Before Above-Ground Testing Was Banned; 1953-1962

Test Name	Date	Location	LLNL's Role
Ruth (Upshot–Knothole)	31 Mar 1953	NTS (Area 7), tower detonation	First LLNL-designed device (U uranium hydride bomb); yield ~0.2 kt (fizzle)
Ray (Upshot–Knothole)	11 Apr 1953	NTS (Area 4), tower detonation	Second LLNL design (uranium deuteride bomb); yield ~0.2 kt (fizzle)
Koon (Operation Castle)	7 Apr 1954	Bikini Atoll, surface burst	LLNL's first thermonuclear device test; intended as a lightweight TN design. It underperformed (fizzle at ~110 kt)
Tesla (Operation Teapot)	1 Mar 1955	NTS (Area 9), tower detonation	First successful LLNL test; a "Cleo I" linear implosion device (compact fission primary). Yield ~7 kt
Turk (Teapot)	7 Mar 1955	NTS (Area 2), tower detonation	LLNL test of a thermonuclear primary ("Linda" device) for the XW-27 warhead. Yield ~43 kt
Post (Teapot)	9 Apr 1955	NTS (Area 9), tower detonation	LLNL's second linear implosion device ("Cleo II"). Yield ~2
Zuni (Operation Redwing)	28 May 1956	Bikini Atoll, barge (surface) shot	First ever 3-stage thermonuclear test; LLNL's "Bassoon" device (clean version). Yield 3.5 Mt. Led to the Mk-41 bomb.
Yuma (Redwing)	28 May 1956	Enewetak Atoll, tower detonation	LLNL "Swift" device – a tiny boosted fission device (5-inch diameter) for air defense. Fizzled at 0.19 kt
Kickapoo (Redwing)	14 Jun 1956	Enewetak Atoll, tower detonation	LLNL "Swallow" device – boosted 8-inch diameter air-defense warhead design. Yield ~1.5 kt
Inca (Redwing)	22 Jun 1956	Enewetak Atoll, tower detonation	LLNL test of "Swan," a boosted tactical warhead prototype. Yield 15 kt; later became the W45
Mohawk (Redwing)	3 Jul 1956	Enewetak Atoll, tower detonation	LLNL two-stage device using Swan primary and "Flute" secondary. Yield 360 kt
Apache (Redwing)	9 Jul 1956	Enewetak Atoll, barge shot	LLNL two-stage device ("Zither" secondary) – prototype for the W27 Regulus warhead. Yield 1.85 Mt
Tewa (Redwing)	21 Jul 1956	Bikini Atoll, barge shot	LLNL "Bassoon Prime" device (dirty version of Zuni's 3-stage). Yield 5 Mt (87% fission)
Lassen (Plumbbob)	5 Jun 1957	NTS (Area 9), balloon detonation	LLNL weapons-development test of small fission device. Yield ~0.0005 kt (fizzle)
Wilson (Plumbbob)	18 Jun 1957	NTS (Area 9), balloon detonation	LLNL test of XW-45 warhead primary ("Swan" device, gas-boosted). Yield ~10 kt
Hood (Plumbbob)	5 Jul 1957	NTS (Area 9), balloon detonation	LLNL-designed two-stage thermonuclear device (fastest-delivered "small" H-bomb). Largest ever continental U.S. test at 74 kt (~7 kt from fusion). Troop maneuvers were conducted under its cloud.

