Current Trends and Case Studies in Contaminated Sediment Capping

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Royal Canal

- Job bid as sediment removal via wet excavation
- Value engineering solution: pumping and dewatering of sediments in geotubes
### In-Situ Capping

#### Passive Capping

**Isolation Layer**
- Relatively thick layer of clean sand

**Separation Layer**
- Sand
- Geotextiles

**Ballast system**
- Sand/Gravel/Rip Rap
- Gabions
- Marine Mattress
- Articulating Concrete Blocks

#### Active Capping

**Active Layer**
- Adsorptive Media
- Relatively thin layer
- Bulk Placement
- Prefabricated layer

**Ballast System**
- Sand/Gravel/Rip Rap
- Gabions
- Marine Mattress
- Articulating Concrete Blocks
Passive Capping
Passive Capping - Marine Mattress

- Marine Mattress

- Typical Size: 5 ft Wide x 1 ft Thick x Varied Lengths 35 ft max
- HDPE, min. 2% carbon black
Passive Capping Project

- Staten Island, NY
- Tidal stream
- Geotextile/Geogrid
- 2 ft Sand overlay
Passive Capping Projects

- Westville, NJ
- Pittsfield, MA

- Hand-placed ACBs
- Underlying Geotextile
Active Capping Materials
Types of Active Media

Organoclay
- NAPL, PAHs, PCBs, Methyl Mercury

Organoclay MRM
- NAPL, PAHs, PCBs, Hg, As

Apatite
- Heavy Metals

Granulated Activated Carbon
- PAHs, PCBs, BTEX
Bulk Placement

- Bulk Placement

Compliments of CETCO

Compliments of CETCO
Active Capping
Variety of media used in prefabricated geotextile mats

- Organoclay, Organoclay MRM, Apatite, GAC
- Sand
- Combinations of the above
Prefabricated Geosynthetic Mats

Compliments of CETCO
Benefits of Prefabricated Geosynthetic Mat

- Provide thin layer of adsorptive media to immobilize contaminants
- Reduce overall cap thickness
- Decrease incidence of contaminants in surface water
- Manufactured material provides consistent distribution of active media throughout mat
- Easy to verify limits of capped sediments
Bergen Harbor, Norway
Bergen Harbor, Norway

- Contamination from 1920’s
- Mostly Hydrocarbons
- Permanent trial
- 50,000 sq. ft.
- 100 mm sand surcharge
- All seams monitored by video
Bergen Harbor, Norway

February 4, 2014
Groton, Connecticut
Augusta, ME
Active Capping with Hard Armor

- Anchor Trench at Toe
- Soil Anchors throughout
- Anchors sealed
Soil Anchors
Active Capping with Hard Armor
Utica Harbor, Utica, NY
Utica Harbor

- Former MGP site
- Harbor - 14 acres
- 15’ deep water
- 440 panels of RCM
- 2’ side overlap per panel
- 4’ end overlap
- Divers to confirm overlap
Deployment from Barge

- Prefabricate Panels
- 23 panels
  - 100’ x 600’

- Eliminate Divers
- Reduce material overlaps
  - Saved > 70,000 sq.ft.
GPS stations on barge
Conclusions

- In situ caps are good alternatives where sediment removal costs are prohibitive.
- Multiple options exist for material selection in passive and active sediment cap design.
- Prefabricated mats allow for uniform layer and easier QA/QC during construction.
- Varied installation methods based on site-specific conditions.
- Careful consideration of means and methods for construction can provide cost savings.
THANK YOU