` DIRECT FROM CDC ENVIRONMENTAL HEALTH SERVICES

Before the 1970s, disposal of excess, obsolete, or unserviceable munitions at sea was common. (Photo 1). It was believed that the vastness of ocean waters would neutralize chemical agents that might have leaked from these weapons. Sea-disposal operations included the disposal of conventional munitions of every type and chemical munitions with various chemical agent lls. Commercial shing, clamming, and dredging operations can stir up these munitions and they can be encountered anywhere at sea, not just charted hazardous areas.

There is now increasing concern about environmental and human health effects associated with the disposal of these agents both on land and in the ocean. Environmental health practitioners, especially those along coastal areas, should be aware that these incidents are occurring. Since 2004, the Centers for Disease Control and Prevention (CDC) has been noti ed of several incidents in which personnel were exposed to chemical agents associated with recovered sea-disposed chemical munitions. Several of the reported incidents resulted in toxic chemical agent contamination/injuries to workers involved in commercial clam sh-

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an incident off base in which an unknown projectile was recovered and destroyed by detonation (Fendick et al., 2013).

In 2010, commercial shermen recovered an unknown number of munitions while dredging for clams off the coast of Long Island, New York. During the effort to dump the munitions back in the ocean, a munition fell on the deck of the boat, releasing a black liquid substance.

In 2016, an ocean clammer was sorting through clams on an ocean clamming vessel and was exposed to a liquid-like substance while dislodging a rock or object that had clogged the hopper of the vessel. He developed blistering symptoms but did not present to a medical care center until 36 hr later. Due to his signi cant burns—reportedly 7–8% of the skin surface on his shoulder and arms—he was transferred to a burn unit in Philadelphia where the injury was recognized as a burn consistent with mustard exposure (The Maritime Executive, 2016). In 2017, a sherman was exposed to a suspected chemical warfare agent in an event that closely mirrored the 2016 event.

CDC has concerns for the health of sher men who might be exposed when munitions are dredged up with clams and other bottom dwelling sea life (Photo 3). CDC started an interest group for stakeholders, including the U.S. Coast Guard and federal and state departments of health and environment, to discuss responses to these incidents and help improve future responses. The goals were to protect shermen, improve recognition in treatment facilities, and improve the public health network noti cation.

Working with interest group partners, CDC recently introduced a new tool for the shing industry designed to be helpful when chemical munitions are encountered. It lays out a sequence of personal protection, disposal, and after-event monitoring. The tool also provides guidance regarding what to do starting from the point that a munition is inadvertently brought aboard. The tool concisely covers four things important to protecting the health of shermen who could encounter these munitions: 1) disposal overview, 2) protective equipment donning and dof ng, 3) nine-step emergency disposal procedure, and 4) symptoms and healthcare provider card. It even includes a "take me with you to your healthcare provider" card with useful information about signs, symptoms, and chemical testing.

The tool can be found at www.cdc.gov/nceh/demil. Next steps include preparing personal protective equipment (PPE) kits and training resources for shermen, as well as for medical providers who could treat the resulting exposures. The expanding use of the world's oceans, and particularly its coastal zones, requires not only an increased awareness of both chemical and conventional munitions in the sea but also increased response and medical treatment capabilities.