Review of the current underground space at completion of CF

Douglas Pelletier, CF Project Manager
22 August 2018
Outline

• High level overview of Arup 30% Final EXC Underground Design
  - Major Changes from Preliminary Design
• High level overview of Arup 30% Final BSI Underground Design
• Review remaining deliverable dates and review periods
• Preliminary Excavation Sequence animation
Major Changes from EXC 100% Preliminary Design

- Removal of septum in North and South Caverns and shortening of the overall caverns in line with F10043159 Rev C.
- Centered Center Access Drifts with respect to the north and south caverns, and moved the Central Utility Chamber so that the alignment with these drifts remains as in the 100% PD.
- Removal of the Maintenance Shop, High Voltage Electrical Room and the LV/MV Electrical Room, and enlargement of the Trolley Drift to form the Electrical Substation, in line with the recommendations of the Underground Electrical Substation Relocation Study, 7/14/2016.
- Drift geometry has been updated in line with the Drift Optimization Study, 4/14/2016.
Major Changes from EXC 100% Preliminary Design

- Modified the location of Ventilation Raise Access Chamber, the Ventilation Raise, and the Spray Chamber location and length.
- The ‘mucking drifts’, which are provided for construction use only, have been modified to avoid impacting the waste pass in the existing trolley drift and minimize the overall excavation volume.
- Mucking drifts have been maintained to the 4910 Level at the base of the caverns, but the connection to the east has been removed as it is no longer needed with the revised construction phasing.
- Refined Ross Brow and junction geometry.
- Yates Brow removed from scope.
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CLEARANCE LONG BEAMS - 48'L x 1.5'H x 3'W

CLEARANCE MAX CONTAINER - 26'L x 10'H x 5.5'W

LEGEND:
- ----------------- DRIFT CENTERLINES
- ----------------- LOAD PATH FOLLOWING RAIL GUIDANCE GUIDE
- _______________ LOAD CLEARANCE ENVELOPE

NOTE:
1. FOR GENERAL NOTES AND OBSERVATIONS, REFER TO DRAWING UG-FD-C-011.
2. FOR RAIL DETAILS, REFER TO DRAWING UG-FD-C-012.
3. WHERE RAIL IS LOADED, IT IS ASSUMED THAT THE LOADS KNOW THAT 20X2 HAS CLEARANCE ON THE OTHER SIDE OF THE RAILWAY.

CLEARANCE DIAGRAMS TO BE UPDATED DURING 56% FD.

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TYPICAL ISOMETRIC VIEW

LONGITUDINAL SECTION
Arup 30% Final EXC Design

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Arup added distribution beam to avoid single point failure issues, under re-evaluation.
Steel:

- New supports on Cavern Walls
- Rationalized Frame Geometry
Experiment Cavern Utility Support:

- New supports on Cavern Walls 6’-6” OC (2m)
- Loading per frame:
  - 2800# Cryo Piping
  - 1100# Cable Tray
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Septum Bridge (not in 30% but):

- Concept Study Ongoing

- Approx. Girder Depths – limited to 4ft including bridge deck due to crane constraints

- Rolled sections with splices likely to be most economic

- If we can revisit hook clearance we can make more economic
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Rerouted Piping

Areas to be avoided:
- Nitrogen and Argon
- Chilled Water
- Hot Water
- Industrial Water and Compressed air
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Additional Chiller
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Substation Room 3D View
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Coordination Challenges

1. Space Constraints
2. Ductwork Clearances
3. Spray Chamber
Remaining Final Design Deliverables

- 60% EXC due October 5, 2018
- 60% BSI due October 19, 2018
- 60% comments due 3 weeks after delivery, Design is Frozen at this point
- 90% EXC due January 11, 2019
- 90% BSI due January 25, 2019
- 100% EXC & BSI due March 29, 2019 (Issued for Construction Procurement)
Preliminary Excavation Sequence prepared by KAJV (Disregard dates)

1/15/2021

Week: 59

![Diagram of underground space with a note to mobilize to 4850 L]

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<tr>
<th>Name</th>
<th>Start</th>
<th>Finish</th>
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<td>1/15/2021 (*)</td>
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<tr>
<td>Milestone: Option 1B NFP for Construction</td>
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<tr>
<td>Mobilize to 4850 Level</td>
<td>1/15/2021</td>
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**Appearance Profiles**
- **Concrete & Rail**
- **Excavate**
- **Install Equipment**
- **Pilot Hole**

(Monthly work weeks 57 to 162 indicated on timescale)