



**US Army Corps
of Engineers**
Baltimore District

Dredging in Sediment Containing Munitions

Timothy Holland



**US Army Corps
of Engineers**
Baltimore District

Munitions Terms

MEC - Munitions and Explosives of Concern

DMM – Discarded Military Munitions

UXO – Unexploded Ordnance

CWM – Chemical Warfare Material



US Army Corps
of Engineers
Baltimore District

MEC Potential

Underwater MEC sites may exist in ponds, lakes, marshes, streams, rivers, estuaries, harbors, canals, seas, and oceans.

Many underwater MEC sites are well-known and can be found on maritime charts. While still others are showing up in unknown and unexpected places.

MEC (including CWM) have been recovered from dredging spoils, commercial fishing catches.

Ocean dumping of military munitions (DMM) was a lawful disposal method for MEC and CWM until 1973.



US Army Corps
of Engineers
Baltimore District

MEC Potential

ALL OCEAN BORROW SITES ARE SUSPECT!



US Army Corps
of Engineers
Baltimore District

OCEAN



US Army Corps
of Engineers
Baltimore District

OCEAN





US Army Corps
of Engineers
Baltimore District

HARBORS



US Army Corps
of Engineers
Baltimore District

MEC Potential

MEC items can show up in many places during a dredging project (i.e. dragheads, cutterheads, pump casings, pipes, turtle screens, placement sites...).

MEC detonations have damaged dredge plants; and have been rumored as the cause for the sinking of at least one fishing vessel.



US Army Corps
of Engineers
Baltimore District

Planning

Archive searches

MEC Detection and Discrimination using magnetometers

General Considerations

Removal vs avoidance

Production rates

****Costs****



US Army Corps
of Engineers
Baltimore District

COSTS

****IT IS CHEAPER TO SCREEN AND
PREVENT RATHER THAN CONDUCT A
POST REPLENISHMENT MEC REMOVAL
ACTION****



US Army Corps
of Engineers
Baltimore District

Planning

1 Solution – Screen sediment intake and outfall and conduct periodic inspection of spoils

Utilize experienced MEC specialists in the planning and operational phases.

Essential that the correct verbiage is placed in the dredging specifications before contract award.



US Army Corps
of Engineers
Baltimore District

Surf City NJ

Coastal Storm Damage Reduction Project (CSDRP)

Long Beach Island – 18 miles long

Private Residences/Public Beaches

880,000 cu yds of sand

Sand borrow site located 2.5 miles offshore

Beach Berm 8ft thick, Dunes 22ft high



US Army Corps
of Engineers
Baltimore District

Surf City NJ



US Army Corps
of Engineers
Baltimore District

Surf City NJ

Hopper dredges employed.

No evidence that MEC is present in borrow area during environmental impact study (EIS).

4 inch turtle screens employed.

No MEC is found until the day after the 1.6 mile first phase of this 18 mile project is completed.



US Army Corps
of Engineers
Baltimore District

Surf City NJ Phase 2 – Beach Monitoring

USACE OE SS conducts daily beach sweeps of project area at low tide (on-site 24/7)

- 112 MEC items located after TCRA completed May 07:
 - 31 during monitoring phase:
 - 20 Items found by OE SS
 - 11 Items by municipal workers and citizens
 - 81 after two spring 08' nor'easters
(Selected Geophysical Mapping & Mag and Dig)



US Army Corps
of Engineers
Baltimore District

Surf City NJ Phase 3 - Cost of Remediation

- USACE Recommended Remedy – Sift Berm
Estimated Cost - \$12.8M
- Public Recommendation – Sift Berm & Dune
Estimated Cost - \$19.88M
- Final Decision – Sift Berm and Dune



US Army Corps
of Engineers
Baltimore District

Surf City NJ Phase 3 Operations



US Army Corps
of Engineers
Baltimore District

Long Beach Island NJ MEC PREVENTION

Screen material to 3/4 inch (Intake 1.25" and outfall .75")

Screen dredge intake at the ocean bottom (borrow area) and the outfall point.

