Beach Replenishment Operational Challenges

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DISCUSSION TOPICS

- Origin of the Problem
- Lessons Learned
- Proven Solution
- Success Stories
- Recent Challenge
- Concerns and On-going Efforts

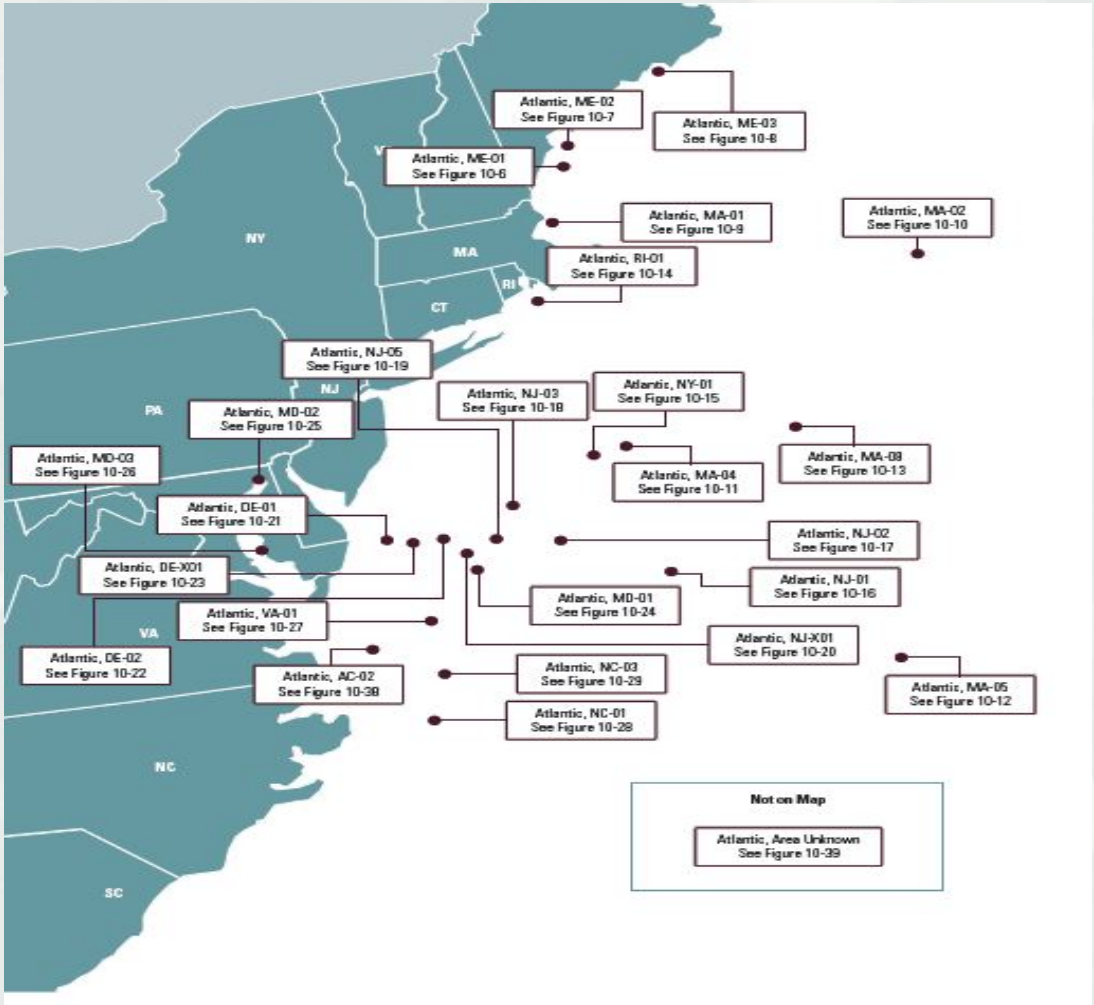
ACRONYMS

- MEC: Munitions and Explosives of Concern
- MPPEH: Material Potentially Presenting an Explosive Hazard
- MDEH: Material Documented as an Explosive Hazard
- MDAS: Material Documented as Safe

Origin of the Problem

- The Department of Defense and commercial firms routinely disposed of excess, obsolete, unserviceable, and captured enemy munitions in the waters off the shores of the United States until prohibited in 1972.
- Available reports indicate that hundreds of thousands of MEC were disposed of by dumping
- This is what we know. Many unknowns

Identified East Coast Dump Sites



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Lessons Learned

- Buckroe Beach, VA. 1991-2003 a total of 6 Time Critical Removal Actions (TCRA) for MEC were required post replenishment activities. Average cost of each TCRA was approximate $500K. In 2005 a beach replenishment operation was conducted utilizing interdiction/prevention techniques consisting of intake and discharge screens. Size of screens utilized were 1.5” at the intake and 1.5” at the discharge. Screens were effective in preventing a total of 16 MEC items (37mm and larger) from being placed on the beach.

