Construction to Daily Operations

From Construction Specifications to Maximizing Air-Space

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Presentation Overview

• Planning
• Construction
• Transition
• Daily Operation
Part 1: The Planning Process

CONSTRUCTION TO DAILY OPERATIONS
Financial Assurance Plan

• Thinking ahead is a necessity, it’s NOT optional.
  • Is your Financial Assurance Plan current?
    • Landfill construction costs are volatile (Petro Based)
    • Verify inflation and regional pricing accuracy.
  • Review annually
Budgeting

- Review your next cell construction reserve fund annually
- Review volume reports monthly
- Create a capital project reserve fund
The Bid Process

• **Act as your own General Contractor**
  - Owner is more involved, saves money, and schedules project
  - High risk of liability (weather, receiving materials, subcontractor schedule conflicts)

• **Design Build Process**
  - Higher costs, owner involvement depends on contractors willingness and/or project specifications
  - Contractor plans the project from start to finish but needs owner approval
  - Lower risk of liability (Specify a GREAT 3rd party CQA)

• **Bid what you are not capable of doing (SISW Cell 5)**
  - Complete what you can and sub-contract the rest. Becomes a liner or infrastructure project.
  - Owner has moderate risk of liability
Cell Construction Specification should Include the Following:

- Summary of Work
- Measurement of Payment
- Administrative Requirements
- Submittals
- Reference Standards
- Construction Quality Control
- Construction Surveying
- Contract Closeout
- Metal Fabrication
- Geotextile, Geomembrane, Geosynthetic, Geonet
- Shoring
- Precast Concrete
- Condensate Drain Traps
- Pipe, Fittings, Valves
- Leachate Pump and Sump
- ETC
Approval Process

• Project needs regulatory approval to proceed with construction and receive final project approval.
  • After construction specifications are in final draft, they are sent to the regional office of Idaho Department of Environmental Quality (DEQ).
  • DEQ will review the specification and comment on any issues that may arise. This process is required to be completed within a certain number of days.
  • If comments are made by DEQ, the owner will address each concern and resubmit specifications until they are approved.
  • After the project is finalized, the owner will need a letter from an engineer verifying that the project was built to the specifications that were approved by DEQ.
CONSTRUCTION TO DAILY OPERATIONS
Disclaimer....

- There are many ways to design and construct a cell, I will be discussing SISW’s cell 5 design.

- Built with peaks and valley
Cell 5- (2) Valley Cell, 13 Acres
The Construction Process

- Scope of Project
- Pre-construction Activities
  - Review material specifications and verify that they meet spec.
  - Collect samples of on-site materials and test to verify that they meet or exceed spec.
  - Review Contractors Qualifications and verify that certifications are up to date.
  - Review schedule
  - View panel layouts
- Pre-Construction Survey (SISW)
  - Elevations/Starting points
  - Excavation Volume Calculations
- Excavation (SISW)
  - SISW completed 95% of excavation, 5% of final excavation was subbed out
- Construction Anchor Trenches
- Install Geosynthetic Clay Liner
Construction Process Continued...

- Install 60-mil HDPE geomembrane
  - Panel layout is important for tensile strength and tension
- Install drainage net in leachate collection trench
  - Helps leachate travel to pipes
- Install 16-ounce cushion geotextile over 60-mil HDPE geomembrane and drainage net
  - Protects HDPE liner from any damage
- Install perforated/slotted leachate pipe in leachate collection trench (SISW)
- Placement of drain rock over pipe in trench (SISW)
- Install 8-ounce geotextile over drain rock (SISW)
- Placement and spreading of drainage aggregate over entire bottom of cell (SISW)
Excavation
Leachate Vaults
Excavate
Place and Backfill
Lay/Cover Pipe
Backfill and Compact
Meet Compaction Ratios
Installing Leachate Header
Cell Excavation
Getting Closer to FG
Final Grade & Smooth Valley
Anchor Trench

NOTES
1. Wrap native soil with textile, to be installed before placement of drainage aggregate.

