#### Historic Overview of DoD Sea Disposal Operations Involving Chemical Warfare Material (CWM) in US Coastal Waters and Recent Studies

1<sup>st</sup> International Conference Chemical and Conventional Munitions Dumped at Sea Halifax, NS October 2007

# **Highlights**

- History of DoD sea disposal operations involving chemical warfare material (CWM)
- Legislation
- Study requirements
- Ongoing studies
- Findings





#### **History of US Sea Disposals**

- Disposal options for CWM were limited, until recently
  - Large quantities of CWM (US and captured) not needed
  - Deteriorating condition of some CWM presented hazard
  - Disposal at depths, beyond human reach, considered safe
- Disposals included:
  - Bulk chemical agent (CA) containers (all types of CA)
  - All types of chemical munitions
  - Captured enemy CWM (WWII)
- Disposals operations often involved CWM and conventional munitions



### Timeline



## When Did DoD CWM Sea Disposal Operations Occur?





•Approximately 27,000 metric tons (30,000 tons) of chemical agent was disposed in US waters

Data published in Defense Environmental Programs FY06 Annual Report to Congress (ARC), Appendix R

## Where Did DoD Conduct CWM Sea Disposal Operations in US Coastal Waters?



Graph based on net agent weight

### **CWM Sea Disposal Sites**



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## **Sea Disposal Sites**

#### Locations:

- Ranged from 5 to over 250 miles (10 to over 400 km) from shore
- Depths ranged from 50 to 16,000 feet (15 to 4,900 m)
- DoD disposal methods
  - Loose or "over the side"
  - Consolidated in ship hulks, with scuttling
- DoD used for:
  - CWM
  - Conventional munitions
- Designated sites
  - Were generally 100 square miles (260 sq km)
  - May also have been used by others for disposal of industrial and municipal wastes



## Public Law 109-364, Section 314 (NDAA) Research on Effects of Ocean Disposal of Munitions

- Identify disposals sites located in US coastal waters
- Identify navigational and safety hazards
- Research effects of sea disposed munitions on oceans and those that use them
  - Determine effects of munitions on environment
  - Determine effects of sea water on munitions
  - Analyze water and sediment from six representative sites



- Investigate feasibility of removal or remediation
- Develop safety measures for dealing with these munitions
- Monitor sites as necessary

## **Historical Research**

- Archival research ongoing
- Initial effort focused on CWM
- DoD Annual Report to Congress (ARC)
  on Environmental Programs
  - Initial effort's result reported in FY06 ARC
  - Interim updates reported annually in ARC
  - Final report due for FY09 ARC
- Current effort is focused on conventional munitions
- Report must include: number, size, and probable locations of munitions







## **Navigation and Safety Hazards**

- DoD and NOAA are working together
- Research and field work will be used to update nautical charts
- DoD developed explosives safety materials for commercial and recreational activities (See www.denix.osd.mil/uxosafety)
- NOAA distributed explosives safety materials to permitted vessels and public



Munitions At Sea A Guide for Commercial Marriage Balastries





### Research

- DoD established a senior level Tiger Team to provide vision and leadership to overall effort. Team is supported by:
  - Underwater Technology Research and Development Work Group
  - Inter-agency Technical Advisory Committee
- Strategic Environmental Research Development Program (SERDP) workshop on research needs for improving detection and remediation of underwater munitions
- Developing sampling, analysis and investigation survey approach and procedures
  - NOAA survey of Ordnance Reef provided basis for approach
  - Hawaii Undersea Chemical Weapons Assessment Program to refine approach

### Research

- SERDP literature review of CA fate and transport in seawater
- Modeling effects of sea disposal on one-ton containers (July 2007, ARL-TR-3883)
- Examination of corrosion of recovered sea disposed CWM
- Modeling of munitions migration
- Review of marine military munitions (M3) sites that may present a hazard during dredging or replenishment





## **Press Reports of CWM Disposals in US Waters**

1919



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Go Into Sea

1970s Navy Flotilla Heads Into Atlantic for Sea Disposal of Nerve Gas

Weapon Dumping In Oceans Halted

1940s

ARMY WILL DUMP GAS 10,000 Tons of Lewisite Will Be Sunk Off Charleston, S. C. War Department Denies Poison Gas Causes Fish Massacre Off Florida

#### 1960 s Pentagon Plans to Dump Chemical Bombs in Ocean

#### GAS-DUMPING PLAN SCORED IN JERSEY

Special to The New York Times

Will transport across country 1,100 roll cars filled with paison gas to be dumped into son

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