Former Marine Oil Terminal
Hampden, Maine

Andrew Flint
Maine DEP - BRWM

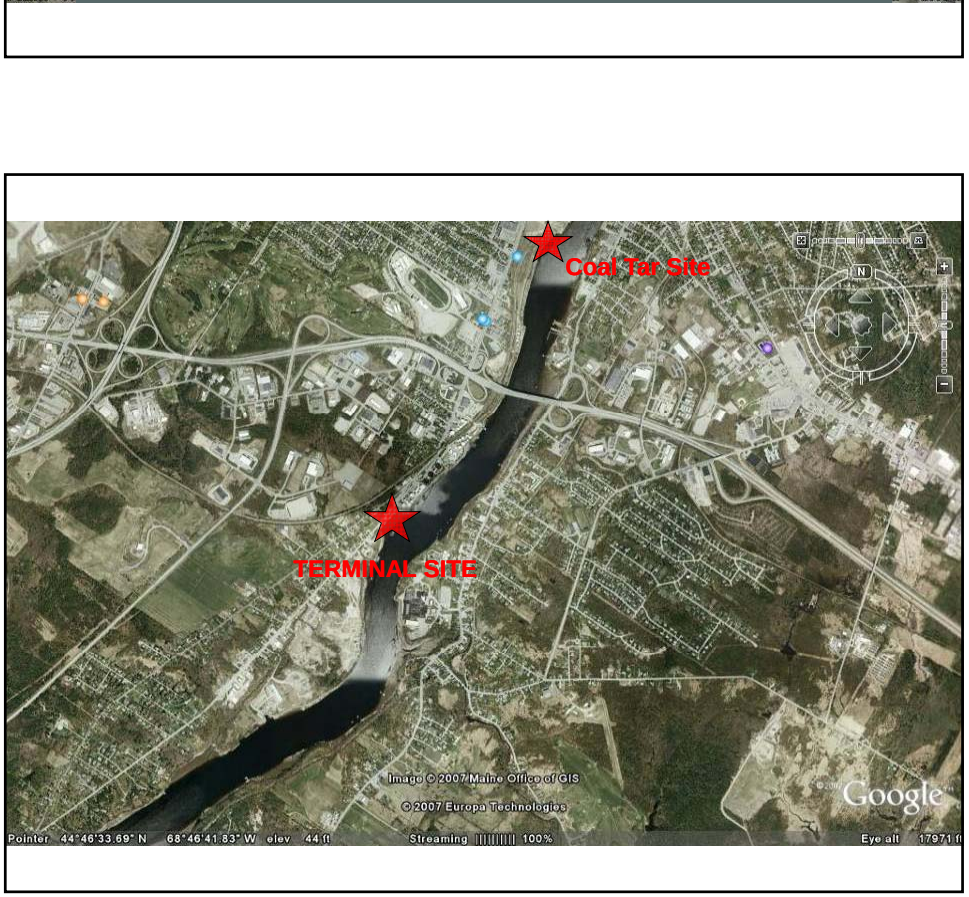


Image © 2007 Maine Office of GIS
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