure the excavation is clear of all trash, organic material, standing water, and other unacceptable materials.
4. The FE/QCE, as required by Quality Levels, shall determine if the subgrade is ready for backfill. The FE will then arrange for compaction testing as required.
5. The RP shall inspect the stockpile area to determine the appropriate method for excavation from the stockpile.
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 shall ensure CFN-1041 and/or CFN-1161 is completed and approved by the affected disciplines; the FE can then release the area for backfill.

3.11.4 The FE shall arrange to have backfill materials tested as required and ensure 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.

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 exceed or are equal to 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 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 within 14 days after use of the disturbed area ceases as required by the site SWPP.

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, reprocessing areas where seeds fail to germinate, and removing weeds.

3.14 Inspection and Testing

3.14.1 The RS and FE are responsible for ensuring material qualification tests (e.g., gradations, laboratory moisture, density) are performed as required by the following Project specifications:

- All proposed onsite and offsite sources of fill material shall be prequalified by proper testing and documentation
- Material stockpiles and borrow areas (both onsite and offsite) 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 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 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, including the following:

- Ensure the testing agency has adequate qualified staff to perform the necessary tests on a frequency that supports the construction schedule
- The RS should ensure 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 test results 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, *UPF Daily Soil Compaction Test Record*. 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 retest 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 CFN-1032

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 Document shall be maintained in accordance with Y15-95-800, *UPF Document Management*.

The following records are generated:

Record or Form Number	Record Title	System/ Location	Document Type
CFN-1030	*UPF Site Excavation Notification (SEN)*	InfoWorks	SEN
CFN-1031	*UPF Daily Trench Safety Report Form*	InfoWorks	DTR
CFN-1032	*UPF Daily Soil Compaction Test Record*	InfoWorks	DSTR
CFN-1041	*UPF Concrete Operations Pour Card*	InfoWorks	CPC
CFN-1161	*UPF Site Backfill Permit*	InfoWorks	SBN
CFN-1251	*UPF Construction/Startup Attendance Sheet*	InfoWorks	ATTN
CFN-1299	*UPF Excavation Walkdown Checklist*	InfoWorks	ERA
CFN-1299A	*UPF Excavation Release Approval*	InfoWorks	ERA

5.0 REFERENCES

5.1 Source References

10 CFR 851, *Worker Safety and Health Program*

4MP-T81-03202*, Site Excavation and Backfill*

E-SD-2009*, Integrated Safety Management Program – Incorporating Worker Safety and Health Program Requirements*

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 (QAP)*

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

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

5.2 Interfacing References

OSHA 29 CFR 1926, *Subpart P, Excavations*

UPF-CP-214, *Barricades and Signs*

Y15-95-200, *UPF Graded Approach to Quality*

Y15-95-800, *UPF Document Management*

Y17-95-64-800, *UPF Construction/Startup Work Control Program*

Y17-95-64-801, *UPF Energy Isolation Management (EIM) – Lockout/Tagout (LOTO)*

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

Y17-95-64-828, *UPF Concrete Operations*

Y73-378, *Conduct of Excavation/Penetration (E/P) Work Manual*

5.3 Forms

CFN-1030, *UPF Site Excavation Notification (SEN)*

CFN-1031,*UPF Daily Trench Safety Report Form*

CFN-1032*,UPF Daily Soil Compaction Test Record*

CFN-1041*,UPF Concrete Operations Pour Card*

CFN-1161*,UPF Site Backfill Permit*

CFN-1251, *UPF Construction/Startup Attendance Sheet*

CFN-1299*, UPF Excavation Walkdown Checklist*

CFN-1299A*, UPF Excavation Release Approval*

6.0 SUPPLEMENTAL INFORMATION

Appendix A, *Acronyms and Definitions*

Appendix B, *Typical UPF Site Excavation and Backfill Process Flowchart*

Appendix C, *Daily Excavation Inspection Sign-Off Tag*

APPENDIX A
Acronyms and Definitions

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Acronyms

Definitions

Benching	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.
Borrow Area	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 prequalified before use.
Clearance Zone	A required distance from an installed commodity where mechanical means of excavating is restricted. The clearance zone is defined as a 360-degree envelope around the installed commodity.
Clearing, Grubbing, and Stripping	Removal of tree shrubs, roots, and topsoil before excavation of a site. Project specifications often include the demolition of minor, miscellaneous building/structure foundations, roads, and abandoned (existing) buried utilities within this same category of work.