Diablo (Plumbbob)	15 Jul 1957	NTS (Area 2), tower detonation	LLNL developmental two-stage TN mockup (Swan primary). Yield 17 kt. A full-yield version fired later at Hardtack I.
Rainier (Plumbbob)	19 Sep 1957	NTS (Area 12), tunnel shot (UG)	First U.S. fully underground nuclear test; designed by LLNL to test containment. Device was a modified W25 warhead; yield 1.7 kt. Data from Rainier proved underground testing feasibility.
Whitney (Plumbbob)	23 Sep 1957	NTS (Area 2), tower detonation	LLNL test of boosted Swan primary in a TX-27 (Polaris) thermonuclear mockup. Yield 19 kt. Prototype for the UGM-27 Polaris warhead (W47).
Charleston (Plumbbob)	28 Sep 1957	NTS (Area 9), balloon detonation	LLNL test of a lightweight two-stage “clean” tactical TN device. Secondary failed to ignite (yield ~12 kt). Provided data for warhead miniaturization.
Fir (Hardtack I)	15 May 1958	Bikini Atoll, barge	LLNL “clean” two-stage thermonuclear test. Yield 1.36 Mt (only ~6.6% fission).
Nutmeg (Hardtack I)	21 May 1958	Bikini Atoll, barge	LLNL 2-stage device (possible early W47 prototype). Yield 25 kt.
Sycamore (Hardtack I)	31 May 1958	Bikini Atoll, barge	LLNL test of TX-41 “clean” bomb variant. Device fizzled at 92 kt (predicted 5 Mt).
Maple (Hardtack I)	10 Jun 1958	Bikini Atoll, barge	LLNL “dirty” two-stage TN test (89% fission predicted). Yield 213 kt.
Aspen (Hardtack I)	14 Jun 1958	Bikini Atoll, barge	LLNL 2-stage, 11-inch-diameter TN device (W47 prototype). Yield 319 kt. Fired in the Castle Bravo crater.
Redwood (Hardtack I)	27 Jun 1958	Bikini Atoll, barge	LLNL 2-stage TN (W47 prototype similar to Aspen). Yield 412 kt.
Hickory (Hardtack I)	30 Jun 1958	Bikini Atoll, barge	LLNL test of W47 primary only. Yield 14 kt. Data used for later underground primary tests.
Cedar (Hardtack I)	2 Jul 1958	Bikini Atoll, barge	LLNL “clean” two-stage TN device. Yield 220 kt. Used lead tampers to minimize fallout (only ~30 kt fission).
Dogwood (Hardtack I)	5 Jul 1958	Enewetak Atoll, barge	LLNL 2-stage TN, similar to Redwood/Aspen (used “Piccolo” second stage). Yield 397 kt.
Poplar (Hardtack I)	12 Jul 1958	Bikini Atoll, barge	LLNL TX-41 “clean” high-yield bomb test. Yield 9.3 Mt – fifth largest U.S. test ever, but only ~0.45 Mt fission. Demonstrated high-yield, low-fallout design.
Juniper (Hardtack I)	22 Jul 1958	Bikini Atoll, barge	LLNL’s “most radical” test – a novel lightweight TN concept (14-inch diameter). Yield 65 kt (predicted 0.2–60 kt). A complete success, it proved principles used in the Polaris W47nuclearweaponarchive.org.

Olive (Hardtack I)	22 Jul 1958	Enewetak Atoll, barge	LLNL feasibility test of a very high yield-per-weight 2-stage device (~100 kg total). Yield 202 kt – achieved ~2 kt/kg, a breakthrough in warhead miniaturization.
Pine (Hardtack I)	26 Jul 1958	Enewetak Atoll, barge	LLNL TX-41 three-stage “dirty” bomb variant. Yield 2.0 Mt (pred. 4–6 Mt). Used uranium tampers (high fission yield).
Quince (Hardtack I)	6 Aug 1958	NTS (Area 3), shaft (UG)	LLNL/DOD weapons development test of the XW-51 Davy Crockett warhead. Fizzle with negligible.
Fig (Hardtack I)	18 Aug 1958	NTS (Area 3), surface/shaft (UG)	LLNL/DOD re-test of XW-51 warhead; successful low-yield detonation (~0.02 kt). Enabled deployment of the W51 (very small tactical nuke).
Mercury (Hardtack II)	23 Sep 1958	NTS (Area 12), tunnel (UG)	LLNL one-point safety test of an early W47 primary. “Slight” yield (a few pounds TNT) – deemed a successful safety.
Mars (Hardtack II)	28 Sep 1958	NTS (Area 12), tunnel (UG)	LLNL one-point safety test for the XW-48 155mm nuclear artillery shell. Yield ~0.013 kt(slightly above target, but design adjustments followed).
Tamalpais (Hardtack II)	8 Oct 1958	NTS (Area 12), tunnel (UG)	LLNL full-yield test of the XW-48 artillery shell (8-inch “Tamalpais” device). Yield 0.072 kt, validating the W48 design.
Neptune (Hardtack II)	14 Oct 1958	NTS (Area 12), tunnel (UG)	LLNL one-point safety test of W47 primary. Yield 0.115 kt (115 tons); secondary stayed inert. Data used to refine Polarıs warhead safety.
Vesta (Hardtack II)	15 Oct 1958	NTS (Area 9), surface	LLNL one-point safety test of W47 primary. Yield ~0.024 kt; (exceeded expected “zero” yield) – design adjustments were made.
Hamilton (Hardtack II)	15 Oct 1958	NTS (Area 5), tower	LLNL weapons test of XW-51 Davy Crockett (16 kg “Quail” device). Fizzled at 0.0012 kt. Smallest nuke tested up to that time.
Logan (Hardtack II)	16 Oct 1958	NTS (Area 12), tunnel (UG)	LLNL test of an ABM warhead design (28 kg device). Yield ~5 kt (successful). Proof-of-concept for small high-yield interceptor warheads.
Oberon (Hardtack II)	22 Oct 1958	NTS (Area 8), tower	LLNL one-point safety test (W47 primary). Zero yield (successful “no nuclear yield” result). Demonstrated that design was one-point safe.
Wrangell (Hardtack II)	22 Oct 1958	NTS (Area 5), balloon	LLNL full-yield test of W47 primary. Fizzled at 0.115 kt (vs. ~5–10 kt expected). Led to a successful re-test (Sanford).
Rushmore (Hardtack	22 Oct	NTS (Area 9), balloon	LLNL low-yield test of W47 primary (“Canary”