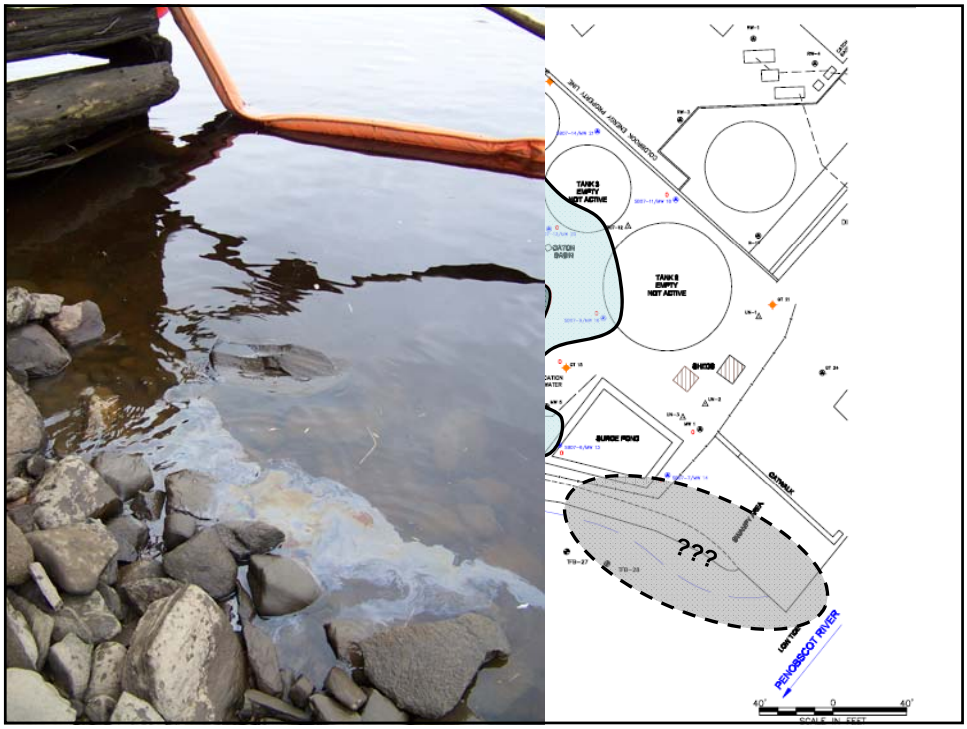
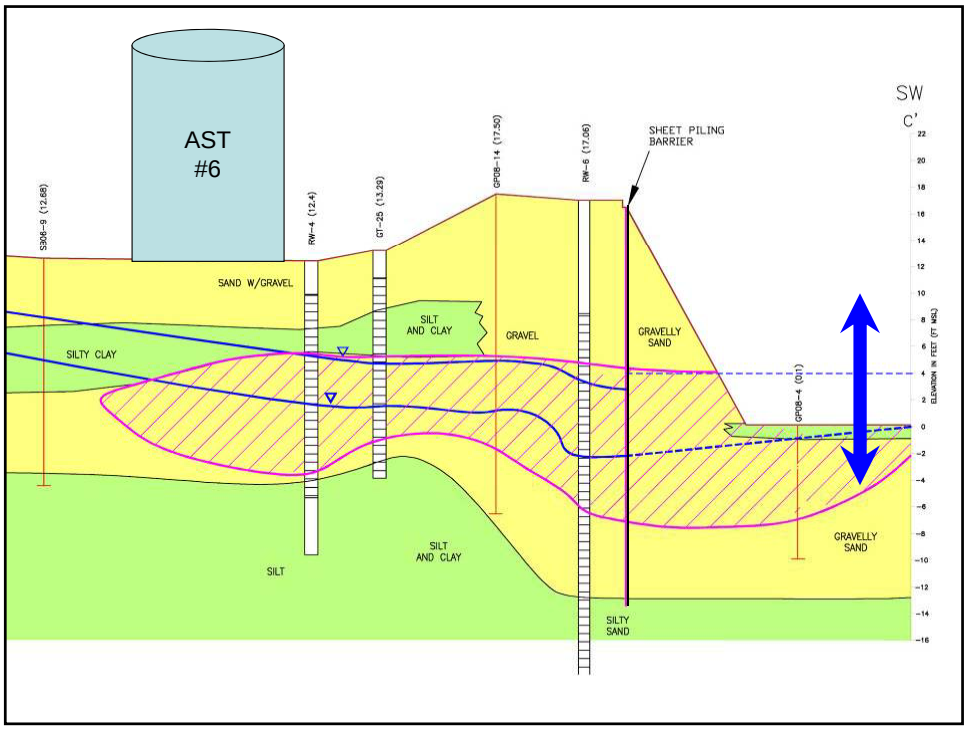
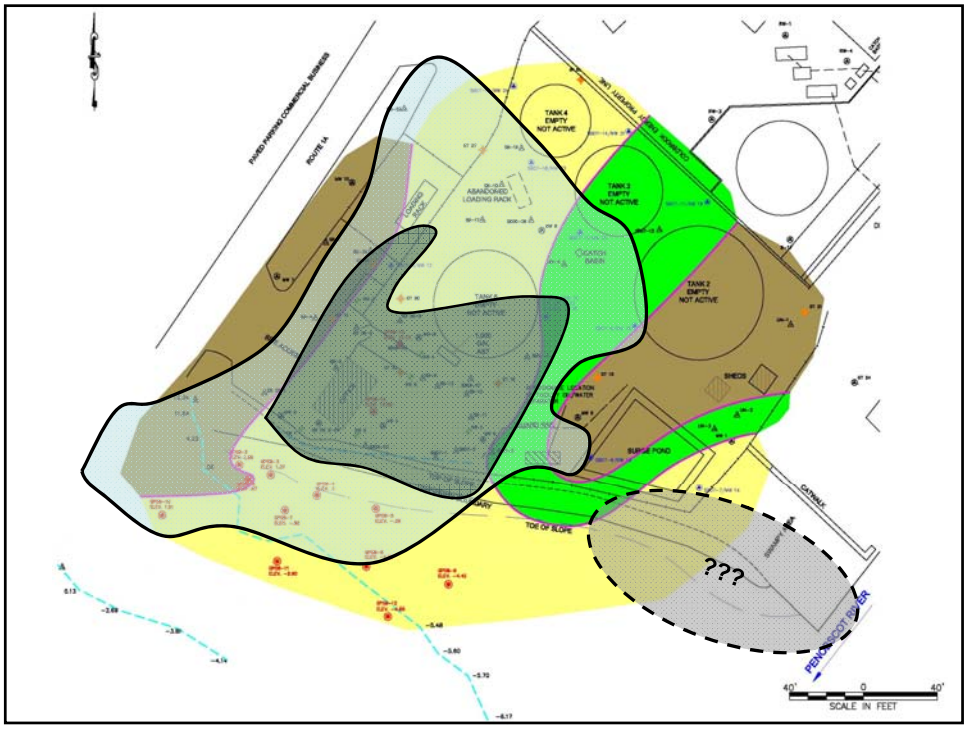
Pointer 44°46'39.93" N 68°47'05.21" W elev 12 ft
Streaming 100%
Eye alt 818 ft