Lessons Learned

- Surf City, NJ: the first phase (1.6 miles) of a Coastal Storm Damage Reduction Project (CSDRP) was completed in the spring of 2007. 2 days after completion of this phase a MEC item was discovered by a beach patron. In order to allow the beach to re-open by Memorial Day a TCRA to 24" was required. Cost of TCRA and subsequent standby support of NAB Ordnance and Explosive Safety Staff (OESS) was approximately $3M. During the winter of 2009 a final MEC removal/sifting project was completed at the cost of approximately $15M. Cost of the CSDRP phase one was approximately $6M. Total cost to remove the MEC was approximately $18M

Lessons Learned

- Lessons learned from numerous projects including the ones previously listed indicated that the key to preventing MEC/MPPEH from entering the dredge plant and subsequent spoils is an aggressive MEC/MPPEH interdiction/prevention program consisting of screening and inspection. Numerous post Surf City dredging projects (over 75) utilizing these screening and inspection techniques have been 100% successful in preventing MEC/MPPEH from being introduced to placed sand and/or dredging spoils.

Planning

Archive searches

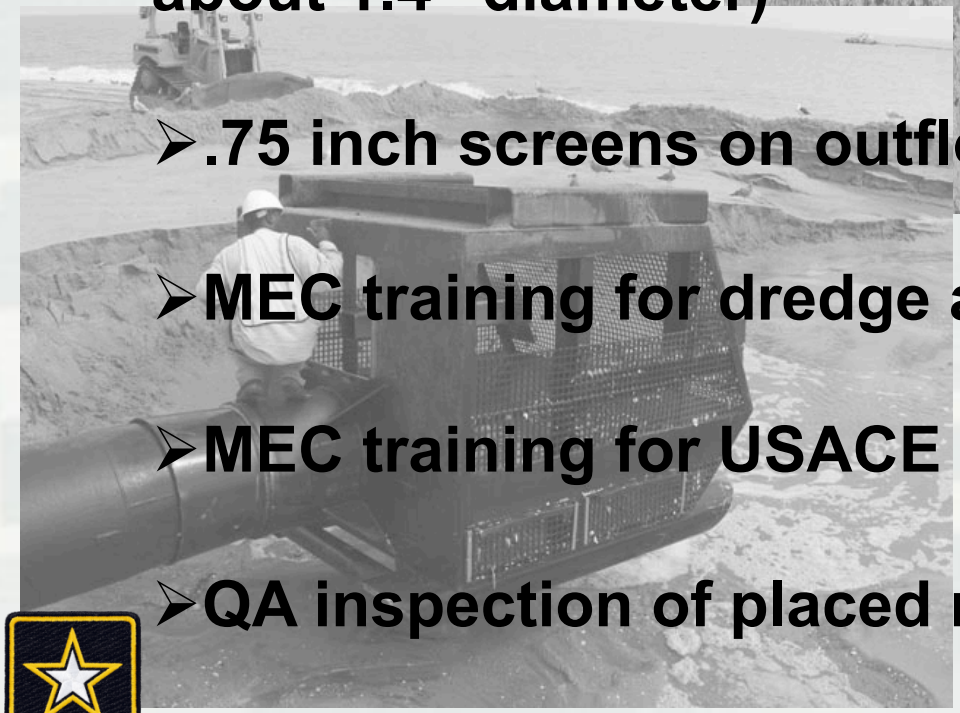
MEC Detection and Discrimination

General Considerations

- Hazard Analysis
- Removal vs avoidance
- Production rates
  - **COSTS**

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

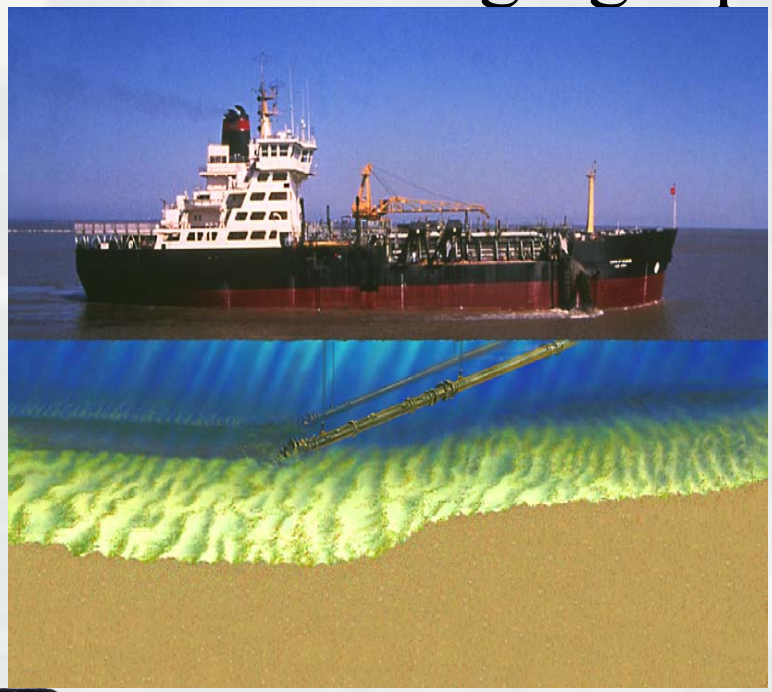
MEC Prevention Measures for Dredging



- 1.25 inch screens on dredge intakes (37mm about 1.4” diameter)
- .75 inch screens on outflow basket
- MEC training for dredge and beach crews
- MEC training for USACE personnel
- QA inspection of placed material by OESS.

Dredging Operations at SEA

- Intakes on Dredging Operations



Replenishment Operations on shore

Screens on Shore

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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’)

Success Stories

- 2013 and 2014 Hurricane Sandy Recovery Projects:
  - Over 18 million CY of sand placed in DE, MD and NJ
  - Screening and Safety Oversight Employed
  - Over 1230 MEC Items Recovered and Disposed of Safely
  - No MEC Placed on the Beaches

Recent Challenge

- During a routine replenishment (April-Sep 2015) being conducted at Loch Arbor, Allenhurst and Deal Beach NJ, numerous MPPEH items were being recovered in the discharge baskets during normal pumping operations. Per the replenishment SOP these items were provided to the local EOD Team for disposal.

Recent Challenge

