EOI-300-296-ERS Attachment 3 - Additional Scope Detail

Mechanical/Electrical Interferences Removal, Cell Sealing/Shielding, Core Drilling and Structural Modifications

Introduction

The 300-296 Soil Removal Project (SRP) is providing new systems to be installed in the 324 Building on the Hanford Site. The project's purpose is to retrieve highly contaminated material under the B-Cell structure. Several project work scope items must be done to make this happen. Structural enhancements to B-cell, cleaning out debris currently in the cells, removal of the floor, installation of new equipment to excavate and transport contaminated soils and loading of soil in cells and covering with grout are among the work that comprises 300-296 SRP. The first construction activities are the removal of mechanical and electrical equipment on the cell walls the covering of penetrations into the cells and providing shielding over the penetrations, core drilling of holes to mount equipment and cameras and installing structural modifications to B-cell.. The four items of work described below in this construction aid are the initial portions of work in the 324 building that are part of the 300-296 SRP project.

Item 1:

<u>Mechanical Equipment Interference Removal</u>

Scope of work for mechanical equipment interference includes the following items.

- Remove stainless steel enclosure around outer door for B-Cell Sample Load Out Port. The enclosure is made of 3/16" stainless steel and plexiglass. Enclosure dimensions are 73" long by 27" thick by 50" tall. The enclosure rests on 3/8" angle carbon steel legs. The enclosure interior and the interior of the HVAC ducting attached to the enclosure is posted as a Beryllium Contamination Area (BCA) and High Contamination Area (HCA). The enclosure is not only attached to the steel legs but is welded to a ¼" stainless steel backing plate that is embedded in the cell wall. The legs will need to be removed in addition to the enclosure.
- Remove Sample Load Out Room HVAC filter and blank that HVAC opening with 3/16" stainless steel sheet also blank the HVAC duct that was connected to Sample Load Out Port Enclosure with 3/16" stainless steel.
- Remove stainless steel tubing running from B-Cell, A-Cell and Airlock to top of enclosure and various abandoned connections and fittings on walls of Sample Load Out Room. Cap or seal tubing left behind.
- Removing tubing and lead shielding and associated steel support angles running to B-Cell from Sample Load Out Enclosure.
- Removing Sample Load Out Room cinder block walls and door.
- Remove compressed air pipe running into Sample Load Out Room overhead, cap or plug remaining piping.
- Remove abandoned vacuum lines on Sample Load Out Room walls and in Sample Load Out Room overhead.

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- Remove Retention Process Sewer on north side of B-Cell on first floor (approximately 45 feet long), cap open pipe at northwest corner of B-Cell and blank off open flange in front of A-Cell on first floor.
- Disconnect compressed air supply to Sample Load Out Enclosure and remove tubing. Plug or cap open pipe.
- Remove Sample Load Out Port outer door (weight 2700 lbs.). Install cover plate shown in FMP over open port.
- Fabricate and install cover plate over Sample Load Out Port opening.
- Modify first floor sprinklers on north side of B-Cell to provide proper coverage. Extend two lines approximately 54" each and field route new sprinkler line around new concrete support column footprint against A-Cell northwest corner (approximately 15 feet of pipe with two sprinklers).
- Remove service piping and tubing running to Airlock from B-Cell first floor south gallery, trim sleeve for tubing and piping.
- Re-route 2 ½" sprinkler pipe in Room 18 on west side of B-Cell to make room for concrete support pier.
- Modify sprinkler location in Room 18 at B-Cell southwest corner to provide proper coverage.
- Add additional sway brace on 2 ½" sprinkler piping line in Room 18 at north end near door to Room 19.
- Remove two 2" Retention Process Sewer pipes, each approximately 30 feet long, running along west side of B-Cell in Room 18 overhead. Cap open pipes and drains left in place.
- Remove approximately 60 feet of abandoned vacuum system piping on west and south side of B-Cell in Room 18, along with associated supports, valves and sample fittings.
- Remove approximately 15 feet of 1 ½" stainless steel Retention Process Sewer pipe on south side of B-Cell in Room 18.
- Air gap 4" Cold Process Water line in southwest corner of Room 18 and blank open end of active line.
- Remove approximately 12' of inactive Cold Process Water piping and 12' of inactive steam piping near northwest corner of B-Cell, in Room 18 leading to Room 21.
- Re-route approximately 18 feet of 1" stainless steel Compressed Air tubing on wall in Room 131 on south side of B-Cell to clear southeast Remote Excavator Arm (REA) location.
- Remove approximately 10 of 2" Retention Process Sewer (RPS) piping at C-Cell southwest corner and 8'of attached 1 inch RPS piping and associated fittings. Cap open ends of remaining active and abandoned piping.
- Remove approximately 6 feet of 31 inch Compressed Air system piping, and associated valves, gages and fittings, east of C-Cell south window. Cap open ends of active piping.
- Remove approximately 8 feet if 1 inch Cold Process Water piping and associated valves and fitting west of C-Cell west window. Cap open ends of active and abandoned piping.
- Remove approximately 12 feet of abandoned vacuum piping in C-Cell gallery.

