Spent Fuel and Waste Science and Technology

WIPP Support and Logistics – Underground Thermal Tests

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WIPP Underground Test Coordination Manager

SFWST Annual Working Group Meeting
University of Las Vegas
May 23, 2018
WIPP Status

- Waste emplacement resumed last year.
- Mining resumed in January on Panel 8.
- Split Shift 4x10 schedule. Mining on day shift. Waste Emplacement on backshift.
- Supplemental Ventilation System operational. Increase flow to north end and allows for mining, drilling, and bolting.
- SDI research area being opened for ventilation and ground control. Will provide access to freshly mined salt (2011-2012) with minimally developed DRZ and minimal traffic.
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WIPP – Location of Field Testing

May 23, 2018

WIPP - Salt Field Tests
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WIPP Support to the Field Tests

- **Dedicated Test Coordination and Logistics**
  - Work control and logistics
  - Training
  - Scheduling
  - Underground escort

- **Coreholes and Instrumentation Holes**
  - Cleanout
  - Grouting?
  - Survey
  - Video
  - Sample control and processing

- **Dedicated Utilities to the Test Locations**
  - Electrical
  - Communication
  - Lighting

- **Gas Bottles and Racks**

- **Automated Data Collection and Distribution**

- **Construction and Operational Testing of a Full-Sized Prototype Canister Heater**
  - Potential heat source for the medium scale test described in FCRD-UFD-2015-000077 (section 3.2)
Canister Heater Near the WIPP IAS
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WIPP Support – Canister Ops Testing

ROM Salt and Instrumentation on Canister

Data Collection
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WIPP Support to the Field Tests

4.8” Dia Coreholes
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WIPP Support to the Field Tests

Nitrogen Distribution System

Electrical Distribution System
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WIPP – Support to Future Testing

Core Rig and Barrels
## Rough Order of Magnitude Cost Estimate:

<table>
<thead>
<tr>
<th>Core Rig</th>
<th>Resource Description</th>
<th>Man-hours</th>
<th>Rate</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>NWP</td>
<td>Labor - Mechanics (2 persons)</td>
<td></td>
<td>160</td>
<td>$61.76</td>
</tr>
<tr>
<td></td>
<td>Shift Differential (2.5%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overtime (10%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NWP</td>
<td>Materials - seals, parts</td>
<td></td>
<td></td>
<td></td>
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</table>

**Subtotal:** 14,117

<table>
<thead>
<tr>
<th>Core Rig</th>
<th>Resource Description</th>
<th>Man-hours</th>
<th>Rate</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>NWP</td>
<td>Materials - Core Barrels and Supplies (five setups)</td>
<td>10,000</td>
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</tr>
<tr>
<td>NWP</td>
<td>Labor - Core Crew (3-person crew, 25-days)</td>
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<td>750</td>
<td>$60.01</td>
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<tr>
<td></td>
<td>Shift Differential (2.5%)</td>
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</tr>
<tr>
<td></td>
<td>Overtime (10%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NWP</td>
<td>Labor - Mine Operations (Supervisor)</td>
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<td></td>
<td></td>
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<tr>
<td>NWP</td>
<td>Labor - Geotech &amp; Survey</td>
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<td></td>
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<tr>
<td>NWP</td>
<td>Labor - Safety</td>
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**Subtotal:** 108,278

<table>
<thead>
<tr>
<th>Test Support - Electrical, Communications</th>
<th>Resource Description</th>
<th>Man-hours</th>
<th>Rate</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>NWP</td>
<td>Labor - Electricians (2 persons)</td>
<td></td>
<td>100</td>
<td>$61.76</td>
</tr>
<tr>
<td>NWP</td>
<td>Materials - boxes, wire</td>
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</table>

**Subtotal:** 11,176

<table>
<thead>
<tr>
<th>Assumptions:</th>
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</thead>
<tbody>
<tr>
<td>1) Assume approximately 5 setups each with one 4.8&quot; core hole (heater hole) and six 2&quot; diameter instrument holes</td>
</tr>
<tr>
<td>2) Heater holes are ~4.8&quot; diameter and 25 feet long. Instrument holes are ~ 2&quot; diameter and 25 feet long</td>
</tr>
<tr>
<td>3) Each heater hole will take 1 day to core and the instrument holes 2 day, with one day to mobe and de-mobe (5 days total).</td>
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</tbody>
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Underground Thermal Testing Activities

Prototype Canister Heater Operational Testing (AIS)
- 220V/120V Electrical Drop Available (AR 1528471)
- Install Canister Heater (Transport Underground, Instrumentation)
- Testing - Phase I
  - 1100 Watts
  - 500 Watts
  - Mine-Back for Physical Observation
  - Analysis
- Testing - Phase II
  - Planning for Phase II Operational Testing
  - Phase II Installation and Testing

Small-Diameter Borehole Thermal Tests - Prototypes (E140/N1100)
- 120V Electrical Drop Available (AR 1738421)
- Design-Build Packer/Heater System at LANL
- Install and Prototype Testing
  - Isothermal Testing
  - Thermal Testing
  - ERT Testing
  - Feedback to Final Design
  - Phase II Prototype Testing

Small-Diameter Borehole Thermal Tests (SDI Area)
- Final Test Design
- Build Packer/Heater Systems
- Instrumentation Ready for Field Install
- SDI Area Available (Ventilation, Ground Control)
- Core Test Arrays
- Infrastructure - Electrical, Lighting, Communications
- Implementation of Small-Diameter Borehole Thermal Test and Analysis

May 23, 2018 WIPP - Salt Field Tests