???
PENOBSCOT RIVER
SCALE IN FEET


AST
#6
SW
C'
SHEET PILING
BARRIER
SAND W/GRAVEL
SILTY CLAY
SILT
AND CLAY
GRAVEL
GRAVELLY
SAND
SILT
AND CLAY
SILT
SILTY
SAND
GRAVELLY
SAND
ELEVATION IN FEET (ft MSL)



Remedial Goals

1. Cease free-phase oil discharge

2. Mitigate dissolved-phase discharge

Framework: Maine's Oil Discharge & CWA statutes
Clean-up Order by Consent

Remove or isolate free-phase in upland source area

Remedial Alternatives Investigated

- Bulk Removal ("Big Dig")
- Recovery Wells / Hydrodynamic Isolation
- Physical Isolation
  - Sheet Pile
  - Clay & Cement Slurry Injection
- The Combo Platter

Key Site Challenges

- 13 to 15 foot tides
  - By land or by sea? subaerial to >10 ft under
  - Thick smear zone, dewatering & NAPL mobility
- Water-handling
- Steep slopes & tight spaces
  - Small Site & tanks to remain in place
  - ~ 30 feet to base of smear zone

Key Site Positives

- Coarse aquifer
- Firm substrate along shoreline
- Areas of good characterization
- RP funded