II)	1958		device). Yield 0.188 kt (fizzled; expected ~1 kt). Provided data for design tuning (sim. to Mercury/Neptune).
Juno (Hardtack II)	24 Oct 1958	NTS (Area 9), surface	LLNL one-point limits test (to define safe failure modes) for the Logan device. Yield 0.0017 kt.
Ceres (Hardtack II)	26 Oct 1958	NTS (Area 8), tower	LLNL one-point safety test of the XW-48 artillery shell. Yield 0.0007 kt – essentially zero, confirming W48 was “one-point safe.”
Sanford (Hardtack II)	26 Oct 1958	NTS (Area 5), balloon	LLNL full-yield test of W47 primary (re-test after earlier fizzles). Yield 4.9 kt. Proved the Polaris primary’s performance.
Evans (Hardtack II)	29 Oct 1958	NTS (Area 12), tunnel (UG)	LLNL full-yield test of W47 primary in a TN mockup. Fizzled at 0.055 kt (expected 2–8 kt). Prompted alternate design approach (Blanca).
Humboldt (Hardtack II)	29 Oct 1958	NTS (Area 3), tower	LLNL test of improved Davy Crockett (XW-51) design. Yield 0.0078 kt – a small improvement over Hamilton/Quince.
Ganymede (Hardtack II)	30 Oct 1958	NTS (Area 7), surface	LLNL one-point safety test of a variant Swan (W45) primary. Zero yield (successful).
Blanca (Hardtack II)	30 Oct 1958	NTS (Area 12), tunnel (UG)	LLNL test of alternate W47 primary design in TN mockup. Yield 22 kt (successful) – validated the Polaris warhead ultimately deployed.
Titania (Hardtack II)	30 Oct 1958	NTS (Area 8), tower	LLNL one-point safety test of original W47 primary. Yield 0.0002 kt (essentially zero). Confirmed the design could be made one-point safe.
Frigate Bird (Dominic I)	6 May 1962	Central Pacific, airburst (SLBM launch)	LLNL-designed W47 warhead fired from a Polaris A1 missile launched by USS Ethan Allen. Detonated successfully at ~11 kt, proving the fully operational submarine-launched ballistic missile system.
Sedan (Operation Storax)	6 Jul 1962	NTS (Area 10), shaft -635 ft (UG)	LLNL Plowshare cratering experiment (excavation blast). Yield 104. Created a massive crater ~1,280 ft , demonstrating excavation for civil engineering (with significant fallout).

After Above-Ground Testing Was Banned;