Intake screen may be larger than outfall screen to minimize impact on dredging plant.

Project completed February 2009. No MEC (Success Story)

The size of the screen is directly related to the size of the ordinance expected to be encountered.



US Army Corps
of Engineers
Baltimore District

Success Stories

Sandbridge VA, Beach Replenishment via Hopper Dredge:
Borrow area in known USN firing range (large projectiles 5")
Screen on draghead – No MEC (completed 07')

Ocean City MD, Beach Replenishment via Hopper Dredge:
Borrow area within range fan of FT Miles coastal shore batteries
Screen on draghead – No MEC (completed 06')

Bethany Beach DE, Beach Replenishment Via Hopper Dredge:
Borrow area within range fan of (former) Ft Miles coastal shore
batteries. Draghead Screen, outflow screen
12 MEC captured in outflow basket on beach (completed 08')

New York Harbor NY, Ongoing harbor deepening project. 1.5"
screen on intake (recently changed to 1.25")



US Army Corps
of Engineers
Baltimore District

Bethany Beach DE, CSDRP



Pumping sediment



Draghead Screen



US Army Corps
of Engineers
Baltimore District

Beach Screening Basket



US Army Corps
of Engineers
Baltimore District

Discharge to the Beach





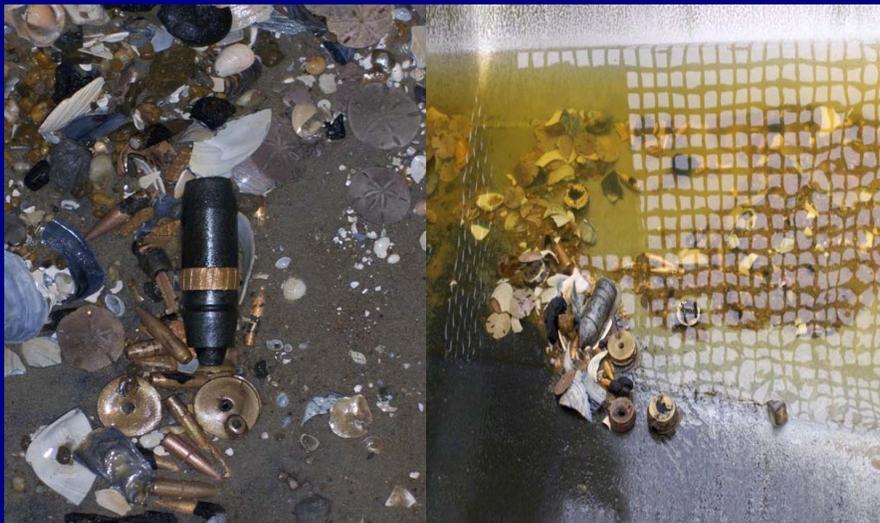
US Army Corps
of Engineers
Baltimore District

Bethany Beach Outfall Screen



US Army Corps
of Engineers
Baltimore District

Bethany Beach DE 40mm & 37mm Projo in Basket





US Army Corps
of Engineers
Baltimore District

Positive Steps

- **NJDEP requiring MEC screens on intake and outfall for all dredging projects in NJ**
- **DDESB planning to insert language in 6055.09 std requiring MEC screens during dredging**
- **USACE EM 385-1-1 inserting language in the safety manual requiring dredging districts to consult with MMDC to determine whether MEC screens are required on specific projects**
- **USACE guidance manual published in August 2008**



US Army Corps
of Engineers
Baltimore District

Positive Steps

- **NAD drafting requirement for all NAD districts to consider MEC screens during dredging**
- **NAP requires all dredging PDT's to consult with MMDC on applicability of MEC screens during specific dredging projects. NAP requires an OESS on-site during dredging that may encounter MEC.**



US Army Corps
of Engineers
Baltimore District

QUESTIONS



US Army Corps
of Engineers
Baltimore District

Contacts

George C. Follett, PMP
Project Manager
USACE Baltimore
Phone (410) 962-6743

Paul Greene
Explosive Safety
USACE Baltimore District
410-962-6741