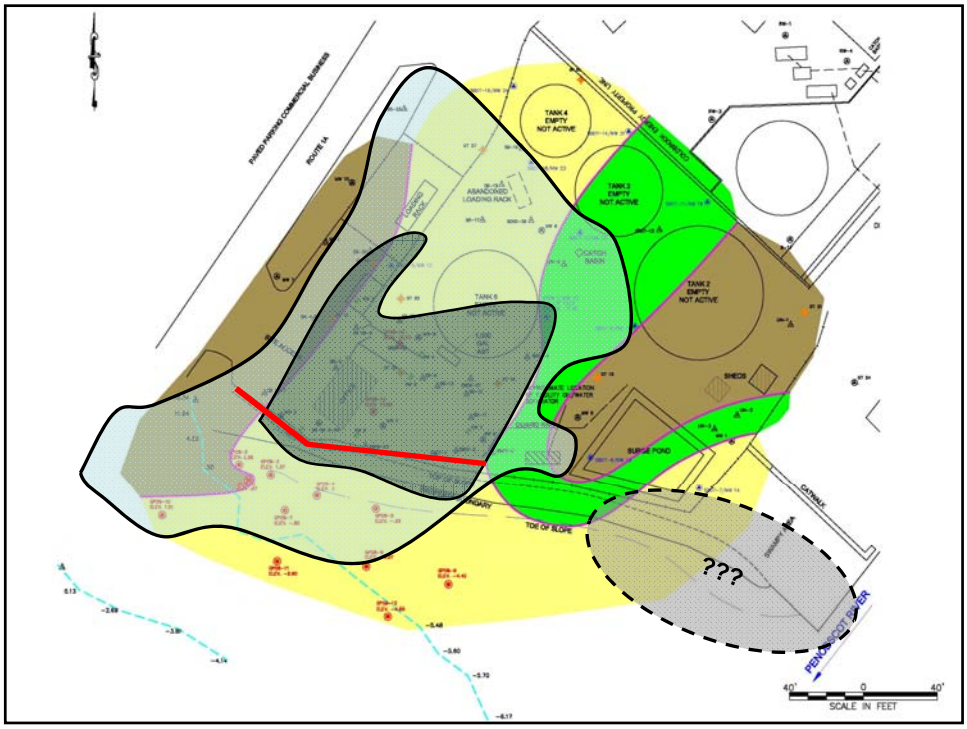
Remedial Options Challenges

- Bulk Removal
  - Dewatering, in hole & pre-disposal
  - Infrastructure
  - Offsite disposal
- Recovery Wells
  - Drawdown, reversing gradient & NAPL mobility
  - Where to put contaminated water
- Physical Isolation
  - Cost & longevity of full-length sheet pile
  - Confidence in the success of deep slurry injection

Remedial Option Selection

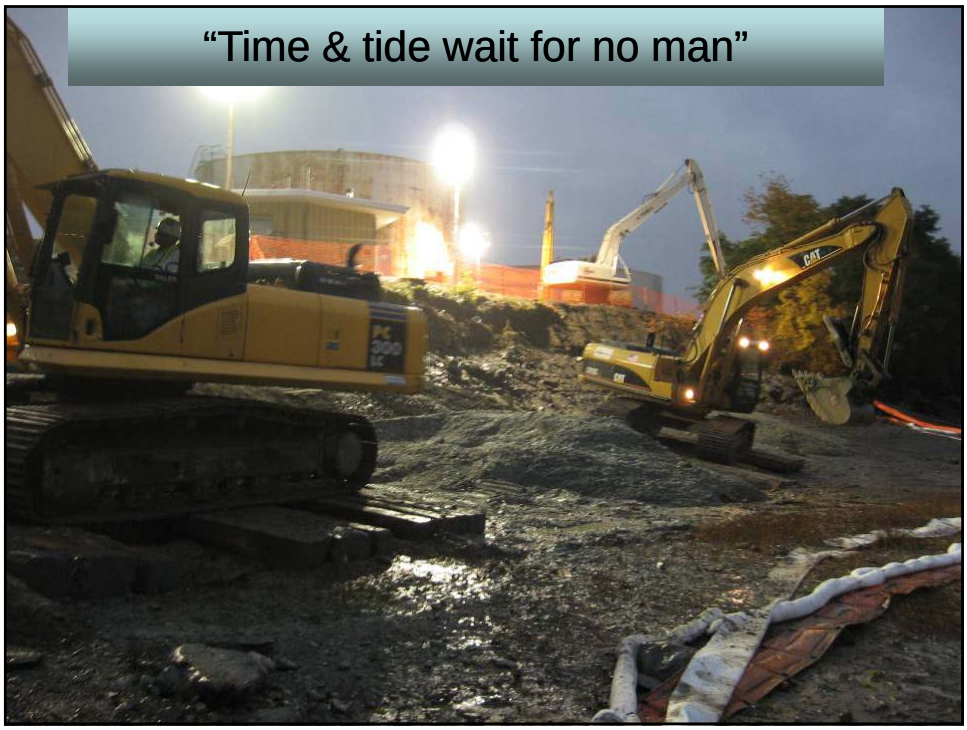
- Sheet Pile Wall & Tidal Flat Removal
- Recovery Well Field
- Dissolved Phase: source removal, natural attenuation, institutional controls & NRD Restoration