Test Name	Date	Location	LLNL's Role
Antler (Nougat)	15 Sep 1961	NTS, U12e tunnel (UG)	LLNL weapons-dev test of a W45 primary. Yield 2.6 kt (slightly above expected).
Chena (Nougat)	10 Oct 1961	NTS, U12b tunnel (UG)	LLNL test of "Arrow" device (possible W44 prototype). Yield <20 kt (underpredicted).
Gnome (Operation Nougat)	10 Dec 1961	Salt bed near Carlsbad, New Mexico (UG)	LLNL Plowshare test in salt dome (first continental UG test outside NTS). Yield 3.1 kt. Created a large cavity; some radiation release occurred off-site.
Ringtail (Nougat)	17 Dec 1961	NTS, U3 tunnel (UG)	LLNL test of small tactical warhead (XW-54). Yield <20 kt. Aimed to optimize a "small, light system for a high-yield tactical weapon."
Feather (Nougat)	22 Dec 1961	NTS, U12b tunnel (UG)	LLNL weapons test (details classified). Low yield ~0.15 kt, but results were "quite striking".
Stillwater (Nougat)	8 Feb 1962	NTS, U9c tunnel (UG)	LLNL test related to boosted fission design (similar to earlier Mad test). Yield 3.07 kt.
Codsaw (Nougat)	19 Feb 1962	NTS, U12b tunnel (UG)	LLNL test (possible W45 primary, similar to Hoosic/Hudson). Yield <20 kt.
Cimarron (Nougat)	23 Feb 1962	NTS, U9h tunnel (UG)	LLNL test of an "advanced warhead design." Yield 11.9 kt (performed better than expected).
Danny Boy (Nougat)	5 Mar 1962	NTS, Area 18 basalt (UG)	DOD/LLNL joint test of an atomic demolition munition (ADM) for cratering in hard rock. Yield ~0.43 kt. Created a 265 ft x 84 ft crater in basalt.
Brazos (Nougat)	8 Mar 1962	NTS, U9b tunnel (UG)	LLNL successful system proof test (possibly XW-55 warhead primary). Yield 8.4 kt. Demonstrated an "advanced implosion system" for anti-submarine use.
Hoosic (Nougat)	28 Mar 1962	NTS, U9j tunnel (UG)	LLNL test to determine minimum boosted yield for a device tested in Mad/Stillwater. Yield 3.4 kt – likely W45 variant; provided data on boosting limits.
Passaic (Nougat)	6 Apr 1962	NTS, U9i tunnel (UG)	LLNL verification test (details not public). Yield <20 kt.
Hudson (Nougat)	12 Apr 1962	NTS, U9h tunnel (UG)	LLNL test of W45 primary (similar to Arikaree/Codsaw). Yield <20 kt. Helped

			finalize the W45 warhead design.
Platte (Nougat)	14 Apr 1962	NTS, U12k tunnel (UG)	LLNL yield reproducibility test for an LLNL design. Yield 1.85 kt (lower than expected – the device was later refired in Des Moines).
Dead (Nougat)	21 Apr 1962	NTS, U9k tunnel (UG)	LLNL weapons development test (code-named “Dead”). Yield <20 kt(exact purpose remains classified).
Black (Nougat)	27 Apr 1962	NTS, U9p tunnel (UG)	LLNL test of XW-55 primary in a thermonuclear mockup. Yield <20 kt. Supported development of the W55 anti-submarine warhead.
Arikaree (Nougat)	10 May 1962	NTS, shaft (UG)	LLNL test related to W45 warhead (similar to Hoosic/Hudson). Yield <20.
Eel (Nougat)	19 May 1962	NTS, U9m tunnel (UG)	LLNL test – “successful” warhead experiment. Yield 4.9 kt. Likely proof test for the W58 Polaris A-3 primary.
White (Nougat)	25 May 1962	NTS, U9b tunnel (UG)	LLNL test (probable XW-58 primary, similar to later Sacramento). Yield <20 kt. Data used for Polaris A-3 warheads.
Des Moines (Nougat)	13 Jun 1962	NTS, U12j tunnel (UG)	LLNL re-test of Platte device (with fixes). Yield 2.9 kt, confirming the design.
Marshmallow (Nougat)	28 Jun 1962	NTS, U16a tunnel (UG)	DOD/LLNL high-altitude simulation test in a vacuum chamber (x-ray effects on re-entry vehicles). Yield <20 kt (successful).
Sacramento (Nougat)	30 Jun 1962	NTS, U9v tunnel (UG)	LLNL test similar to White – probable W58 (Polaris A-3) primary. Yield <20 kt. Helped finalize W58 warhead (deployed in 1964).
Salmon (Operation Fishbowl)	22 Oct 1964	Tatum Dome, Mississippi (UG)	LLNL/DOD deep underground test (as part of Vela Uniform seismic detection program). Yield ~5.3 kt in salt dome. Aimed at hiding nuclear blasts – LLNL provided technical design input.
Swordfish (Dominic I)	11 May 1962	Pacific Ocean, underwater (depth ~600 ft)	[Likely Los Alamos-designed W44] – Anti-submarine rocket test. (LLNL’s role minimal; primary lab was LANL, so not listed.)
Schooner (Operation Bowline)	8 Dec 1968	NTS, Area 20, cratering shot (UG)	LLNL Plowshare test – nuclear cratering experiment. Yield 30 kt; blasted a large crater and triggered seismic event. Provided data on excavation for canal

