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## **Disposal of chemical weapons at sea**

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While World War II is well-known as the beginning of the age of atomic weapons, World War I is lesser-known as dawn of the age of chemical weapons. The 1914-1918 conflict saw development and large-scale production of mustard gas, lewisite, and other chemical agents specially designed and packaged for use in armed conflict. With the armistice ending the War to End All Wars, large quantities of this material was left with no place to go. The technology to safely destroy these chemical weapons did not exist and public concern over its existence was largely nil.

Without giving the matter much thought, the victorious Allies took much of the surplus chemical weapons out to sea and dumped it overboard. Such dumping is known to have occurred in the Atlantic Ocean, the North Sea, the Baltic Sea, and the Mediterranean Sea, but probably also occurred in other waters. Records documenting what was dumped and where are either non-existent or cursory.

While chemical weapons were not widely used during World War II, large quantities were produced and stockpiled, in the event that the enemy might initiate chemical warfare. Many WWI-era chemical weapons (such as mustard gas) were produced, as well as newer chemical weapons (such as sarin). Again, the victorious Allies dumped large quantities of these weapons at sea after the conflict ended. Again, recordkeeping was cursory.

In the 1960's, people started to raise questions regarding use of the oceans as a dumping ground for chemical weapons. Governments phased out the practice and started research on methods to destroy chemical weapons, rather than drop them into the ocean and hope for the best. Methodologies have since been developed for the relatively safe destruction of most, if not all, chemical weapons, but the financial cost is high.

The last disposal of chemical weapons at sea by the US Government was on August 18, 1970, when 12,508 M55 sarin rockets, three 155 mm sarin projectiles, and one M23 VX land mine were dumped in the Atlantic Ocean 250 miles east of Cape Kennedy, Florida. Earlier at-sea disposals by the US Government include an unknown number of mustard projectiles off Charleston; 16,000 one-hundred-pound mustard bombs off Oahu; 1,154 fifty-five-gallon drums of arsenic trichloride and 924 ten-pound white phosphorus cluster bombs in "Disposal Area

Number 1” in the North Atlantic; twenty 1000-pound hydrogen cyanide bombs and 1,100 one-thousand-pound cyanogen chloride bombs off Waianae, Hawaii; an unspecified quantity of mustard projectiles in the Gulf of Mexico south of New Orleans; three phosgene bombs (German origin) in the Gulf of Mexico; 887 containers of lewisite in the Pacific Ocean twelve miles off the Aleutian Islands; and 301,000 mustard bombs (of 115 pounds each) in the Pacific Ocean 117 miles off San Francisco. The above list is just a sampling of the full list – and the full list is acknowledged to be highly incomplete.

To the extent that anyone thought about it at the time, it was assumed that the oceans were vast and that the chemical weapons would be diluted and dispersed to such an extent that no noticeable harm would result. It hasn't quite worked out that way.

Environmental advocates have raised a number of concerns about the impact of these deteriorating chemical weapons on the marine ecosystem. There is, to date, little hard evidence regarding the ecological impact. This does not mean that there has been no deleterious impact, only that it is hard to document adverse changes that can be traced back to chemical weapons disposal that occurred years previously.

Adverse impact on humans is easier to demonstrate. Numerous fishermen (particularly in European waters) have brought up old munitions, including old chemical weapons, from the bottom of the sea.

As recently as June 2010, a crewmember on the US clamming dredger *ESS Pursuit* was injured when he picked a shell-shaped object off the boat's conveyor belt and threw it back into the sea. He smelled a strange odor as he did so. Shortly thereafter, he experienced a burning sensation on his hands and arms. He was evacuated to shore by the US Coast Guard. Doctors diagnosed that he was suffering from exposure to mustard gas. The clamming vessel was ordered back to port and underwent extensive decontamination. It had been operating in waters above the Hudson Canyon south of Long Island. Although there are no specific records that mustard gas weapons were disposed of in the Hudson Canyon, the records, as noted above, are abysmal. Many of the chemical weapons dumped at sea departed from the Colts Neck Naval Pier at Earle, New Jersey.

While dumping of chemical weapons at sea became a violation of federal law in 1972, it wasn't until 2007 that Congress adopted legislation directing the Department of Defense to review historical records and attempt to better identify areas in waters off the United States where chemical and conventional weapons have been deposited and what was placed there. This information is to be released publicly. Research is to be done on the effects of those weapons on the environment and those who use the ocean waters. A feasibility study is to be done regarding the removal or remediation of those munitions. Unfortunately, no monies were appropriated to fund implementation of the legislation.

An earlier DOD report estimated the cost of environmental remediation of US military installations and former US military properties to be in excess of \$34 billion. The cost of

recovery and remediation of chemical weapons disposed at sea could easily exceed that figure. Funding for such a large-scale effort is not expected to be forthcoming in the near future.

As noted above, the ecological problems posed by these chemical weapons are impossible to quantify, even though they are very real.

The threats to humans are easier to identify. Chemical weapons have on occasion washed ashore. More frequently, human activity in the sea has resulted in direct contact with these weapons. Fishermen have brought them up in their nets and trawls. Dredging and work on oil and gas platforms and undersea pipelines risk making contact with chemical weapons. As humans increasingly engage in subsea activities, both commercially and recreationally, the likelihood of coming into contact with long-discarded chemical weapons can only increase.