



Marine Professionals Since 1919

# BRENNAN

## WODCON XXI



# Production

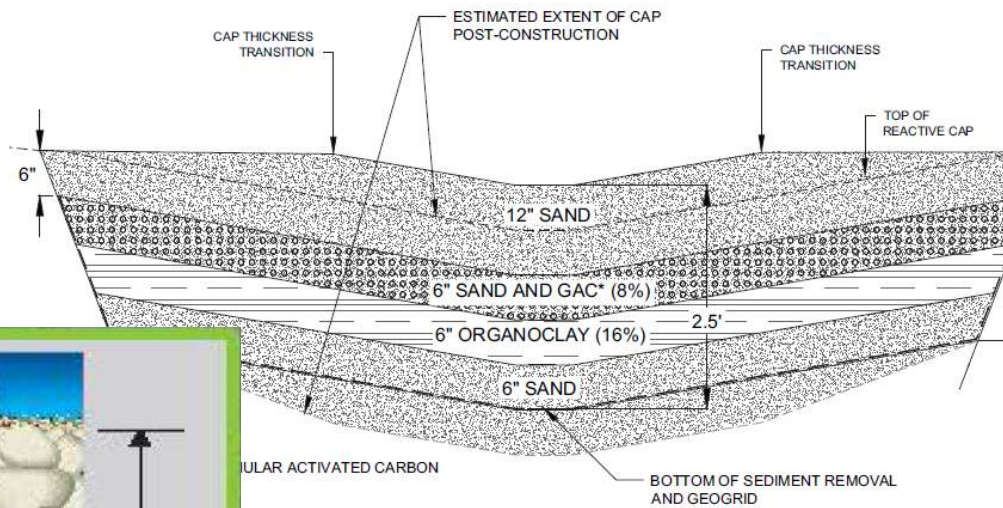


# Technological Innovations for Placement of an Amended Cap





# Cap Designs





# Amendments





# Overview

- Preparation
- Construction
- Quality Control





# Preparation

- Bench Scale Testing
  - Concentrations
  - Visual testing
  - Settling rates
  - Workability





# BCS™ Overview



Land Plant



Material Transport

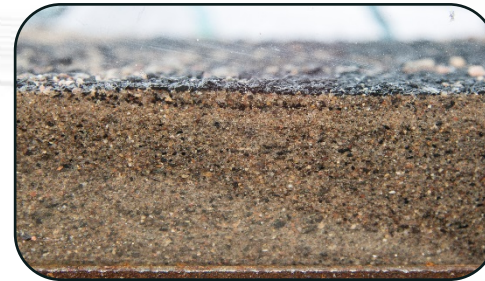


Conveyor Loading



Broadcast Dispersion

QA/QC





# Land Plant

- Multiple metering hoppers
  - Variable production rates
  - PLC controlled
- Quality control of system starts here
- Hydraulic or mechanical transport







# Material Transport

- Hydraulic Transport
  - Slurried on land
  - HDPE Pipeline
  - Dewatered at the spreader
  - Very efficient
- Material Barges
  - Land plant is largely the same
  - Barge loading via conveyor
  - BCS™ hopper is loaded using an excavator





# Spreader Movements



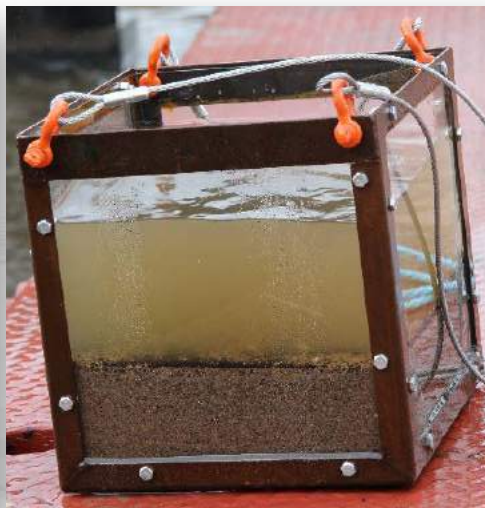
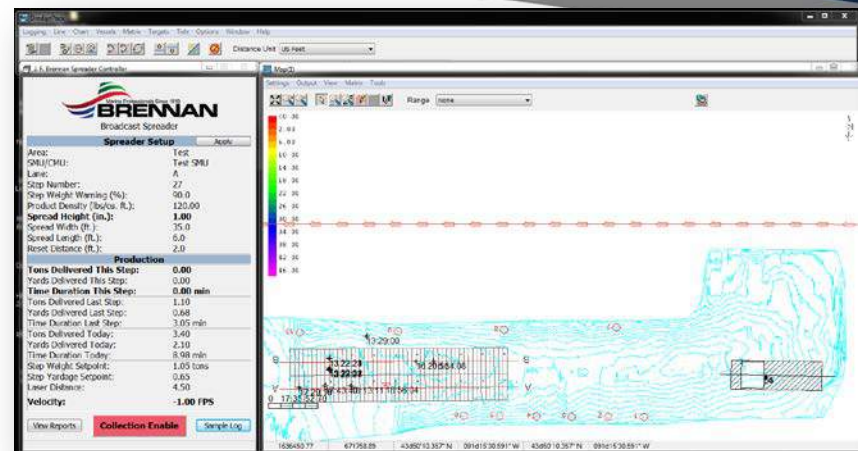
- 2-Barge system
  - Spreader barge
  - Guide barge
  - Held in place using spuds
  - Allows for real time sampling
  - RTK-GPS positioning