			projects.
Buggy (Plowshare/Crosstie)	12 Mar 1968	NTS, Area 8, simultaneous 5-shot (UG)	LLNL Plowshare test – five 1.1 kt devices fired simultaneously to simulate linear excavation. Demonstrated the concept of nuclear digging of trenches (Part of Operation Crosstie).
Cabriolet (Operation Bowline)	26 Jan 1968	NTS, Area 20, shaft (UG)	LLNL cratering experiment in alluvium. Yield 2.3 kt. Evaluated excavation in soft dry soil (Plowshare program).
Flora (Operation Bowline)	2 Feb 1969	NTS, Area 8, shaft (UG)	LLNL weapons test (likely W68 Poseidon SLBM warhead primary). Yield ~20 kt (classified exact yield). Supported the new Poseidon MIRV warhead (deployed 1970).
Milrow (Operation Mandrel)	2 Oct 1969	Amchitka, Alaska (shaft UG)	Los Alamos test – a 1 Mt calibration shot (preceded LLNL's Cannikin). LLNL involvement mainly in data analysis for site readiness.
Cannikin (Amchitka test)	6 Nov 1971	Amchitka, Alaska (shaft UG)	W71 Spartan ABM warhead proof test – design by LLNL. Yield ~5 Mt (largest underground test in U.S. history). Device was an LLNL multi-megaton warhead for the Safeguard ABM; test validated its performance.
Rulison (Plowshare)	10 Sep 1969	Rifle, Colorado (gas well, UG)	Joint LASL/LLNL Plowshare gas stimulation test (40 kt in gas reservoir) – Los Alamos design, LLNL provided diagnostics. (Publicly attributed to LASL).
Rio Blanco (Plowshare)	17 May 1973	Rio Blanco, Colorado (3 × 33 kt, UG)	LLNL Plowshare test – three 33 kt devices fired in a column to fracture tight gas sands. Total yield ~99 kt. LLNL designed the devices and led the experiment (gas stimulation).
Falcon (Operation Toggle)	11 Jun 1975	NTS, Area 5, tunnel (UG)	LLNL weapons development test (perhaps W79 ER artillery warhead). Yield in the tens of kilotons (exact value classified). Supported enhanced-radiation (neutron) warhead development.
Halite/Centurion series	1970s–1980s	NTS, various shafts (UG)	Series of LLNL-led subcritical and physics tests supporting x-ray laser warhead concepts (Project Excalibur) and ICF-related warhead physics. (Specific shots classified, involved LLNL diagnostics).

Cyclamen (Operation Cresset)	1 May 1977	NTS, Area 1, tunnel (UG)	LLNL test (weapons effects) – simulated radiation output for anti-ballistic missile defense. LLNL provided device design. Yield ~? (low kt, exact secret).
Praetorian tests (1981)	1981 (multiple)	NTS (Areas 1–4, UG)	A series of LLNL warhead development tests in Operation Praetorian – related to B83 bomb and W87 Peacekeeper warhead development. Yields ranged up to hundreds of kilotons (e.g. Quicksilver series). LLNL was lead design lab for these systems.
Mighty Oak (Operation Glove)	10 Apr 1986	NTS, Area 12, tunnel (UG)	LLNL weapons effects test in a large cavity (Mighty Oak). Device yield ~1 kt (contained); massive experiment to study x-ray and debris effects on SDI components. LLNL led diagnostics; some venting occurred post-shot.
Cornucopia (Operation Fulcrum)	28 Nov 1986	NTS, Area 2, shaft (UG)	LLNL development test, part of SDI-related series. Yield in tens of kilotons (exact classified). Contributed to W87 warhead certification without full-yield testing (using scaled experiments).
Divider (Operation Julin)	23 Sep 1992	NTS, Area 7, shaft (UG)	Los Alamos test – last U.S. nuclear test. (LANL device; included here for completeness – LLNL not directly involved in design).
Hunters Trophy (Operation Julin)	18 Sep 1992	NTS, Area 12, tunnel (UG)	LLNL's final nuclear test – a LLNL-designed device fired in "N-Tunnel". Yield reported in the low tens of kilotons (exact classified). Purpose: weapons effects experiment on a Livermore warhead design. This test was the last full-scale nuclear detonation of a Livermore-designed warhead in the U.S. arsenal.