Engineered Geosynthetic Turf Cover System for Capping Phosphogypsum Stack
Mississippi Phosphates Corporation
Pascagoula, Jackson County, MS

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Mississippi Phosphates Corporation
Bayou Casotte / Gulf of Mexico
Pascagoula, Mississippi
MPC Site History/Background

• Produced diammonium phosphate (DAP) from 1950s thru 2014
• Digested phosphate ore with sulfuric acid to produce phosphoric acid
  • Waste product = gypsum
  • West Gyp Stack closed out mid 2000s
  • East Gyp Stack has 350 acres of acid generating material exposed (≈ 15 Million CYs)
• Phosphoric acid + ammonium = granulated DAP
• Declared bankruptcy; July 2015 settlement agreement
  • Liquidation Trust = infrastructure/dock
  • Environmental Trust = lime treatment plant + West/East Gyp Stacks
  • $12 Million provided for water treatment
Water Treatment to Mitigate Environmental Risk

- Large volume of acidic pH water with high levels of nutrients
- Known uncontrolled releases of wastewater
  - 2005 – 17 MGs to Bangs Lake/Grand Bay Estuary decimated large portion of most productive fisheries on Gulf Coast
  - 2013 – 38 MGs to Bayou Casotte killed 47,000 fish and criminal violation of Clean Water Act
- EPA R4 Removal Program assumed water treatment responsibility 02/11/17
- Daily ops transferred to Remedial Program 05/25/18
  - > 500 MGs of water on-site with pH≈2-3
  - Burn rate ≈ $40,000-$45,000/day
- 1” of rainfall = 9 MG of acidic water that must be treated
  - 112” rainfall in 2017/80” rainfall in 2018
  - ≈ 53” in 2019
- Mechanical Lime Plant + GeoTubes
  - 2 to 4 MGD average treatment volume
  - Neutralize pH and remove nutrients
- Total EPA costs to date ≈ $43 Million
Region 4 Superfund Strategy

• Integrated Removal & Remedial authorities
  • MPC was on the Administrator’s Emphasis List (SF Task Force)
  • Presented to RA Priority Panel 11/07/17
  • Presented to NRRB 02/13/18
• Proposed to NPL on 08/03/17 & Final on NPL 01/18/18
• Need to get out of the rainwater treatment business
  • Common acid mine drainage strategy (keep clean water clean)
  • Reduce quantity & improve quality that requires treatment
  • Achieve long-term management of leachate only ASAP (MDEQ)
• Non-Time Critical Removal Action Framework for East Gyp Stack closure
  • EE/CA framework per 09/07/17 meeting with OSRTI
  • Work split into 3 phases over 3 consecutive years (2019, 2020 and 2021)
  • $72 Million Action Memo signed 04/18/18
• Site-Wide RI/FS for former plant area
• Redevelopment of the Liquidation Trust Property
Value Engineering Study

- EE/CA assumed cap design of 40-mil liner, 18” of protective soil, 6” top soil and vegetation
  - 1.2 Million CYs of soil (50% of cost)
- Alternate Cap Design #1
  - 40-mil liner + 18” cover soil
  - Borrow soil from Chevron dredge basin
  - 30 year life cycle costs = $41 Million
- Alternate Cap Design #2
  - Geosynthetic Engineered Membrane
  - 40-mil liner/Turf/Sand in-fill
  - 30 year life cycle costs = $35 Million
- O&M savings ($500k vs. $1.9M)
- Construction savings ($4.6 M)
- Eliminates 42,700 truck trips
- Turf cover system can be installed quicker
ClosureTurf® Cover System

- 3 component hybrid system
- Structured geomembrane
  - Includes studs on top for drainage, and spikes on bottom for stability
- Engineered synthetic turf
  - Covers and protects the geomembrane
- Specified infill
  - ASTM C-33 sand, binder or cementitious (concentrated flow channels)
- Easier settlement repairs/lower cost O&M
- More resilient to extreme weather conditions
  - Third party lab testing for hydraulic performance, UV weathering and hurricane force winds
East Gypsum Stack Closure – Remedial Design
Closure Concepts
Closure Progress & Path Forward

- Phase 1A (west slope) subgrade prep, drainage work, and lime removal from Pond 4 started November 2018
- Kemron awarded $5.8M fixed price contract
  - 3 change orders approved that have increased value by ≈ $900K
- Contract for 55 acres of ClosureTurf® and 50 mil liner awarded June 28th
  - $5.3M for materials/$2.8M for installation
- Liner/Turf installation started mid-September and completed by December 2019
- Phase 1B (south slope) earthwork awarded 9/27/19 for $5.7M
- Procure remaining 140 acres of liner and turf material for Phase 1B and 1C by end of 2019
- Phase 1B work in 2020
- Phase 1C (northeast section) likely split into 2 years (2021/2022) due to anticipated funding streams
Managing Stakeholders - Challenges

• Typical external stakeholders pose no significant challenges
  • No PRPs or attorneys to argue with
  • Limited community interest
  • Cooperative/supportive state (MDEQ)
  • Political science is manageable
  • High performing project team

• Funding stream has been sufficient

• Internal stakeholders in contracting & procurement proven most challenging
  • Inability to timely acquire cover system materials led to costly change order
  • Sense of urgency often lacking
  • Sole source acquisition of proprietary materials complicates matters
Engineered Geosynthetic Turf Installation
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