

DREDGE MATERIAL DEWATERING AND DISPOSAL: AMENDMENTS FOR SEDIMENT DEWATERING OF PCB IMPACTED SEDIMENTS IN THE MANISTIQUE RIVER

Tenth International Conference on the Remediation and
Management of Contaminated Sediments

February 11-14, 2019

Tim Briggs, White Lake Dock & Dredge, Inc.
Ben Gezon, White Lake Dock & Dredge, Inc.
Heather VanDewalker, Arcadis



PROJECT DESCRIPTION



Project Scope of Work Summary

The Manistique River Area of Concern Operable Unit 1

- Dredge 9,127 cy of PCB impacted sediment
- Dewater and solidify 1,537 tons of TSCA sediment
- Dewater and solidify 9,899 tons of non-TSCA sediment
- Install ~1,600 cy sand cover on elevated PCB areas

MANISTIQUE RIVER PROJECT FLYOVER



PROJECT OBJECTIVE



The overall Remedial Action Objective (RAO) for the Manistique River OU1 (Zones 3 and 4) Site was to remove the Beneficial Use Impairments (BUIs) restriction on fish consumption.

The elevated concentrations of polychlorinated biphenyls (PCBs) in fish, which affect BUI fish consumption advisories, were largely derived from sediments containing PCBs.

PROJECT PARTNERS



- Project Partners Included:
 - MDEQ,
 - United States Environmental Protection Agency [EPA]
 - National Oceanic and Atmospheric Administration [NOAA]

- Design Engineer
 - Arcadis



DREDGING OPERATIONS



Dredge Float Plant and Material Barges



DEWATERING, SOLIDIFICATION AND LOADOUT



Transloading and Solidification Area



ANTICIPATED REAGENT DOSAGE



- Based on past site investigations and treatability studies, it was anticipated that up to 10% (wt./wt.) of drying agent would be adequate to amend the sediment to “pass” the paint filter test, required for waste acceptance at both the TSCA and non-TSCA landfill disposal facilities.

CONSIDERABLE MORE REAGENT WAS REQUIRED

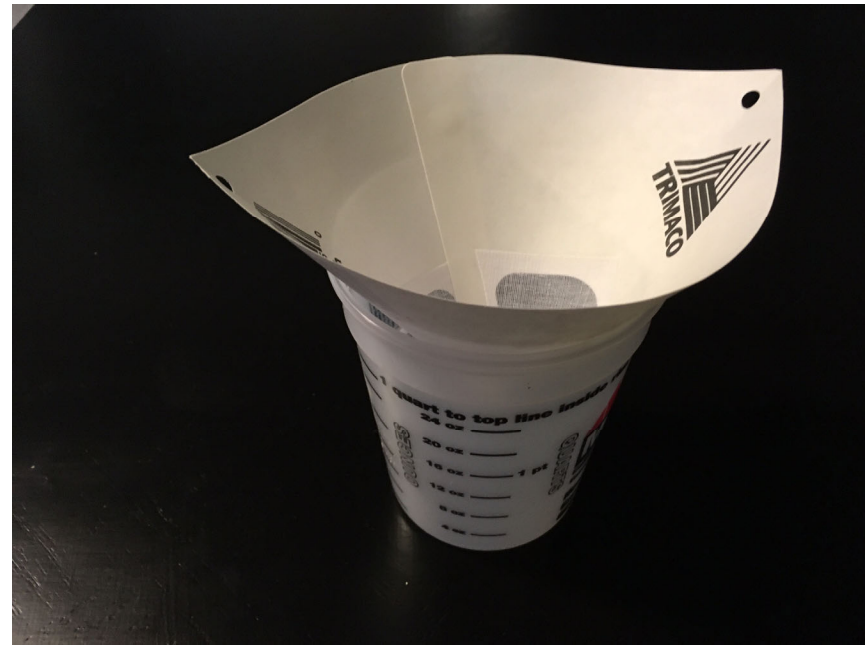


The material initially dredged from the river contained a significant amount of wood chips and smaller woody particles and required a considerably larger quantity (>20%) of amendment than anticipated to solidify the sediment to “pass” the paint filter test.