Sheet Pile Wall

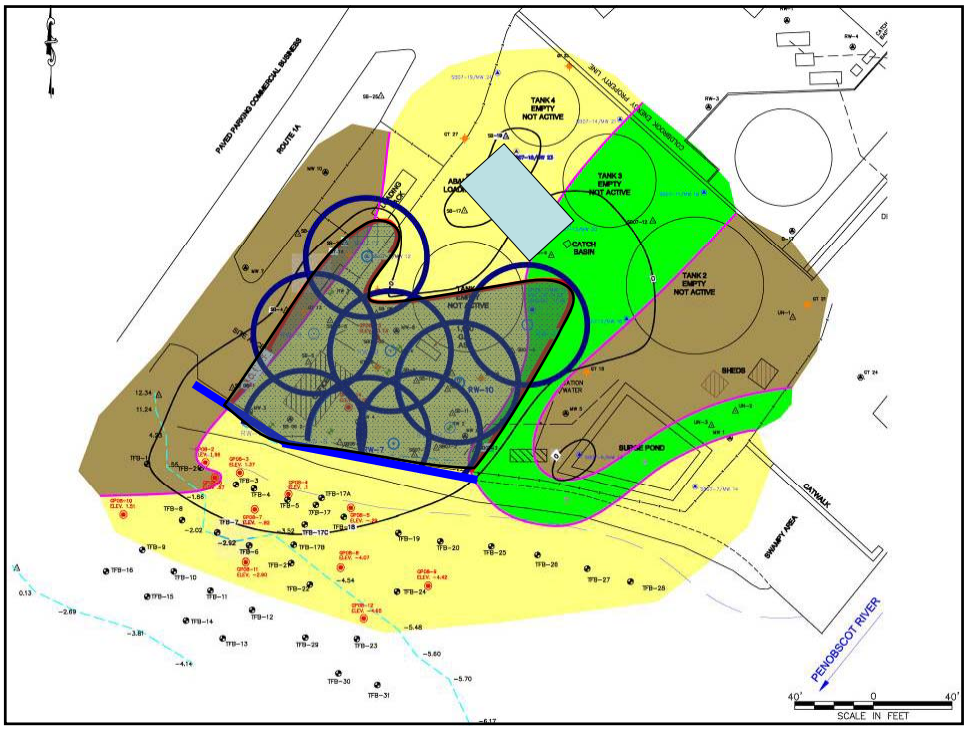

TANK 4
EMPTY
NOT ACTIVE
TANK 3
EMPTY
NOT ACTIVE
TANK 2
EMPTY
NOT ACTIVE
ABANDONED
LOADING RACK
SHEDS
SURGE POND
TOE OF SLOPE
???
SCALE IN FEET


EAGLE RENTAL


KOMATSU


“Time & tide wait for no man”
CAT


TEREX


PAVED PARKING COMMERCIAL BUSINESS
ROUTE 1A
TANK 4
EMPTY
NOT ACTIVE
TANK 3
EMPTY
NOT ACTIVE
CATCH
BASIN
TANK 2
EMPTY
NOT ACTIVE
SHEDS
SLUDGE POND
CATWALK
SWAMPY AREA
PENOBSCOT RIVER
40'
0
40'
SCALE IN FEET

Current Status

>9,000 gallons of NAPL recovered to date

>2,800 tons of sediment removed

Going Forward

- Second phase of RWs and eastern site assessment targeted for 2010
- Onshore: post-remedial confirmation borings
  (at or below residual saturation)
- Potential future mid- or post- remedial assessment of dissolved-phase via pore water

~3 years of sampling