LA-UR-22-20091

Approved for public release; distribution is unlimited.

Title:	Operation Tumbler-Snapper
Author(s):	Meade, Roger Allen
Intended for:	Inclusion in the NSRC History of Atmospheric Testing
Issued:	2022-01-05

Operation Tumbler-Snapper

R.A. Meade

Operation Tumbler-Snapper began on April 1, 1952, when Able, a low-yield nuclear device, detonated 793 feet over the Frenchman Flat area of the Nevada Proving Ground. Able, the first of four airdrops conducted as the Tumbler phase of the Operation, provided the Department of Defense with reliable data on the relationship between height of burst and blast overpressure. Such information was vital to establishing the battlefield use of nuclear weapons. A final set of four tower detonations, the Snapper phase, provided the AEC and Los Alamos with diagnostic data on new weapon designs. Although the test series was nominally divided between the AEC and the DOD, this distinction held little meaning because two of the Tumbler effects tests, Charlie and Dog, employed experimental devices and all four of the Snapper tests involved effects experiments, including military troop maneuvers.[1]

Planning for Operation Tumbler-Snapper began after "near-earth overpressures from the nuclear airbursts" of Buster-Jangle were lower than predicted. Accurately establishing the relationship between blast and overpressure was critical to determining how effective tactical nuclear weapons would be against various targets. The goal, then, of the Tumbler phase, which was accomplished, "was to increase understanding of nuclear blast wave phenomenology near the ground." The AEC's mission was "to expedite development of a nuclear weapon stockpile in response to rapid Soviet nuclear weapon advances."[2] Such developments included both smaller yield tactical devices and design improvements in pursuit of a thermonuclear weapon.

Tumbler-Snapper had a moment of high drama when the Fox event failed to detonate. As was the case seven months before, the job of climbing the tower and diagnosing the problem fell to Jack Clark. Carrying a hacksaw and accompanied by Barney O'Keefe and John Weineke, Clark began the long and slow 300-foot climb. Reaching the bottom of the shot cab, Clark used the hacksaw to cut through the wire holding the trap door shut. A diagnostic check found a malfunctioning measuring device that had automatically blocked the firing circuit.[3]

The troop exercises, Camp Desert Rock I, included psychological tests to evaluate "reactions to witnessing a nuclear detonation," inspections "of military equipment exposed to both blast and radiation," and tactical maneuvers near ground zero. These troops, wearing little or no protective gear, crouched in trenches before detonations and then taken to display areas to inspect all manner of military equipment placed at various distances from ground zero. The following descriptions, distilled from a Defense Threat Reduction Agency fact sheet, provide further details on the Desert Rock activities:

---

[1] Glen McDuff. Tumbler-Snapper. Unpublished manuscript, NSRC database; and Defense Threat Reduction Agency, U.S. Strategic Command Center for Combating Weapons of Mass Destruction, Standing Joint Force Headquarters for Elimination, *Fact Sheet: Operation Tumbler-Snapper.* Fort Belvoir, Virginia, May 2015.

[2] Ibid.

[3] Roger A. Meade. A-Bomb Trigger Man. Nuclear Weapons Journal, November-December, 2003, 212.

After observing Charlie, troops were tested to determine their reactions to the detonation. These troops also toured the display area and approached as close as 160 meters to ground zero, where they encountered radiation intensities of up to 0.01 R/h.[4]

After observing Dog, troops from the Marine Corps took psychological tests, and toured display areas 2 hours and 20 minutes after the detonation. Their tour stopped at 820 meters from ground zero because of the radiation intensities they encountered.[5]

After observing Easy, no troop maneuvers were conducted. The initial radiological survey team was unable to complete the survey on shot day because of the large radiation area and rough terrain. On the day after the shot, the 0.01 R/h line was 900 to 1 kilometer (6.2 miles) east, south, and west of ground zero but extended about 6 kilometers (3.7 miles) north.[6]

After observing Fox, troops were given psychological tests and a tour of the equipment display area. High radiation levels to the northeast prevented completion of the initial radiological survey on shot day. Three days after the shot, the 1.0 R/h line extended less than 500 meters (0.3 miles) from ground zero, except to the northeast where it reached nearly 2 kilometers (1.2 miles).[7]

After observing George, troops toured the equipment display area, located about 500 to 2,500 meters (0.3 to 1.6 miles) southwest of ground zero. Other soldiers, accompanied by five tanks, made a ground assault on an objective south of ground zero. When Army monitors detected radiation intensities of 0.5 R/h at about 460 meters (0.3 miles) from ground zero, the attack was halted.[8]

Although radiological hazards were recognized during the Desert Rock exercises, no one anticipated any possible long-term physical or mental effects. Many years later, accounts of physical maladies, primarily cancer, and the accompanying psychological trauma, became a national issue. Real or imagined, such accounts cloud the early test program in Nevada.[9]

---

[4] Defense Threat Reduction Agency, U.S. Strategic Command Center for Combating Weapons of Mass Destruction, Standing Joint Force Headquarters for Elimination, *Fact Sheet: Operation Tumbler-Snapper.* Fort Belvoir, Virginia, May 2015.

[5] Ibid.

[6] Ibid.

[7] Ibid.

[8] Ibid.

[9] See, for instance: Saffer, Thomas H. and Orville E. Kelley. *Countdown Zero.* New York: G.P. Putnam's Sons, 1982.

Despite the momentary problem with Fox, Tumbler-Snapper was a routine, almost pedestrian operation. The close working relationship between the AEC and DOE, begun by their predecessors during World War II, continued, but now with an emphasis on tactical, battlefield considerations. This relationship became the hallmark of continental testing. The table below summarizes Operation Tumbler-Snapper.

Tumbler-Snapper [10]

Codename	Date	Venue	HOB (ft.)	Purpose	Yield (kt)
Tumbler-Able	04/01/1952	Air Drop	793	Weapons Effects	1
Tumbler-Baker	04/15/1952	Air Drop	1109	Weapons Effects	1
Tumbler-Charlie	04/22/1952	Air Drop	3447	Weapons Related	31
Tumbler-Dog	05/01/1952	Air Drop	1044	Weapons Related	19
Snapper-Easy	05/07/1952	Tower	300	Weapons Related	12
Snapper-Fox	05/25/1952	Tower	300	Weapons Related	11
Snapper-George	06/01/1952	Tower	300	Weapons Related	15
Snapper-How	06/25/1952	Tower	300	Weapons Related	14

[10] Derived from DOE/NV-209, Rev 16, September 2015.