BENCH SCALE TEST PROGRAM



In response, additional bench scale solidification tests were conducted in the field to determine the most cost effective drying agent.



BENCH SCALE TEST PROGRAM



- A representative sample of the dredge spoils was allowed to gravity drain for 30 min. prior to testing.
- The addition rate of the drying agents varied from 0.3% to 40% (wt./wt.) and
- Solidified mixtures were allowed to cure for a minimum of four hours prior to paint filter testing.

BENCH SCALE TEST PROGRAM

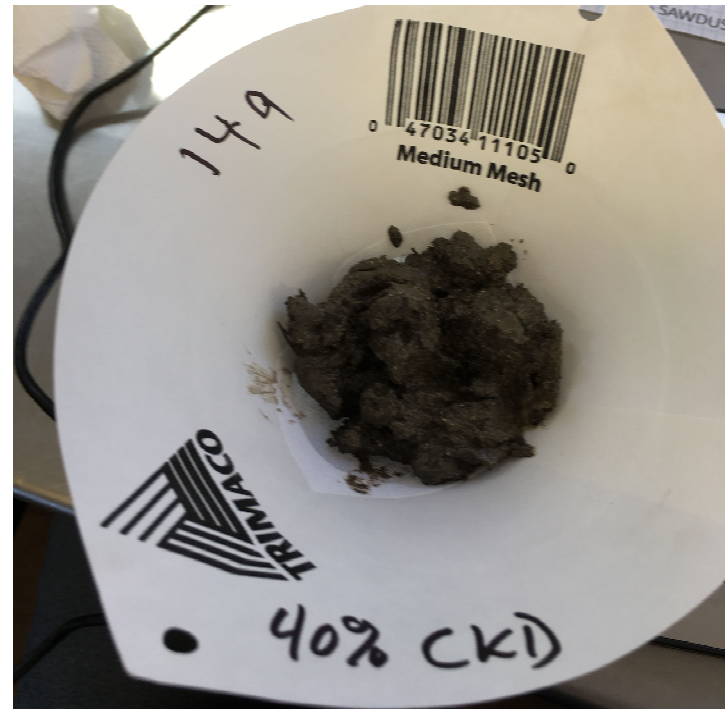
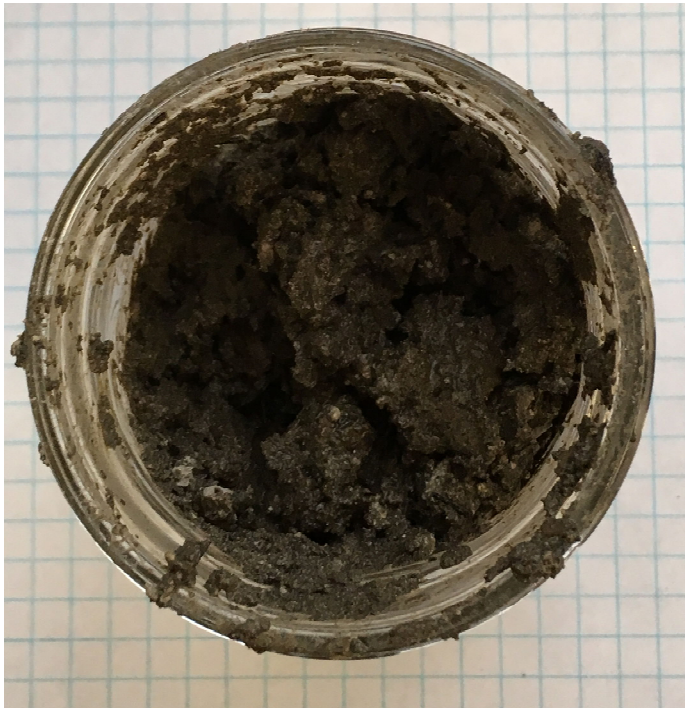


- Bench scale solidification tests were then conducted using locally available drying agents, which included:
 - Cement kiln dust,
 - Lime kiln dust,
 - Type IA portland cement,
 - Saw dust,
 - Super absorbent polymer.

