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

1st 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?

- 1911-1920
- 1921-1930
- 1931-1940
- 1941-1950
- 1951-1960
- 1961-1970

Net CA in Tons

Year

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000
What Type CWM Did DoD Sea Dispose?

- 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?

- **Atlantic** (9 sites) 50%
- **West Coast** (1 site) 37%
- **Gulf of Mexico** (2 sites) 1%
- **Hawaii** (3 sites) 9%
- **Alaska** (1 site) 3%

Graph based on net agent weight
CWM Sea Disposal Sites

Percent of chemical agent disposal by miles (km) from shore

Percent of chemical agent disposal by depth in feet (meters)

Graphs based on net agent weight
U.S. Coastal CWM Sea Disposals

- Atlantic, Area 1
  1945 November – 1964 August
- Atlantic, Unnamed 3
  1945 Nov – 1964 August
- Atlantic, Unnamed 1
  1960 June – 1964 August
- Atlantic, Area A
  1967 June – 1968 August
- Atlantic, Unnamed 2
  1957 November
- Atlantic, Unnamed 4
  1946 March – 1970 August
- USS Elinor
  1919 February
- Gulf of Mexico, Alabama
  1946 July
- Mississippi River, Braithwaite LA
  1946 March – 1970 August
- Pacific, HI, Oahu, Area 1
  1945 October – 1946 March
- Pacific, HI, Oahu, Area 2
  1945 October
- Pacific, HI, Oahu, Unknown
  1943 May – 1944 June
- Pacific, HI, Oahu, Unnamed
  1944 December
- Pacific, AK, Attu
  1947 June
- Pacific, CA, San Fran
  1945 December & 1958 April
- Pacific, HI, Oahu, Area 2
  1945 December
- Pacific, HI, Oahu, Unnamed
  1945 October – 1946 March
- Pacific, HI, Oahu, Unknown
  1943 May – 1944 June
- Atlantic, Unknown
  1919 August – 1958 August
- Atlantic, Unnamed 1
  1960 June – 1964 August
- Atlantic, Area 1
  1945 November – 1964 August
- Atlantic, Unnamed 3
  1945 November – 1964 August
- Atlantic, Baker
  1946
- Atlantic, B-1
  1946 June – October
- Atlantic, Unnamed 4
  1946 March – 1970 August
- Atlantic, Unknown
  1919 August – 1958 August
- Gulf of Mexico, Alabama
  1946 July
- Mississippi River, Braithwaite LA
  1946 March – 1970 August
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
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
War Gas Dumped Far Out at Sea
Gas Shells Being Dumped into Sea

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

1950s
Poison Gas - Loaded Tanker Scuttled
Army Excess Poison Gas to Go Into Sea

1960s
Pentagon Plans to Dump Chemical Bombs in Ocean
Gas-Dumping Plan Scored in Jersey
Special to The New York Times

1970s
Navy Flotilla Heads Into Atlantic for Sea Disposal of Nerve Gas
Weapon Dumping In Oceans Halted
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