# Onboard Software

- Customized Software
  - Applies design thicknesses
  - Integrates belt scales
  - Records sample collections
  - Logs all data



**QC Sample Log**

Start Date: 10/5/2015 End Date: 10/6/2015

Sample ID	Date/Time	Area	SMU/CMU	Lane	Step	Port	Port/Cente	Center	Stbd/Cent	Stbd	Notes
1	10/6/2015	Test	Test SMU	B	0	0.0	0.0	0.0	0.0	0.0	DELETE
2	10/6/2015	Test	Test SMU	B	0	0.0	0.0	0.0	0.0	0.0	DELETE
3	10/6/2015	Test	Test SMU	B	10	0.0	3.0	0.0	2.5	0.0	BUCKET
4	10/6/2015	Test	Test SMU	B	17	0.0	0.0	0.0	0.0	0.0	BUCKET
5	10/6/2015	Test	Test SMU	B	16	3.0	3.5	4.0	4.0	4.0	POLE
6	10/6/2015	Test	Test SMU	B	24	0.0	6.0	0.0	5.0	0.0	BUCKET
7	10/6/2015	Test	Test SMU	B	27	0.0	6.0	0.0	5.5	0.0	BUCKET
8	10/6/2015	Test	Test SMU	B	21	5.0	6.0	5.5	6.0	4.0	POLE
9	10/6/2015	Test	Test SMU	A	2	0.0	5.5	0.0	5.0	0.0	BUCKET
10	10/6/2015	Test	Test SMU	A	8	0.0	4.5	0.0	4.8	0.0	BUCKET
11	10/6/2015	Test	Test SMU	A	4	6.0	6.0	6.5	6.0	5.8	POLE
12	10/6/2015	Test	Test SMU	A	14	0.0	4.5	0.0	4.5	0.0	BUCKET
13	10/6/2015	Test	Test SMU	A	9	6.0	5.5	5.5	5.5	4.5	POLE

