FACT SHEET

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Project Shipboard Hazard and Defense (SHAD)

DTC Test 69-32

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' 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 Deseret Test Center (DTC) Test 69-32 was to examine the effect of solar radiation on the viability of aerosolized Serratia marcescens and Escherichia coli after being aerially disseminated in a temperate marine environment during time periods about sunrise and sunset.

Twenty-seven field trials were conducted (14 Serratia marcescens and 13 Escherichia coli). R eleases were made from two Aero 14B spray tanks wing-mounted on an A-4C aircraft. *Bacillus subtilis var. niger* (BG) with fluorescent tracer suspension was released from one tank while either *Serratia marcescens* or *Escherichia coli* was simultaneously released from the other. Calcofluor was added to the BG as the physical fluorescent tracer. All trials were conducted using ten percent calcofluor added to the BG.

The USS *Granville S. Hall* (YAG-40), along with five Army light tugs, was assigned to provide surface support to DTC Test 69-32. The five tugs, each converted to serve as an ocean-going sampling platform and laboratory, were employed as target vessels. Agent and tracer dissemination by A-4C aircraft commenced 1.6 kilometers downwind of the primary laboratory ship (YAG-40) and continued downwind for approximately 3.2 kilometers beyond the last sampling support tug.

DTC Test 69-32 was conducted at sea southwest of the Hawaiian Islands during the period of April 30 to June 28, 1969.

Test Name	DTC Test 69-32
Testing Organization	US Army Deseret Test Center
Test Dates	April 30 – June 28, 1969
Test Location	Testing was conducted at sea southwest of the Hawaiian Islands.
Test Operations	To examine the effect of solar radiation on the viability of aerosolized Serratia marcescens and Escherichia coli after being aerially disseminated in a temperate marine environment during time periods about sunrise and sunset.
Participating Services	US Army, US Navy, US Air Force, Deseret Test Center personnel
Units and Ships Involved	USS *Granville S. Hall* (YAG-40) Five Army light tugs VC-1 (previously designated VU-1, Utility Squadron One) the Blue Aiis (Blue Warriors) Squadron, stationed at Barbers Point, Hawaii, provided a Navy A-4C as a disseminator aircraft. Patrol Squadron Six (PATRON SIX), Fleet Air Wing Two, provided two P3V *Orion* aircraft as airborne command posts.
Dissemination Procedures	Releases were made from two Aero 14B spray tanks wing mounted on an A-4C aircraft. *Bacillus subtilis var. niger* (BG) with fluorescent tracer suspension (calcofluor) was released from one tank while either *Serratia marcescens* or *Escherichia coli* was simultaneously released from the other.
Agents, Simulants, Tracers	*Serratia marcescens* (SM) *Escherichia coli* *Bacillus subtilis var. niger* (BG) Calcofluor (fluorescent brightner 28)
Ancillary Testing	Not identified
Decontamination	Not identified

Potential Health Risks Associated with Agents, Simulants, Tracers	*Serratia marcescens* (SM) In 1969 Serratia marcescens was recognized as having a limited pathogenic capability and its use as a bacterial marker for studying the dissemination of bacterial aerosols was discontinued. It is an opportunistic pathogen, causing infections of the endocardium, blood, wounds, and urinary and respiratory tracts. (Source: U.S. Army Activity in the U.S. Biological Warfare Programs, Volume II, Appendix E, p. E-6, p. E-7, February 24, 1977; Miller-Keane Medical Dictionary, 2000, http://my.webmd.com/content/asset/miller_keane_30189 [as of January 9, 2002]). *Escherichia coli* (Synonym: E. Coli) E. coli is one of the most common bacteria in man's environment. Most animals and humans have it in their digestive systems, where it does no harm. E. coli can cause severe stomach cramps, diarrhea, bloody stools, and kidney failure. Some who are exposed to E. coli may experience mild irritation of the stomach and intestines that goes away without treatment, while for others the bacteria can be deadly. (Source: http://my.webmd.com/content/article/3606.464 [as of January 9, 2002]). *Bacillus subtilis var. niger* (Bacillus globigii [BG]) The American Type Culture Center characterizes Bacillus subtilis var. niger as a BioSafety Level-1 (BSL-1) bacterium. The Centers for Disease Control and Prevention define BSL-1 as suitable for work involving well-characterized agents not known to consistently cause disease in healthy adult humans. (Sources: American Type Culture Collection data sheet, http://www.atcc.org/ [as of January 11, 2002]. *Biosafety in Microbiological and Biomedical Laboratories*, US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention and National Institutes of Health, 4th ed., p. 17, April 1999, U.S. Government Printing Office, Washington).

	Calcofluor (fluorescent brightener 28, Calcofluor White ST) Used as a fluorescent tracer with BG. $C_{40}H_{42}N_{12}Na_2O_{10}S_2$. Testing on laboratory animals indicates calcofluor may cause mild eye irritation. (Source: *http://hazard.com/msds/tox/f/q127/q679.html* [as of April 30, 2002])