FACT SHEET

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Project Shipboard Hazard and Defense (SHAD)

Copper Head

Project Shipboard Hazard and Defense (SHAD) was a program encompassing several tests undertaken in the 1960s to learn the vulnerabilities of US warships to an attack with chemical or biological warfare agents and develop procedures to respond to such an attack while maintaining a war-fighting capability.

Copper Head testing was similar to Autumn Gold testing in that the test used simulants only. The primary difference between Copper Head and Autumn Gold was Copper Head was designed to use simulants to learn biological agents' characteristics in frigid temperatures. Copper Head was conducted in international waters in the North Atlantic.

The crews who participated in Copper Head were not test subjects, but test conductors. Participants should have been fully informed of the details of each test. Before testing began, all persons involved in Copper Head should have received comprehensive biological and chemical agent training. Trial tests conducted before the actual test should have reinforced the training already received and ensured everyone involved knew their role in the test. The training program should have included training in these areas: using protective masks and clothing, medical training and immunizations, knowledge of chemical and biological agents and simulants, and knowledge of test procedures and processes. Under actual test conditions, test conductors should have worn appropriate nuclear, biological, and chemical (NBC) protective equipment and should have taken extensive safety precautions to prevent any adverse health effects from the testing.

Test Name	Copper Head (Test 65-1)
Testing Organization	US Army Deseret Test Center
Test Dates	January 24 through February 25, 1965
Test Location	Atlantic Ocean, off the coast of Newfoundland, Canada
Test Operations	Target ship was operated under three different readiness conditions: A. Normal steaming conditions—full ventilation B. Battle or near-battle condition C. Chemical and biological attack expected
Participating Services	Navy, Marines, plus Deseret personnel
Units and Ships Involved	USS Power (DD-839)
Dissemination Procedures	Sprayed from A4B aircraft.
Agents, Simulants, and Tracers	Bacillus globigii (BG). Harmless to humans, BG is ubiquitous and easily found in samplings of wind-borne dust. BG is safely used in biological studies as a stand-in for pathogenic bacteria. BG is used as a biological tracer for anthrax because its particle size and dispersal characteristics are similar to those of anthrax. A household bleach and water solution easily kills BG. Zinc Cadmium Sulfide (FP – fluorescent particle). Zinc cadmium sulfide is an inorganic compound. Although it is not a biologic weapon, it is used as a tracer to simulate biological weapons' dispersion in various environments. In the early 90's, in response to concerns about cancer and infertility, the National Research Council studied the compound's long-term effects. The Council's findings indicate zinc cadmium sulfide is not harmful to humans. It is a stable compound; strong acids dissolve it only slightly. Because zinc cadmium sulfide does not dissolve in water or fats, it is unlikely it can enter the body through cutaneous contact or inhalation. Cadmium is the most toxic element of the compound. Humans are exposed to cadmium naturally in water, air, food, soil and house dust. It enters the air from burned coal and household waste. There have been no studies on the toxic effects of repeated exposure to zinc cadmium sulfide. The National Research Council devised a worst-case scenario: if exposure to zinc cadmium sulfide has the same effect as exposure to an equal amount of cadmium, repeated exposures to zinc cadmium sulfide could be toxic to kidneys and bones and cause lung cancer. Currently, no medical test determines

	exposure to zinc cadmium sulfide. However, tests are available to determine cadmium exposure. After 30 to 40 years it would be hard to identify people exposed or affected and determine their past exposures to zinc cadmium sulfide. Source: National Academy Press, Toxicologic Assessment of the Army's Zinc Cadmium Sulfide Dispersion Tests, 1997, web site: books.nap.edu/books/0309057833/html/R13.html#pagetop.
Ancillary Testing	Aero 14-B spray tank
Decontamination	Exterior: Not documented. Interior: Betapropiolactone (b-Propiolactone). Modern uses for b-propiolactone include vaccines, enzymes, tissue grafts, and surgical instruments; to sterilize blood plasma, water, milk, and nutrient broth; and as a vapor-phase disinfectant in enclosed spaces. Its sporicidal action kills vegetative bacteria, pathogenic fungi, and viruses. The primary routes of potential human exposure to b-propiolactone are inhalation, ingestion, and dermal contact. There is evidence b-propiolactone is a carcinogen. However, the results of animal testing in mice, rats, hamsters, and guinea pigs are questionable due to a lack of controls in the study. An International Agency for Research on Cancer (IARC) working group reported no data are available to evaluate the carcinogenicity of b-propiolactone in humans. Source: Department of Health and Human Services, National Institutes of Health web site: http-server.niehs.nih.gov/htdocs/8_RoC/RAC/betaPropiolactone.html.