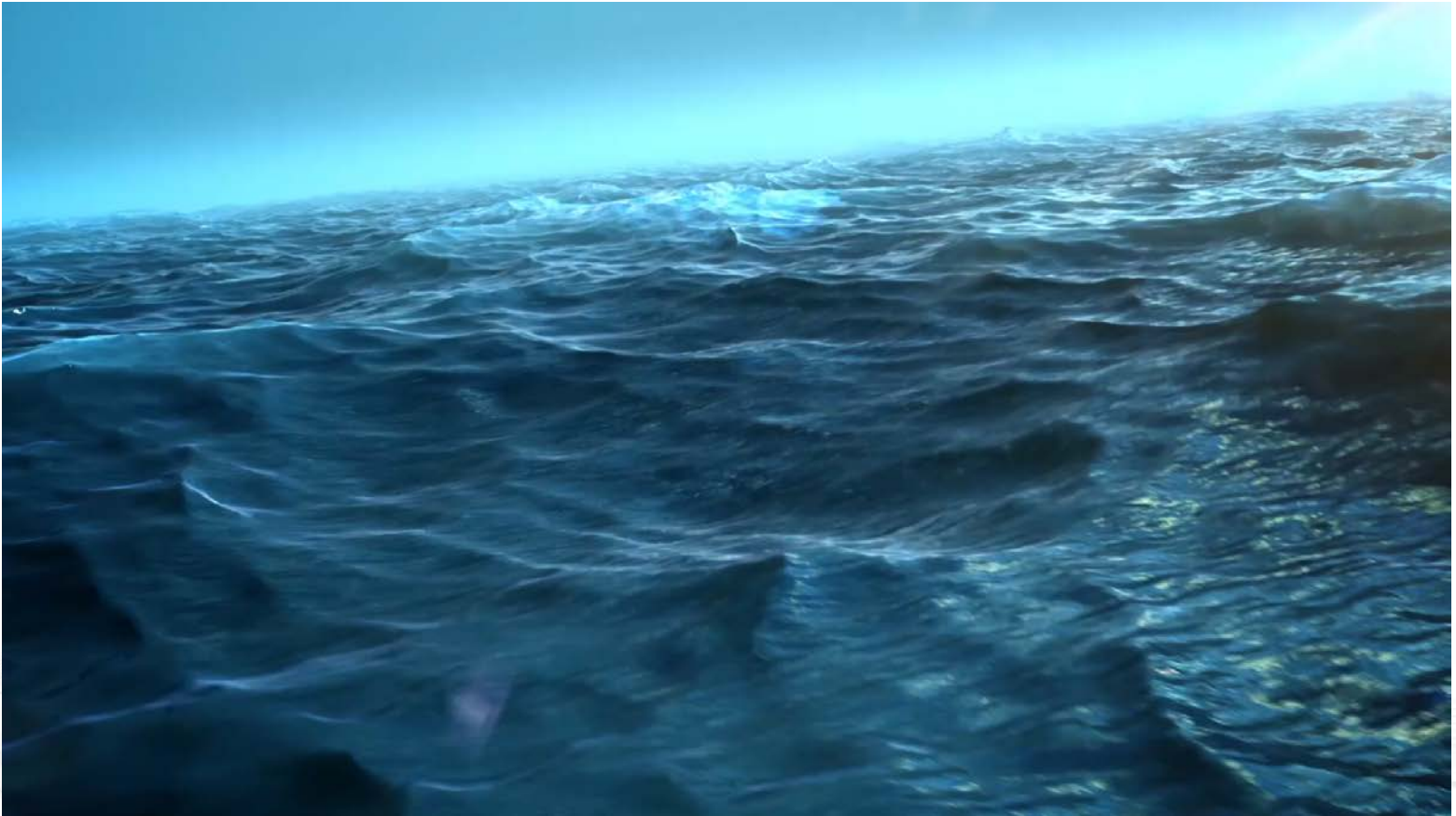


# Broadcast Spreader

- Material is distributed with patented two-disc spreading system
- Advantage of BCS™ verses traditional methods
  - Covers a large area
  - Deceleration of each particle using the water column
  - High production
  - Can spread along shorelines and in wetlands
  - Real-time QA/QC



# Video





# Quality Control

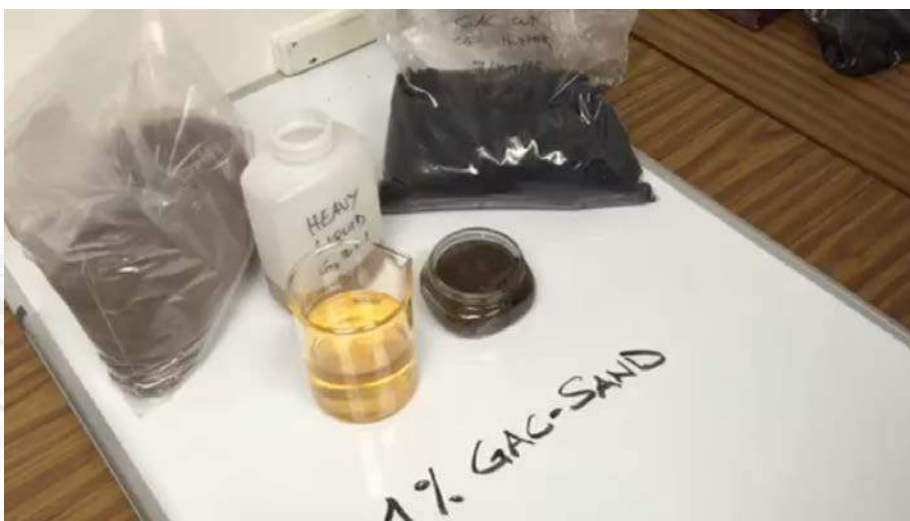
- Land
- Scale confirmation
- Thickness samples
- Mass Balance





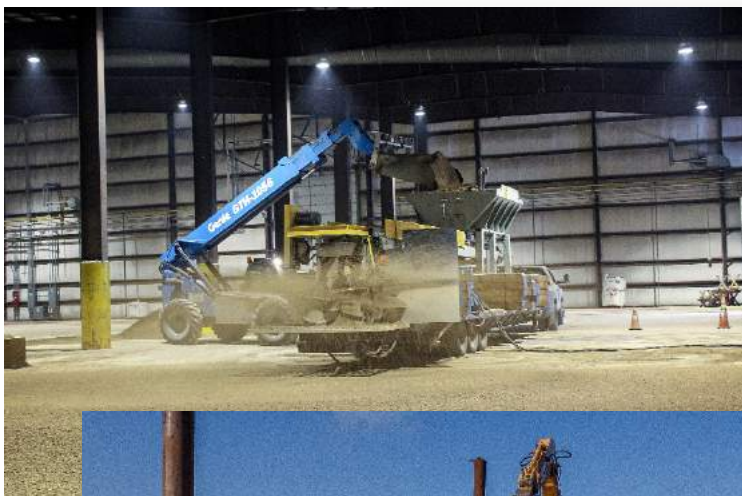
# Quality Control

- Amendment samples
  - Multiple check points
  - Timely results
  - Stockpile moisture
- BMPs





# Review



- Robust
  - 2 barge system
  - Resistant to wind, seiches, tidal fluctuations, and current
- A proven system!
  - Over 1,200 acres to date
  - 6 Different river systems
- Constantly improving
  - Efficiency
  - Accuracy
  - Positioning
  - Quality control methods





**Thank You**