Post-Landfill Mining Soils Testing Using Incremental Sampling Methodology

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Escambia County

- 310,000 population
- 600 miles away
- Central Time Zone
- Home of the Blue Angels
- Impacted by BP oil spill 2010
- Devastated by Hurricane Ivan 2004
- 424 Total Acres
- 104 Acres of Class I LF
- 3 Years Current Capacity
- 30+ Years Additional Capacity
- 700 tpd
Section 5 Expansion

- Old unlined trench fill
- 45 Total Acres = Section 5
- 15 Acres Mined – Phase I = Section 5 Cell 1A
- 500,000 cy excavated
- 5 Yrs Cell 1A additional capacity
- 700 tpd
Timeline of Events

- **2009**: Mining
- **2010**: Section 5 Permitting
- **2011**: Permit Modification
- **2012**: Soils Testing
- **2013**: Final Design
- **2014**: Cell 1A Const.
- **2015**: Cell Open for Disposal
- **2016**: 
- **2017**: 
- **2018**: Today
Phase 1 Landfill Mining

- 45 acres of unlined trench fill
- Phase 1 Mining = 500,000 cy
  - Phase Mining 2 - 2019
  - Phase Mining 3 - 2025

- 30% Clean Soil
- 30% Waste
- 40% Fines
Phase 1 Landfill Mining
Section 5 Depth Design Options

Elevation (feet)

- Mined Area
- Limits of Old Landfill
- Native Soil

Elements:
- Hg
- Pb
- Ba

Legend:
- ?
### Section 5 Depth Design Options

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<tr>
<th>Elevation</th>
<th>Excavation (CY)</th>
<th>Dewatering (gal)</th>
<th>Capacity</th>
<th>Cost $/CY</th>
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Excavation & Soil Use

Balance of Use and Testing to **Maximize Value While Minimizing Risk**

- Unrestricted Use → High Level of Testing
- No Excavation → No Testing
- Stockpiled in Lined Class I → Minimal Testing
Testing Plan Goals

- Comprehensive Risk Assessment
  - Direct Exposure - SCTL
  - Groundwater Risk - GWCTL
- Determine Soil Suitability
- Final Section 5 Cell Design
What is Incremental Sampling Methodology (ISM)?

- Interstate Technical & Regulatory Council, 2012 (www.itrcweb.org)
- Contaminated Soil Clean-Up & Remediation
- Developed Specifically for Use by Regulatory Agencies
- Close to a Prescriptive Process
What is ISM?

Uses Compositing of a Large Number of Samples to:

- Reduce Sampling Variability
- Provide Unbiased Statistically-Valid Results
- Produce High Level of Confidence
- Reduce Number of Tests
What is ISM?

Perdido Landfill Cell 1A
What is ISM?

Perdido Landfill Cell 1A

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What is Incremental Sampling Methodology

Samples were taken at 2 ft., 4 ft., 6 ft., and 8 ft.
Perdido Landfill Cell 1A

Samples were taken at 2 ft., 4 ft., 6 ft., and 8 ft.

Samples are composited based on depth. Composite subsamples are used for testing.
Primary Benefit of ISM

“....if the 95% UCL for the DU is below the action level, the entire DU passes, even if the ISM result for one or more of the partitioned areas is above the action level...”

- Incremental Sampling Methodology
  The Interstate Technology Regulatory Council
Four Key Components

- Systematic Planning
- Field Sampling Collection
- Laboratory Analysis
- QA & QC
- Yes/No
Systematic Planning

- Extensive Pre-planning
- Defining Decision Unit & Sub Units
- GPS Field Layout
- Prep of Boring Locations
- Practicing with Field Team
- Supplies & Logistics
Field Sample Collection

- Team Effort
  - 6 - Escambia County
  - 2 - Drillers
  - 2 - Test America
  - 2 - Jones Edmunds
Laboratory Analysis

- **Pre-identified Contaminates of Concern**
  - VOCs
    - Vinyl Chloride
    - Benzene
  - Metal
    - Barium
    - Cadmium
    - Lead
    - Mercury

- **Compared to Clean-up Standards**
  - Groundwater Risk Evaluation
  - Direct Exposure Risk
QA/QC Process

- Overall Field Manager
- Laboratory Tech On-Site
- Practice in the Office
- Checklist & Labeling
Analysis of Results

- Actual Number of samples tested (1800 Samples)
  - 12 for Total and SPLP Metals
  - 12 for VOCs (total concentration)
  - 30 for SPLP VOCs
  - 54

- Metals < Residential Soil Clean-up Target Levels
- VOCs < Residential Soil Clean-up Target Levels
Conclusion

- Use for Phase 2 & 3 Mining Projects
- Reduced ISM Development Cost
- Standardizes Post-Mining Process
Questions

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