Carlsbad Brine Well Remediation Project
Carlsbad, New Mexico
State of New Mexico - Energy, Minerals and Natural Resources Department (EMNRD)

Presentation to the Carlsbad Brine Well Remediation Authority July Meeting
Wood Group
July 11, 2018
1:30 PM
Project Team

- Amec Foster Wheeler officially changed its name on April 16, 2018 to Wood Environment & Infrastructure Solutions, Inc. This is a name change only and is administrative in nature.
- Wood has assembled a Team of specialized contractors, capable of implementing all aspects of the project.

<table>
<thead>
<tr>
<th>Company</th>
<th>Role</th>
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<tbody>
<tr>
<td>Wood Environment &amp; Infrastructure, Inc. (Wood)</td>
<td>Project Management/ Quality Assurance/ Design Lead</td>
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<tr>
<td>Hayward Baker Inc. (HBI)</td>
<td>Construction Team Lead/ Grout Deployment</td>
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<td>RESPEC</td>
<td>Monitoring/ Rock Mechanics/ Public Relations Support</td>
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<td>Constructor’s Inc. (Constructors)</td>
<td>Local Contractor/ Borrow Material</td>
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<td>ESG Solutions (ESG)</td>
<td>Microseismic Instrumentation &amp; Data Acquisition</td>
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Wood Direct Project Experience

In 2012 retained by OCD to perform:
• Monitoring system upgrades & operation
• Evaluation of previous investigation methods
• Conduct Feasibility Study

To date, we have gathered and evaluated data from site monitoring instruments over the last 5 years
• Slight pressure increases
• Decrease in microseismic activity
Feasibility Study

• Cavity investigations performed to confirm size, shape, and mechanical parameters.
• OCD selected alternative for in-situ fill of the cavity.
On-going Methods of Site Monitoring

Microseismic (MS)
- Four MS monitoring stations
- One below cavity, three above roof

Atlas Monitoring System (24 hours/7 days)
- Four borehole tilt meter
- Two pressure transducers to measure pressure at Eugenie #1 (well head/annulus)
- Two pressure transducers to measure depth to groundwater (shallow and deep aquifers)
- Pressure transducer to measure depth of water in canal (canal loading)
- Barometric pressure, air & soil temperatures, rain gauge
Public Outreach

- Wood responsible for Project public outreach and Community Interaction for this contract
- Project related press releases and public/stakeholder meetings will be coordinated with OCD
- Series of Town Hall meetings are planned throughout the project.
  - Convey project information at milestones
  - Convey accurate information to all stakeholders
- Project Fact Sheet is being developed to convey project details to stakeholders, residents, businesses and media.
The Solution
Proposed Solution

- Install a series of wells to extract brine and inject grout
  - Maintain cavity pressure
  - Balance volume of brine removed with volume of grout injected
  - Install a grout cap using high mobility grout to support cavity roof
  - Install grout columns using low mobility grout to support grout cap
# Cavity Filling Process

## Boring & Grouting Sequencing

### LEGEND
- PHASE 1 WELLS
- PHASE 2 WELLS
- PHASE 3 WELLS
- PHASE 4 WELLS
- PHASE 5 WELLS
- PHASE 6 WELLS
- AREA OF IMPACT
- EXISTING IWMS
- FUTURE IWMS

### GROUT SEQUENCING

<table>
<thead>
<tr>
<th>PHASE</th>
<th>GROUT INJECTION WELL</th>
<th>BRINE RECOVERY MONITORING WELL</th>
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Carlsbad Brine Well Remediation Project
Site and Security Map During Construction
Project Timeline and Progress Report
Planned Activities

• Changes to the site
  o Installation of security/privacy fencing (completed)
  o Signage
  o Relocation of neighbors (City of Carlsbad leading effort)
    o Expanded site boundaries
    o Utility connections
  o Install additional site instrumentation
    o Additional BTM’s, HIPI
    o Locations selected based on CSM
    o Relocate existing instrumentation
  o Install additional MS monitoring sites
  o Traffic patterns – Traffic Control Planning
Milestone Schedule

- June 11-22 – Site Maintenance, Site Survey, Brine Well Sampling, and Security Fence Installation (Completed)
- June 30, 2018 - Phase 1a Preliminary Design (Completed)
- July 11, 2018 – Presentation on Traffic Control to Brine Well Authority
- September 2018 – Proposed Public Informational Meeting
- September 2018 – Upgrades to Monitoring
- December 2018 – Complete Design and Refine Cost Estimate for Phase 2
- January 30, 2019 – Field Mobilization and Site Preparation Begin Phase 2 – Implementation
Traffic Control - Strategy
Traffic Control

• Wood responsible for the Following Traffic Control Elements:
  – Coordination with NMDOT on Project Related Traffic Control
  – Preparation of Traffic Control Plan to allow for safe access and egress from the Project Site
  – Provide Traffic Related Signage and Barriers
  – Conduct Monitoring and Maintenance During Construction
Traffic Control Plan (TCP)

- Draft Traffic Control Plan submitted to NMDOT
- Plan updated per NMDOT Recommendations
- Coordination between Wood and NMDOT is ongoing
- TCP allows for two lanes of traffic in both North and Southbound directions on US 285
- Traffic flow will be modified to allow continued access from Northbound US 62 to Southbound US 285
- TCP will not be implemented until January 2019
Project Site Map

Legend:
- **PERIMETER FENCE**
- **FIELD OFFICE**
- **FRAC TANK**
- **SOLD**
- **EXCLUSION ZONE**
- **INJECTOR POINT**
- **TRUCK ROUTE**
- **FRESHWATER TANK**
- **BRINE TANK**
- **CEMENT**

Diagram of the Carlsbad Brine Well Remediation Project site map showing various locations and amenities.
TCP Map