FACT SHEET

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Deseret Test Center
Project SHAD

Shady Grove
(Revised)

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.

Shady Grove, Deseret Test Center (DTC) test 64-4, was originally named Red Beva. At some time before the actual test was conducted, DTC renamed it Shady Grove, likely for operational security reasons.

Shady Grove consisted of three phases (A, B, and D) totaling 25 trials conducted in the Pacific Ocean and one phase (C) of 10 trials conducted at Eglin Air Force base, Florida.

1. Phase A trials. This phase consisted of eight trials that served as a preliminary check of all test procedures prior to conducting the pathogenic agent phases. Phase A objectives were to evaluate test procedures prior to conduct of pathogenic trials; and, to determine downwind travel of tracer *Bacillus globigii* (BG) over a marine environment when released from an operational weapon system.

   Phase A of Shady Grove consisted of six aerial and two surface release trials during which biological tracer BG was disseminated upwind from the Army Light Tugs. In each of the six aerial release trials, A-4C aircraft, equipped with two modified

Aero 14B spray tanks, disseminated tracer BG. In each of the two surface trials, an Army Light Tug, equipped with an E-2 Multihead Disseminator, released tracer BG. Fluorescent particles (FP) were released during six of the Phase A trials. An Aero-Commander aircraft released the FP.

2. Phase B trials. This phase consisted of 13 trials during which *Pateurella tularensis* (UL) and tracer BG were simultaneously released to obtain decay and infectivity data.

   Phase B used both aerial and surface releases of UL and BG. A total of 13 trials (nine aerial and four surface) were conducted. UL and tracer BG were released in all trials, except one during which only UL was released. In each of the aerial release trials, A-4C aircraft, equipped with Aero 14B spray tanks, disseminated tracer BG. For the surface trials, the Multihead E-2 Disseminator, mounted on an Army Light Tug, was employed.

   Phase B trials were conducted between February 12 and March 15, 1965, in the Pacific Ocean in an open sea area approximately 100 miles southwest of Johnston Island.

3. Phase C trials. This phase consisted of ten tower flyby trials to obtain estimates of dissemination efficiencies for the Aero 14B/A-4 weapon system. In each trial, an A-4 aircraft, equipped with an Aero 14B spray tank, disseminated tracer BG.

   Trials were conducted between October 5 and October 14, 1965 on Eglin Air Force Base Range C52A, located approximately 15 miles northeast of the main base. The aircraft released the tracer material upwind of the 91-meter sampling tower located on the range.

4. Phase D trials. This phase consisted of four trials during which *Coxiella burnetti* (OU) and tracer BG were simultaneously released to obtain decay data.

   In each of the trials, A-4C aircraft, equipped with Aero 14B spray tanks, disseminated OU and tracer BG.

   Phase D trials were conducted between March 22 and April 3, 1965, in the Pacific Ocean in an open sea area approximately 100 miles southwest of Johnston Island.

Following publication of this fact sheet in September 2001, we received new information about the Shady Grove test. Based on that information, we have added additional test data (Phase A, May 1964 and Phase D, March 22 - April 3, 1965), additional test locations (Phase A: Pacific Ocean near the island of Oahu, Hawaii, and Phase C: Eglin Air Force Base, Florida), test operations (Phase A served as a preliminary check of all test procedures prior to conducting the pathogenic agent phases, and Phase C obtained estimates of dissemination efficiencies for the Aero 14B/A-4 weapon system) and five Army light tugs (2080, 2081, 2085, 2086, and 2087).

Test Name	Shady Grove (DTC Test 64-4)
Testing Organization	US Army Deseret Test Center
Test Dates	Phase A, May 1964 Phase B, February 12 – March 15, 1965 Phase C, October 5 – 14, 1965 Phase D, March 22 – April 3, 1965
Test Location	Phase A: Pacific Ocean near the island of Oahu, Hawaii. Phases B and D: Pacific Ocean near Johnston Island. Phase C: Eglin Air Force Base, Florida
Test Operations	Four phases of testing were conducted. Test operations included both aerial and surface releases of agents and tracer material. Phase A served as a preliminary check of all test procedures prior to conducting the pathogenic agent phases. Phase B obtained decay and infectivity data for *Pateurella tularensis* (UL). Phase C obtained estimates of dissemination efficiencies for the Aero 14B/A-4 weapon system. Phase D obtained decay data for *Coxiella burentti* (OU). Fluorescent particles (FP) were released in each phase to obtain metoerological data.
Participating Services	US Navy, US Marine Corps, US Air Force, Deseret Test Center personnel
Units and Ships Involved	USS *Granville Hall* (YAG-40) Army Light Tugs 2080, 2081, 2085, 2086, and 2087 Marine Aviation Group 13 Patrol Squadron Four Patrol Squadron Six AEWBARONPAC Detachment

Dissemination Procedures	Agent and tracer material were disseminated from Aero 14B spray tanks mounted on A-4 aircraft and from the Multihead E-2 Disseminator mounted on an Army Light Tug
Agents, Simulants, Tracers	*Bacillus globigii* (BG) *Coxiella burnetti* (OU) *Pasteurella tularensis* (UL) Fluorescent particles (FP)
Ancillary Testing	Not identified
Decontamination	Not identified
Potential Health Risks Associated with Agents, Simulants, Tracers	<u>*Bacillus globigii* (BG)</u> Now considered to be *Bacillus subtilis var. niger,* a close relative of *Bacillus subtilis*, this bacterial species was used as a simulant and considered harmless to healthy individuals. *Bacillus subtilis* and similar *Bacillus* species are common in the 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.) <u>Fluorescent particles (FP)</u> 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.) *Coxiella burnetii* (OU) Until the stockpile was destroyed in 1972, OU was part of the US biological weapons stockpile. OU causes Q fever in humans. Domestic animals (cattle, sheep, and goats), cats, wild animals, and ticks usually host OU. Humans become infected after contact with contaminated materials (feces, blood, placenta, etc.); inhaling contaminated dust or droplets; or ingesting contaminated food or raw (unpasteurized) milk. Symptoms of the disease include fever, headache, muscle pains, joint pain (arthralgia), and a dry, non-productive cough. Hepatitis or pneumonia also may develop during the early stages of the disease. In rare occurrences, Q fever can cause severe complications in the aortic heart valve (and subsequent endocarditis). Generally, victims recover even without treatment. However, complications, if they ensue, can be very

	serious and sometimes even life threatening. (Sources: Mitretek Systems web site http://www.mitretek.org/mission/envene/biological/agents/rickettsia.html and University of Maryland School of Medicine web site umm.drkoop.com/conditions/ency/article/001337.htm) *Pasteurella tularensis* (UL) UL causes the infectious disease tularemia (rabbit fever, deer fly fever, Ohara's disease), most commonly in people who handle infected wild rabbits. Other infected animals, ticks, or contaminated food or water also transmit tularemia. The symptoms, high fever and severe constitutional distress, appear suddenly within 10 days of exposure. One (or more) ulcerating lesion develops at the site of infection, such as the arm, eye, or mouth. The regional lymph nodes enlarge, suppurate, and drain. Pneumonia, meningitis, or peritonitis may complicate the infection, whose mortality rate is about 6 percent. (Sources: Colorado State University, Environmental Health Services web site http://chemdat1.ehs.colostate.edu/LARmanual/tular.htm and The Columbia Encyclopedia, 6th ed., New York: Columbia University Press, 2001, web site www.bartleby.com/65/)