APPENDIX A
Acronyms and Definitions

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Deep Excavation	As defined by OSHA 29 CFR 1926, Subpart P, a bell-bottom pier hole or other similar deep and confined footing excavation.
Excavation	Any man-made cut, cavity, trench, borehole, or depression in an earth surface formed by earth removal.
Grading (Rough, Finish)	Rough and 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.
Hold Point	A mandatory verification point in the sequence of work. The hold point may not be passed without being released 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.
Inspection Record	A record used to document the occurrence of an independent inspection of an item, product, or activity, so as to acknowledge acceptance and compliance with specified criteria.
Interferences	An installed commodity that is exposed during the excavation process.
Potholing	The process of locating and exposing an installed commodity using hand digging or vacuum equipment.
Quality Level Designator	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, *UPF Graded Approach to Quality*.
Sloping	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.
Soil Classification	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, Soil Classification, for a complete definition, requirements, and description of acceptable visual and manual tests for use in classifying soils.

APPENDIX A
Acronyms and Definitions

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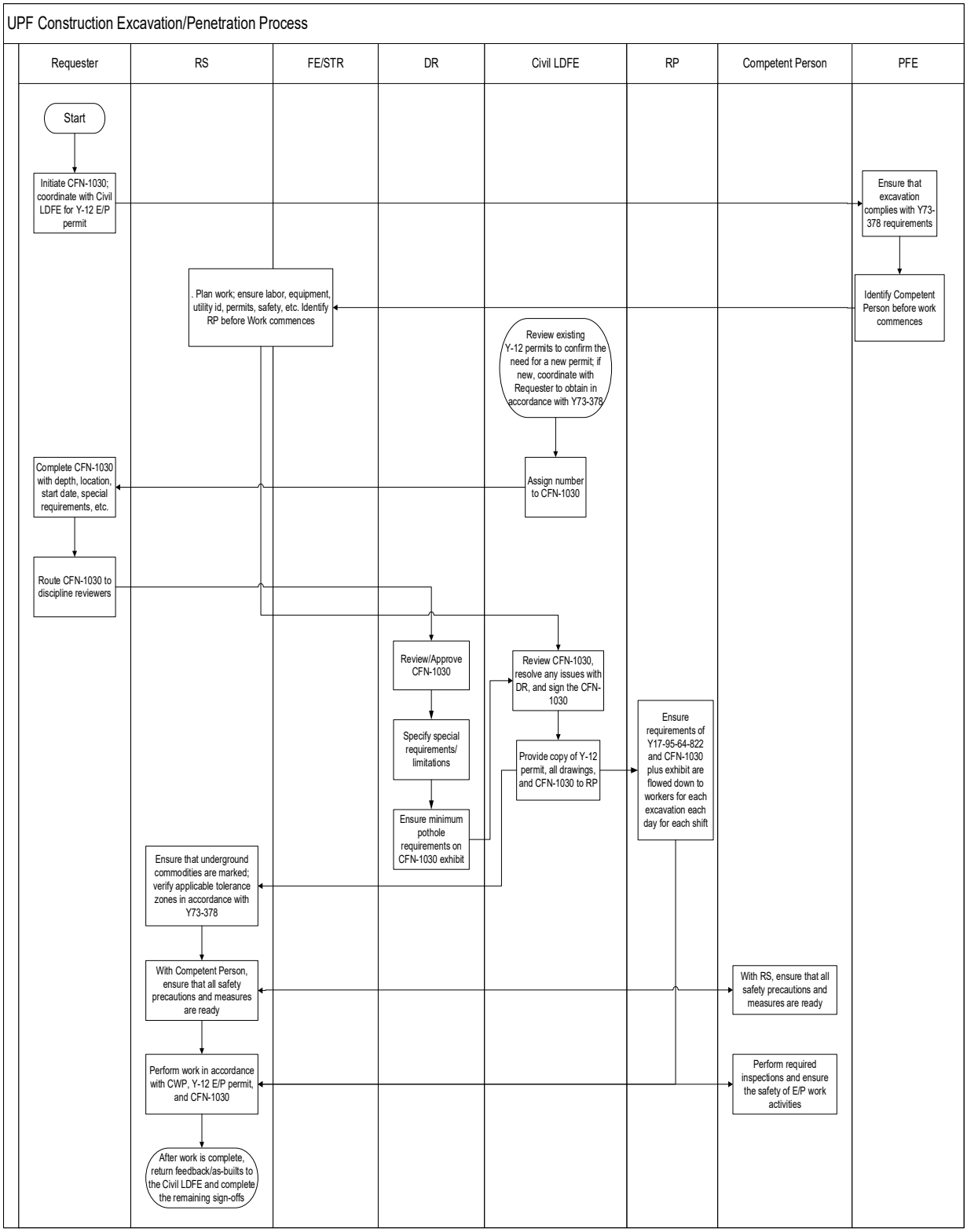
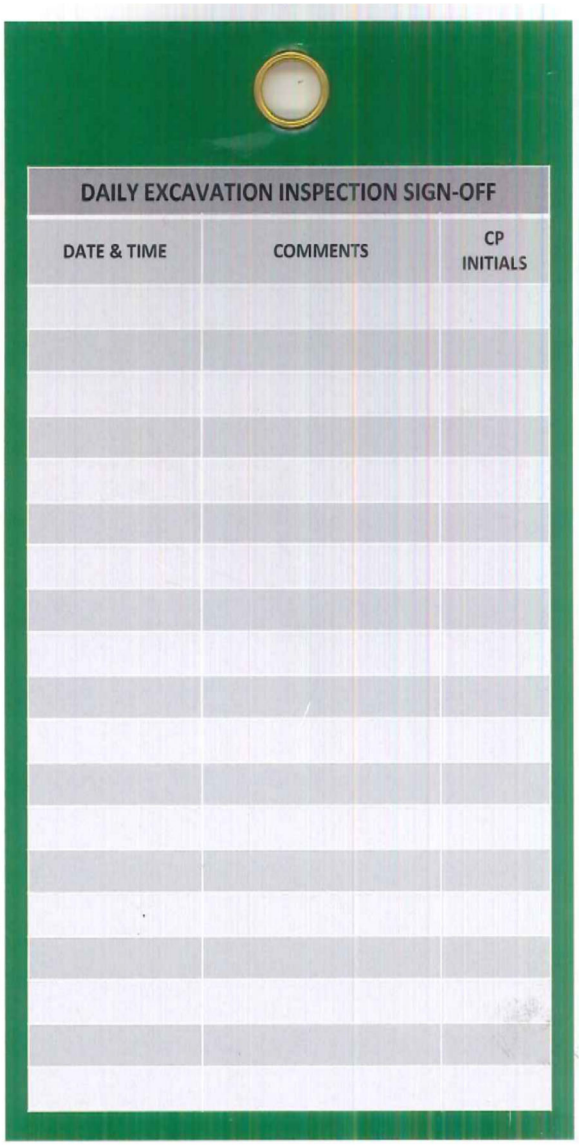
Spoil Area	An area generally close to the work site where unwanted or unneeded, excavated soil or rock may be disposed.
Stockpile Area	An area generally close to the work site where excavated soil or rocks may be deposited/stored for later re-use as backfill.

APPENDIX B
Typical UPF Site Excavation Process Flowchart



APPENDIX C
Daily Excavation Inspection Sign-Off Tag

Front



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