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- Air gap and blank flange 4" cold process water supply to Room 18.

The following items should considered when performing planning for interference removal.

- Retention Process Sewer piping contents are not known. Cutting, sampling, capping and blanking of RPS system will need to be done in glove bags. Before cutting pipes should be tapped to verify no liquid is present. Any liquids need to be sampled and drained to appropriate containers. Removed piping may need to be sized reduced and bagged up or plugged for transfer to ERDF containers.
- The Sample Load Out Enclosure interior and interior of Sample Load Out Port are Beryllium Control Areas (BCAs) and High Contamination Areas (HCAs). Dose rates inside the Sample Load Out Port are 47 mR/hr. Interior of HVAC system above Sample Load Out Enclosure should also be considered an HCA and BCA.
- Appropriate measures need to be taken to control dust during removal of cinder block walls for Sample Load Out Room.
- A hydraulic lifting table or similar lifting apparatus will be needed to removal of the Sample Load Out Port outer door.
- Interference removal in Room 245 will require scaffolding or a manlift.
- Interference removal in over head of Sample Load Out Room and B-Cell First Floor South Gallery will require scaffolding.

There are two reasons for removing mechanical equipment from the exterior walls of B-cell:

1) Provide clear space on the walls to attach B-Cell structural support columns and
2) Provide clear space on the B-cell walls to core drill holes need to mount cameras, lights and equipment in B-cell.

Sequencing of the work generally, will be the basement floor first and the main floor second, but specific timing will be provided in the daily work package planning (see section below for further information on work sequencing). Any Lock out/Tag Out requirements will be identified in the work package.

<u>Electrical Equipment Interference Removal</u>

Similar to the mechanical equipment interference removal there are two reasons for removing electrical equipment from the exterior walls of B cell:

3) Provide clear space on the walls to attach structural supports and
4) Provide clear space on the B-cell walls to core drill holes need to mount cameras, lights and equipment in B-cell.

Sequencing of the work generally, will be the basement floor first and the main floor second, but specific timing will be provided in the daily work package planning. Any Lock out/Tag Out requirements will be identified in the work package.

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Item 2:

Cell Sealing and Shielding Installation Design

The scope of the Cell Sealing and Shielding Installation is the fabrication and installing of 120 to 130 mechanical seals for shielding, grouting and fire protection. The sealings are in the walls of A, B & D cells of the 324 building. It some includes the demolition of areas to access and provide the mechanical racks to hold the shielding blankets. It includes the draining of oils from the shield windows and installation of cover plates for sealing and shielding. The seals are at multiple levels and thickness of the walls.