BENCH SCALE TEST PROGRAM



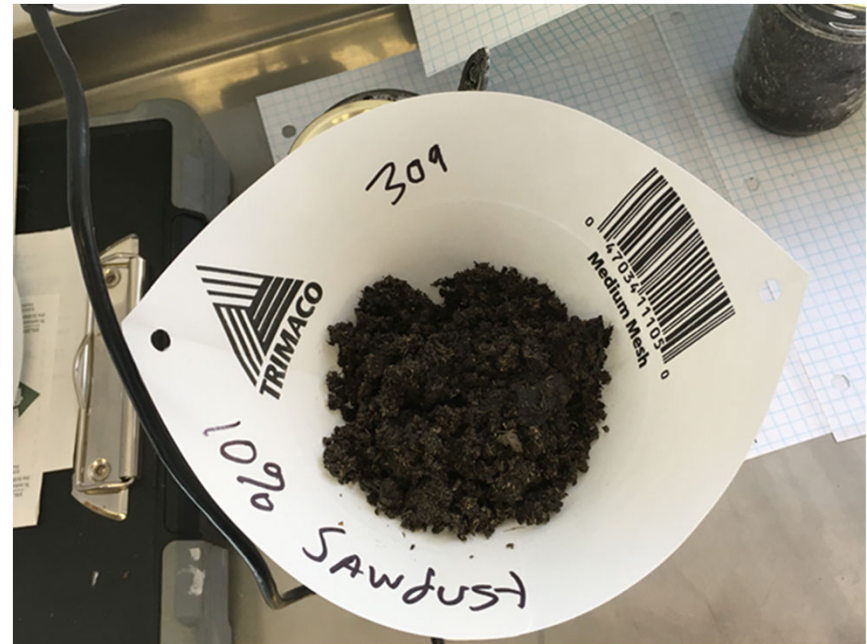
- Bench Scale Treatability Test with 40% CKD



BENCH SCALE TEST PROGRAM



- Bench Scale Treatability Test with 10% Saw Dust



RESULTS OF BENCH SCALE TREATABILITY TESTS



Summary of Bench Scale Solidification Test Results

Type of Reagent	Reagent Dosage	Cure Time (Hrs)	Paint Filter Test Results
Cement Kiln Dust (CKD)	10%	5:50	Fail
Cement Kiln Dust (CKD)	20%	5:41	Fail
Cement Kiln Dust (CKD)	30%	5:35	Pass
Cement Kiln Dust (CKD)	40%	5:26	Pass
Lime Kiln Dust (LKD)	10%	4:16	Fail
Lime Kiln Dust (LKD)	20%	4:13	Fail
Lime Kiln Dust (LKD)	30%	4:10	Fail
Lime Kiln Dust (LKD)	40%	4:06	Pass
Portland Type IA Cement	10%	4:58	Fail
Portland Type IA Cement	20%	4:55	Fail
Portland Type IA Cement	30%	4:51	Pass
Portland Type IA Cement	40%	4:46	Pass
Saw Dust	10%	4:41	Pass
Saw Dust	20%	4:34	Pass
Saw Dust	30%	4:28	Pass
Saw Dust	40%	4:21	Pass
Super Absorbent Polymer	0.3%	1:05	Pass

RESTRICTION ON TSCA DRYING AGENTS



TSCA Regulations

40CFR265.314(e) Sorbents used to treat free liquids to be disposed of in landfills must be nonbiodegradable.

Nonbiodegradable sorbents are: materials listed or described in paragraph (e)(1) of this section; materials that are determined by EPA to be nonbiodegradable through the Part 260 petition process.

CONCLUSION



1. The dosage of reagent required to solidify the dredge spoils from the Manistiquie River exceed the estimated addition rate of 10% by weight, with the exception of saw dust.
3. Higher dosages of CaO based reagents are needed to solidify TSCA dredge spoils to meet the TSCA landfill disposal requirement.
4. Saw dust cannot be used to solidify TSCA material, due to TSCA requirement to use a non-biodegradable sorbent.
5. As an alternative, Super Absorbent Polymer (SAP) may be allowed to be used to solidify TSCA dredge spoils.