



FACT SHEET

Office of the
Assistant Secretary of Defense (Health Affairs)
Deployment Health Support Directorate

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Deseret Test Center Project SHAD

Big Tom

Project Shipboard Hazard and Defense (SHAD) was part of the joint service chemical and biological warfare test program conducted during the 1960s. Project SHAD encompassed tests designed to identify US warships' and ashore installations' vulnerabilities to attacks with chemical or biological warfare agents and to develop procedures to respond to such attacks while maintaining a war-fighting capability.

The purpose of Big Tom was to evaluate the feasibility of a biological attack against an island complex and to evaluate doctrine and tactics for delivery of such an attack.

Test personnel investigated the diffusion and downwind travel of biological simulant and tracer aerosols; estimated area coverage in both jungle and surrounding tropical terrain; investigated the degree of aerosol penetration of a jungle canopy, ventilation rate, and time resolution of aerosols; and, investigated the degree of penetration and aerosol time resolution of typical fortifications.

The test consisted of a series of line-source trials during which a biological simulant, *Bacillus globigii*, was disseminated from a high performance aircraft and from the US Navy fleet submarine, USS *Carbonero* (SS-337). Both liquid and dry *Bacillus globigii* were used in

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this test. Liquid *Bacillus globigii* was disseminated from an Aero 14B spray tank mounted on a US Navy A-4 aircraft. Dry *Bacillus globigii* was disseminated from an A/B Y45-4 spray tank mounted on a US Air Force F-105 aircraft. *Bacillus globigii* was released from the USS *Carbonero* using a submarine-biological-disseminator. Aerosol sampling was done at various land-based stations.

For this test, a contractor-flown Aero Commander aircraft also released two colors (yellow and green) of fluorescent particles of zinc cadmium sulfide (FP).

Big Tom was conducted on the island of Oahu, Hawaii and its surrounding waters and airspace during May and June 1965*.

* This fact sheet was updated to include the participation of the USS *Carbonero* (SS-337).

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Test Name	Big Tom (DTC Test 65-6)
Testing Organization	US Army Deseret Test Center
Test Dates	May – June 1965
Test Location	Oahu, Hawaii, and surrounding waters and airspace
Test Operations	To evaluate the feasibility of a biological attack against an island complex and to evaluate doctrine and tactics for delivery of such an attack.
Participating Services	US Navy, US Marine Corps, US Air Force, Deseret Test Center personnel
Units and Ships Involved	USS <i>Granville S. Hall</i> (YAG-40) USS <i>Carbonero</i> (SS-337)
Dissemination Procedures	Liquid <i>Bacillus globigii</i> was disseminated from an Aero 14B spray tank mounted on a US Navy A-4 aircraft; dry <i>Bacillus globigii</i> was disseminated from an A/B Y45-4 spray tank mounted on a US Air Force F-105 aircraft. <i>Bacillus globigii</i> was also released from a specially equipped fleet submarine using a submarine-biological-disseminator.
Agents, Simulants, Tracers	<i>Bacillus globigii</i> Zinc Cadmium Sulfide
Ancillary Testing	Not identified
Decontamination	Not identified
Potential Health Risks Associated with Agents, Simulants, Tracers	<i>Bacillus globigii</i> Now considered to be <i>Bacillus subtilis</i> var. <i>niger</i> , a close relative of <i>Bacillus subtilis</i> , this bacterial species was used as a simulant and considered harmless to healthy individuals. <i>Bacillus subtilis</i> and similar <i>Bacillus</i> species are common in the

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environment, and are uncommon causes of disease. They have been associated with acute infections of the ear, meninges (brain lining), urinary tract, lung, heart valve, bloodstream, and other body sites, but always or nearly always in individuals whose health has already been compromised. Long-term or late-developing health effects would be very unlikely (except perhaps as a complication of the acute infection). (Sources: Tuazon CU, *Other Bacillus Species* (chap. 197), in *Principles and Practice of Infectious Diseases*, 5th edition (vol. 2), ed., Mandell GL, Bennett JE, Dolin R, Churchill Livingstone, Philadelphia, 2000, p. 2220-6; US Environmental Protection Agency, *Bacillus subtilis* Final Risk Assessment, February 1997, available at <http://www.epa.gov> as of October 4, 2002.)

Zinc cadmium sulfide

This compound was aerosolized as a tracer material for the dispersion of biological warfare agents because it had similar properties. There has been little scientific study on the toxicity of this compound when inhaled. A National Research Council (NRC) committee focused on the cadmium component as potentially most toxic. While higher concentrations and more prolonged exposures to cadmium are associated with the development of lung cancer, the concentrations and durations of exposure in the Army's tests were substantially lower. The NRC committee concluded that the risk of adverse health effects to populations in the area was low. (Sources: National Research Council (National Academies), *Toxicologic Assessment of the Army's Zinc Cadmium Sulfide Dispersion Tests*, and *Toxicologic Assessment of the Army's Zinc Cadmium Sulfide Dispersion Tests: Answers to Commonly Asked Questions*, National Academy Press, Washington DC, 1997, both available at <http://www.nap.edu> as of October 1, 2002.)

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