Diagram:
- Drainage aggregate
- Liner protection (see detail 6 this sheet)
- Geosynthetic components (see detail 1 this sheet)
- Geotextile, woven
- Native soil
- Liner system termination (east side)
- 6' high chain link fence
- Limit of liner system see sheet C1
- Native soil
- Prepared subgrade
- As necessary
Anchoring the Liner (GCL in the background)
GCL Continued
GCL Installation
HDPE Placed over GCL
One Valley with HDPE and Beginning Felt
16 ounce non-woven
16 ounce non-woven with leachate pipe in valley drainage aggregate in top right

GCL, HDPE, Non-Woven, Geonet, Drain Rock and Drain Aggregate Placed in Cunjunction
Drain Rock
Drainage Aggregate
Leachate Collection Trench

LEACHATE COLLECTION TRENCH

DRAINAGE AGGREGATE

GEOTEXTILE, 8 OZ NW

GEOSYNTHETIC COMPONENTS
SEE DETAIL 1 THIS SHEET

DRAINAGE NET (6' MIN WIDTH CENTERED IN TRENCH) LOCATE BELOW 16 OZ TEXTILE

LEACHATE COLLECTION PIPE
SEE DETAIL 7 THIS SHEET
Part 3: Making the Transition from Construction to Operation

CONSTRUCTION TO DAILY OPERATIONS
Final Approval from DEQ

• Before depositing MSW in the new cell make sure you get DEQ to sign off on the project
• One of the most difficult requirements to meet is the need to have 10 feet of un-compacted MSW on the base before you can get on the new cell with equipment.
• Consent and final approval is relatively easy to receive from DEQ. Our DEQ’s Twin Falls Regional Office approved our construction specs within two weeks.
Start Placing MSW
10 feet of un-compact ed MSW
Working on the first lift
SUCCESS!
During the First Lift

- No compaction = Rapid fill rate
- Wide open spaces with exposed gravel = A LOT OF LEACHATE GENERATION.
  - Be ready handle the possibility of excess water.
- Access roads and surface water culverts become VERY temporary.
- Opportunity to train operators and break bad habits.
- Daily cover is difficult on the open faces of the active 10 feet lift.
  - Excess dirt is required that may cause sedimentation to enter you leachate collection system.
  - Needed to prevent fires
Part 4: Daily Operations

CONSTRUCTION TO DAILY OPERATION
Areas of Concentration

- Working Face Size
- Building a Working Face
- Lift Infrastructure
- Technological Advances
- Waste Composition
- Fill Sequence
How Big should your Working Face be?

• Working Face Size
  • Depends on the volumes received
    • Large Volumes = Larger WF
      • Equipment Variations (Compactor, Compactor+Dozer, Compactor+Compactor, Dozer, Compactor, Compactor)
    • The Need for Spacing & Customers

• Optimal Size
  • 1 Compactor Operation= 4 Compactor Width X 50’ – 100’ Length
    • Anything above 1 compactor will increase in size
  • Efficiencies and Cost Savings
    • Small WF = Short Push = Less Fuel Consumption = More Compaction = Less Air Space Used = Longer Timeframe to Expand = Longer Life Use = BUTTERFLY EFFECT
How SISW Builds a WF

• Building a Working Face
  • Pancake Lifts Building Pies/fingers
    • Building Pies/building Fingers done in conjunction with building WF
      • Requires operators to think about the day’s goals before beginning the day.
        • How will I build fingers with pancake lifts and still be able to cover each day?
        • If the operator does not build correct, it will make things a lot more difficult later.
    • Our Pancake lifts are constructed in 5’ depths. 15’ lift = (3) 5’ pancake lifts
      • Much better compaction ratios overall because of thinner compacted lifts
  • Uphill of Downhill? That tis the question…
    • Industry says C&D downhill, Landfill uphill
    • SISW pushes both downhill
Pancake Lift
Keeping up with Technology

- Technological Advances
  - GPS installation on the Compactor
    - Costs: $70,000.00
  - Advantages
    - Operators can visualize his expectations
    - Upload a CAD plan to build LF to exact specifications
    - Operators can visualize paths to verify compaction
    - Pitch and slope is programmable
    - Consistent fill sequence
    - Better planning and scheduling
    - Verify and combat trends
    - In-house surveying and mapping
    - More efficient operations
GPS Display and Receiver/Radio
More than 1 Right Way

• Waste Composition (WC)
  • Like a Snowflake
    • There are no two landfills alike
    • Each one is its own living creature (T. Hutchinson)
    • Agriculture, Rural, City, Commercial and Industrial Communities are all unique and differ from one another.
    • Just because it works for SISW does not guarantee success for your operation.

• How this Effects SISW Daily Operations
  • Ag-waste is difficult to handle (bunches up) and achieve compaction
  • Arid environment = Mostly stable and optimal MSW consistency
  • Currently transitioning from arid WC to a more damp WC
    • Higher Industrial waste from Chobani
The Importance of your Fill Sequence

• Fill Sequence is the strategic placement of MSW to achieve optimal performance in current and future operations
  • Why it Matters
    • Consistent LFG composition and generation
    • Allows you to plan for short and long term projects
    • Gives employees direction and understanding
In Closing...

• Keep in mind, I am NOT an engineer.
• Every operation is different.
• Don’t reinvent the wheel.

Questions?