- On 5 May 2015 a beach patron with a metal detector recovered a MK II booster (non-ferrous).

- The USACE team quickly conducted a QA of placed material and discovered that a number of these items had escaped the basket and been placed on the beach.

Recent Challenge

- The site USACE team immediately investigated potential causes for the release of the MEC.
- Potential causes for release were identified as:
  - Extremely high pressure and large quantities from pumping evolutions
  - Material failures with screens
  - Light weight of boosters
  - Non-ferrous composition negating the QA efforts by OESS using magnetometer.

Recent Challenge

- High Pressure pumping from dredging vessel
  - High pressure from the dredging vessel pumps results in a much higher quantity of material being pushed through the pipes at a much higher velocity
  - Velocity and high quantities resulted in continuous material failures on the screening baskets
  - Velocity and high quantities additionally resulted in boosters being forced out of basket relief ports. Relief ports on screening baskets are designed to allow biological debris to exit the basket which helps minimize sand retention in the basket.

Recent Challenge

- Non-ferrous composition of boosters
  - ►Non ferrous items were never anticipated
  - ►OESS QA was conducted with magnetometers (ferrous)
  - ►Non-ferrous boosters were not detected during routine QA sweeps of placed material

Recent Challenge

- Preventative Measures Employed
  - Relocated to alternate borrow area
  - Modified basket designs
  - Relief port screens
  - Reinforcing of baskets
  - Close inspection after each pumping evolution
  - QA with all metals detector
- Approximately 932,000 cubic yards of sand will require sifting.

Basket Modifications

Concerns

- Water Resources Development Act (WRDA)
  - Section 1027 requires funding of clean up of munitions to be provided by the DoD agency responsible for the original release of munitions
  - USACE and DA Office of counsel agree that the original release took place when munitions were legally disposed of by dumping at sea
  - Responsible agency for original dumping of items recovered at Deal Beach is unknown

Ongoing Efforts

- EM 385-1-1 Errata:
  - Draft provided to HQUSACE Safety and Civil Works April 2014
- EM 385-1-97 Change
  - Draft provided to HQUSACE Safety and Civil Works April 2014
- Engineering Construction Bulletin
  - Draft provided to HQUSACE Safety and Civil Works April 2014

QUESTIONS

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