Item 3:

Core Drilling

The core drilling scope of work will be drilling through the walls of B- Cell, C- Cell, D- Cell and the REC Airlock. These walls are 3 ft to 5 ft thick with embedment's, piping and structural steel. The scope of work for core drilling will include the following items:

- Drilling 20 core drill holes. Hole locations and sizes are as follows.
    - Two 12" core drill holes for REAs at elevations 1' – 0" and 3' – 0" in the northeast and northwest corners of B-Cell in the cell north wall, four holes total.
    - Two 12" core drill holes for REAs at elevations 1' – 0" and 3' – 0" in the southeast and southwest corners of B-Cell in the cell south wall, four holes total.
    - Four 10" core drill holes for REA hydraulic hoses adjacent to each pair of REA mounting holes (1' – 5" to left of each pair) at elevation 2' – 0".
    - One 8" core drill hole for the Transfer Mechanism power supply at elevation 9' – 0" in the northeast corner of B-Cell.
    - Two 6" core drill holes for supplying water to B-Cell located on the centerline of the north wall and south wall of the cell at elevation 13' – 6".
    - One 10" core drill hole in the west wall of C-Cell at elevation 10' – 6" for a camera.
    - Core drill one 10" hole in the east wall of the REC Airlock at elevation 23' – 0" for a camera.
    - Core drill one 4 ½" hole in the east wall of the REA Airlock at elevation 23' – 0" and one at elevation 14' - 0" for lights.
    - Core drill two 10" holes in the south wall of D-Cell (one in the southwest corner, one in the southeast corner) at elevation 26' – 0" for cameras.
    - One optional 6" core drill hole in the south wall of C-Cell at elevation 26' – 0" for grout addition.

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- For all core drill holes the sub-contractor will provide adequate protection against fugitive water running down walls and onto the facility floor in the form of vacuum rings and plastic sheet catchments or equivalent methods to be demonstrated to and approved by the buyer. A water recirculation system will be used to minimize waste water.
- Temporary shielding will be necessary for the core drill holes in the B-Cell walls. Twelve-inch, ten-inch and six-inch holes will require steel plugs 3" thick while the 8" hole will require a 3 ½" thick plug. Design and build eight 12" nominal diameter plugs, four 10" nominal diameter plugs, two 6" nominal diameter plugs each 3" thick and one 8" nominal diameter by 3 ½" thick plug prior to beginning core drilling. Plug design must be approved by Project Engineering and Radiological Control. Install plugs as B-Cell core drill holes are completed.
- For REC Airlock, C-Cell and D-Cell holes sheet metal plugs will be designed and fabricated and installed to maintain cell and Airlock air balance and ensure containment of contamination. Design of sheet metal plugs must be approved by Project Engineering and Radiological Control.
- Prior to commencing core drilling in the facility fabricate a dummy wall 5' tall by 5' – 4" thick by 16' long. The wall will have #10 rebar at 7" centers, horizontally and vertically, 3" from the "outside" wall, and #8 rebar at 12" centers, horizontally and vertically, 3" from the "inside" wall. There will be a 11 gauge stainless steel plate attached to the "inside" wall with ¼" Hilti bolts at 18" centers. Each dummy wall will have two embedded pipes, one 1" schedule 40 stainless steel and one 2" schedule 40 stainless steel. One-inch schedule 40 pipes will be attached to the stainless steel liner at shown in the sketch. Five 12" practice core drill holes will be drilled, two such that the bottom of the core drill holes runs through or just below the bottom of an embedded pipe and two such that the bottom of the core drill hole runs through the middle of an embedded pipe. One core drill hole will be drilled so that it runs through the 1" embedded pipe and 1" pipe attached to the wall. For each core drill the sub-contractor will measure drill speed, average water usage for each hole, total water usage for each hole, and water flowing out through the embedded pipes for each hole. The sub-contractor will demonstrate effectiveness of water control methods on these practice holes including use of the recirculating system. The dummy wall may be inclined at a slope of 3" vertically for 30' of pipe to match expected embedded pipe sloping.
- Sub-contractor will use practice holes drilled in dummy wall for working out and demonstrating means for ensuring core drill holes for REAs in B-Cell walls will be parallel with each other and perpendicular to inside and outside walls.
- Prior to commencing core drilling in the facility dummy pipes simulating the pipes embedded in B-Cell walls will be fabricated per SRP-SK-010. These pipes will be used to test and develop grout mixtures and pumps to be used for filling embedded pipes with grout before core drilling in the facility. Five dummy 1" pipe runs and five dummy 2" pipe runs will be fabricated and set up. These pipes will be used by the Sub-contractor to test grout pump(s) and grout mixtures to develop grout mixtures that can be pumped into the pipes embedded in B-Cell walls to seal the pipes without draining out the open

