300-296 Remote Soil Excavation Project

Hanford Advisory Board, River and Plateau Committee Presentation

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Agenda

• Project Overview
• Proof of Concept/Risk Mitigation
• Mockup
• 324 Bldg. Prerequisites
• Airlock Cleanout
• Interference Removal/Cell Sealing
• Challenges
• Timeline
Project Overview

Remote excavation of the 300-296 Waste Site beneath B-Cell (TPA M-016-085A) in support of future disposition of the 324 Building and further remedial actions of the 300-296 Waste Site.

Building 324:
- Surveillance and maintenance
- Support building prerequisites and activities for remote soil excavation project

300-296 Soil Removal:
- Design, test, procure, construct, and operate the systems, structures, and components used to complete remote excavation of contaminated soil
• Remotely excavate soil with facility intact and functional
• Excavate six to eight feet below B-Cell
  – Surveys and modeling indicate high radiation soils confined to ~six feet below cell floor
  – Remotely operated excavator capable of removing soil to 12 feet below B-Cell
• Highly radioactive soils will be placed in containers and placed in A, C and D Cells
  – Building demolition not in project scope
• Remaining excavated soil will be packaged, grouted and transferred for onsite disposal at the Environmental Restoration Disposal Facility (ERDF)
• Focused/active risk management

**Strategy: Remove the Least Amount of Soil / Contamination Required for Conventional Remediation of 324 Building**
324 Animation Video
# Project Overview (Cont.)

## Proof of Concept/ Risk Mitigation

**Component testing**
- Floor saw test
- Remotely operated impact device/seal breaker

**Mockup**
- Infrastructure/modifications
  - Equipment design, procurement and install
  - Testing/validation
    - Procedures/training
    - Proficiency development
    - Readiness/operations support
    - Demolition/remediation

## 324 Prerequisites

- Loose debris cleanout
- Interference removal
- Cell sealing
- Core drilling
- Structural modifications
- 324 Building equipment design, procurement and installation (long lead items started)

## B-Cell Activities

- Debris and grout cleanout
- Readiness
- Floor cutting/removal
- Soil removal
- Refill excavation with grout

**Legend:**
- Planned
- Started
- Completed
Project Overview - B-Cell Equipment Layout

- Upper Remote Excavator Arm (REA)
- Transfer mechanism
- Water delivery hose reel
- REA Through Support w/dummy post
- Lower REA
- Floor Saw
Proof of Concept/Risk Mitigation

Component Testing – Floor saw test at Maintenance and Storage Facility (March – June 2017)

Mockup – Dry run activity for initial Airlock entry (July 2017)
Mockup

- Off-site full-scale replica of B-Cell and Airlock
  - Weather protected 80 feet x 100 feet test area
  - Overhead 10-ton crane
- Operations, training and crew trailers
- Intended use:
  - Equipment testing / validation
  - Work package / procedures development
  - Installation training
  - Remote equipment training
  - Proficiency development
  - Contingency/response planning
  - Readiness/operations support

Mockup Progress

• Equipment installations to date
  – Master Slave Manipulators (MSMs)
  – Cameras and light mounting brackets

A-frame for installing MSMs (Nov. 2017)

Three MSMs successfully installed (Dec. 2017)
324 Bldg. Prerequisites

• Airlock / cell cleanout
  – Loose debris successfully removed from Airlock
  – Loose debris removal from cells is in progress
  – Seven ERDF roll-off containers and 11 large steel boxes of debris were removed

• Facility modifications
  – Interference removal, cell sealing and core drilling new penetrations are in progress

• Structural modifications
  – Design progressing with 30% design due February 2018

• Equipment procurement/installation
  – Procurements progressing
  – Installation at the Mockup has begun
Airlock Cleanout

Before cleanout (May 2017)

During cleanout

After cleanout (Nov. 2017)
B-Cell Interference Removal

Before (May 2017)

After (May 2017)
Airlock and C-Cell Entry

- **Airlock entry**
  - First entry in over 15 years made on April 10, 2017
  - Over 40 entries made to date
  - Access point for removing debris, installing equipment, and remotely remediating soil

- **C-Cell entry**
  - First person entry in over 15 years on December 7, 2017
  - Over 10 entries made to date
  - Debris cleanout is progressing
Challenges

- First of a kind remote excavation of soil from within a hot cell
- Extremely high contamination/radiation levels
- 324 Building originally constructed in 1960s
  - Aging building equipment, systems and infrastructure
  - Unknown or unforeseen facility conditions that impact planning/execution
- Legacy facility operations and conditions
- Structural reinforcement of facility needed during soil excavation
- Soil removal equipment performance in the elevated radiation environment
Timeline

300-296 Waste Site Remediation - Summary Schedule
Status as of December 24, 2017 (Field Execution Schedule)

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Questions?
324 Video