ends of the pipes into the REC Airlock Pipe Trench. Expanding foam may be tested with the concurrence of the CHPRC Design Authority and sub-contract management. CHPRC recommends use of a small portable pump such as a QuikSpray Mini-Pump and varying grout thickness between the consistency of cake batter and toothpaste.

- Prior to commencing core drilling in the facility the Sub-Contractor will enter cubicles B-12 and B-14 and fill pipes PT-129, PT-180, PT-183, PT-202, PT-184, PT-185, PT-113 and PT-174 with grout mixture developed during cold testing (expanding foam may be used with concurrence or CHPRC Design Authority, CHPRC Responsible Manager, CHPRC Safety and CHPRC Field Work Supervisor if tested successfully). Mixture will be allowed to cure for a minimum of seven days before core drilling in the affected areas. Sub-Contractor will ensure that ends of pipes PT-129, PT-180, PT-183, PT-202, PT-184, PT-185, PT-113 and PT-174 have been plugged or capped.
- Cubicles will be closed up following measuring and sampling work and following installation or grout or expanding foam.
- For C-Cell, D-Cell and the REC Airlock the sub-contractor will design, fabricate and install sheet metal covers for each core drill hole. Designs will require CHPRC Design Authority and Radiological Control approval.
- For B-Cell the sub-contractor will design, fabricate and install steel plugs for each core drill hole. Designs will require CHPRC Design Authority and Radiological Control approval.
- Prior to core drilling holes in D-Cell wall the abandoned glove box in the D-Cell Gallery shall be moved or removed as necessary to allow access with scaffolds or aerial lift to the D-Cell south wall for interference removal and core drilling.
- Prior to core drilling holes in the D-Cell south wall compressed air, cold process water, electrical conduit and abandoned vacuum system and steam system piping shall be moved or removed.

The following items should considered when performing planning and estimating for interference removal.

- The 8” core drill hole for the Transfer Mechanism power supply and the 10” core drill hole for the C-Cell camera will require scaffolding for interference removal and core drilling. The 6” optional hole for D-Cell grout addition and the 10” core drill holes for the D-Cell cameras will require scaffolding or an aerial lift to access the core drill locations.
- The core drill holes in the REC Airlock wall will be in the Cask Handling Area. Access of the core drill locations will require the use of scaffolding or an aerial lift. Whichever means of access is used the installation and use will have to be coordinated with 324 Building Operations.
- For all core drill locations sub-contractor will have to coordinate core drilling work with ongoing facility operations.

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- After each core drill hole is completed a solid steel or sheet metal plug will be installed as called out above to maintain air balance and reduce dose. Plug designs should allow for easy removal by operations or others for installation of equipment that will use hole.
- Before filling embedded pipes with grout, capping or plugging embedded pipes and core drilling, embedded pipes will be surveyed by Radiological Control and samples will be taken of pipe interiors to the extent feasible.
- Before core drilling all locations will be scanned by GPR for near surface mechanical interferences. Scans for known conduits and known pipes shall be done by generating a signal in those conduits and pipes for scanning equipment to detect such as an RD-8100. When these scans are complete electrical equipment and wiring in the vicinity of the core drill area will be isolated from power and a live power search will be done for possible undocumented electrical wiring.

The sub-contractor will need to examine each core drill location and in those cases where there is a nearby interference that prevents using standard anchor plates alternative anchor plates will need to be constructed.

Item 4:

<u>Structural Modifications</u>

The scope of Project 300-296 is to remove highly contaminated soil from under B Cell. Removing this soil will erode the structural foundation of the REC. To prevent any shifting and/or settling of the structure, enhanced structural members are being added to the REC. This scope provides those modifications.

The modifications to the REC are to place 4 support columns at the four corners of B Cell. The supports will consist of columns jet grouted into to the soil at the 4 locations, then support columns formed on top of these jet grouted foundations. These columns will be structurally tied into the existing walls.

The jet grouting will consist of installation, monitoring and testing of jet grouting inside the 324 facility within the limits indicated in the conceptual drawing below.

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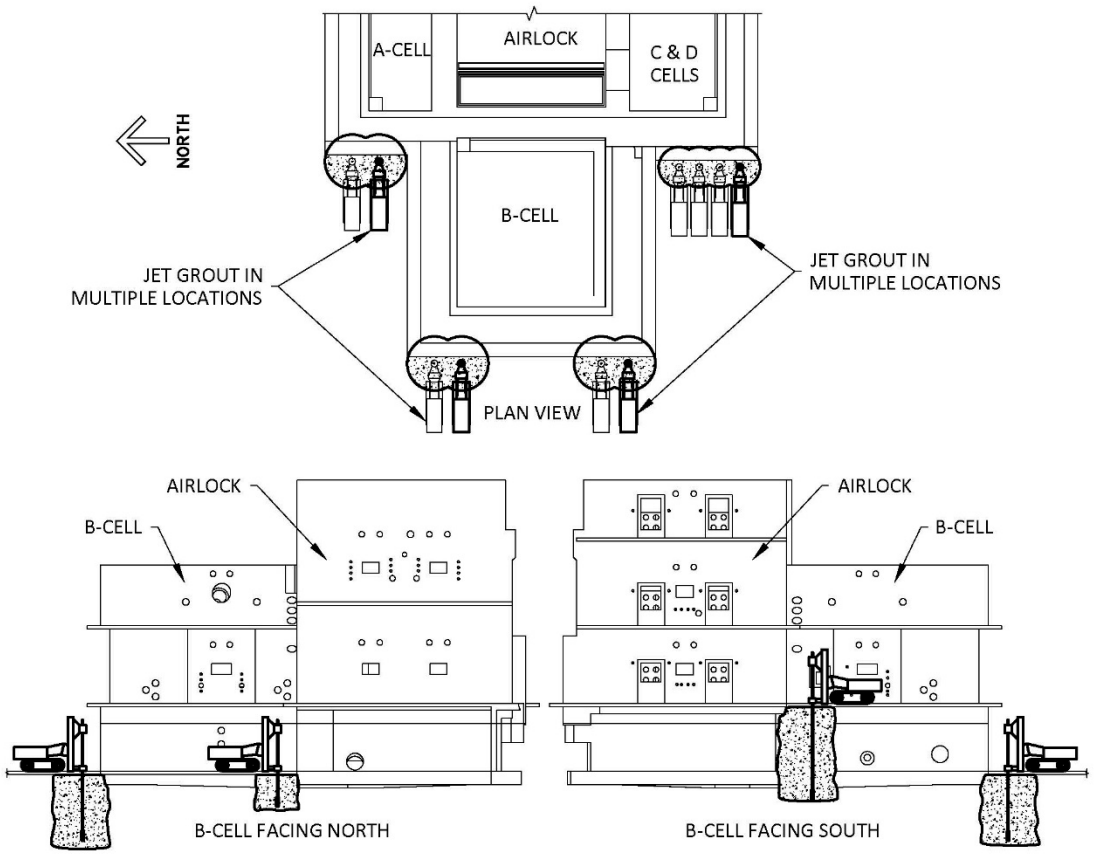

Figure 1: Jet Grout Locations Concept (Inside 324 Facility)

In connection with the jet grouting program, as shown on the drawings, the jet grouting contractor shall provide all labor, materials and equipment to accomplish the following items of work:

a) Mobilization & Demobilization

b) Drilling an exploratory hole in each location that jet grouting is to be conducted and collecting soil samples

c) Drilling through the concrete floor of the galleries

d) Jet-grouting

e) Quality Assurance/Quality Control and verification

f) Spoil containment, collection and disposal.

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Due to the specialized nature of the jet grouting portion of the work, the jet grouting Contractor shall be pre-qualified before bidding on this work. Contractors must meet the following experience criteria;

Project Experience

The jet grouting contractor must have at least five years jet grouting experience over the last ten years; and have successfully completed at least five (5) jet grouting projects, with at least two (2) projects having objectives and a jet-grouting system (single, double, or triple) similar to those of this project and in similar soils.

Personnel Experience

The jet grouting supervisor must have at least three (3) years on-site experience managing jet grouting field operations of similar size and scope, and must have supervised at least two (2) projects within the past five (5) years employing the jet grouting technique proposed for this project. The supervisor shall have experience and knowledge of all aspects of jet grouting as required for the project and shall be present at the work site at all times during jet grouting operations.

Qualifications

The following shall be submitted to the Owner's representative by the grouting contractor 8 weeks prior to the start of the work:

a) A list of at least (5) previously completed projects for review by the Owner's representative. The list shall include a description of the project location, scope and magnitude, and contact person with phone number.

b) A list of at least (2) previously completed projects of similar scope and purpose for review by the Owner's representative. The list shall include a description of the project, relative size, and contact person with phone number.

c) Resumes of the management, supervisory, and key personnel, for approval by the Owner's representative, in accordance with qualifications of section above.

d) Jet Grouting equipment.

e) Submit catalog cuts, details of grout mixers, pumps, drill rigs, and a plan view of the jet grout equipment arrangement, noting any equipment that has been modified or is of unique construction.

f) Submit copies of field data collection forms, including a sample copy of daily field report.

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The design media to define this scope of work will have two parts. Part one will be a performance specification for the jet grouting portion of the design. The contractor will provide the design of the jet grouting system to be deployed as a submittal to the buyer. Part two will be the design of the columns above the jet grouted base that will tie structurally into the walls. A 90% completed design of these columns will be provided prior to contract award. The final released for construction design will be provided after the jet grouting design has been approved. The reason for this logic is that it will be necessary to have the completed jet grouting design to do the final design integration with the columns.

Scheduling Issues Discussion

The scopes of work described above as well as a future follow on work scope known as "structural modifications" will be executed in the same area of the 324 building. There are several interfaces between these items as well as other activities going on in parallel in the 324 building that need to be taken into consideration by the contractor. These considerations are as follows:

- Both the mechanical interference removal and the electrical interference removal being performed at the -10 foot elevation (basement) are being done to make way for structural modifications in the basement. Therefore this work must be completed before structural mods can begin
- On the main level (0' level) of the gallery the mechanical and electrical work is removing items that prevent core drilling, penetration sealing and structural modifications, hence interference removal must be done before structural modifications (NorthEast corner of B Cell) and core drilling.
- The interference removal work related to cell sealing is minimal. Most of the cell sealing is not related to interference removal.
- For each core drill hole interference removal will be completed before commencing core drilling. For the B-Cell northeast corner core drilling for the REA mount and for the Transfer Mechanism power supply should be completed before beginning structural work on the northeast concrete support column.
- There will be work being performed in the cells by the operations organization in parallel with much of this construction work. Therefore there will be a weekly integration between the construction work package and the operation activities.
- Cell sealing will be restrained on some of the locations during the time frame that operations is also working in the galleries. Some work locations cannot be performed until released by operations. Also some penetration sealings must be made in the airlock. This work cannot be performed until the airlock is released to construction.