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## "Broken Arrows" - The World's Lost Nuclear Weapons

Since the early 1950s, the United States and Russia have had numerous accidents with their nuclear bombs, and a number have even gone missing.

(<https://interestingengineering.com/author/marcia-wendorf>) By Marcia Wendorf  
<https://interestingengineering.com/author/marcia-wendorf>



[depositphotos \(https://depositphotos.com/search/nuclear-weapon.html?qview=8417614\)](https://depositphotos.com/search/nuclear-weapon.html?qview=8417614)

"Broken Arrow" is the name given to nuclear weapon accidents, whether they be by accidental launching, firing, detonating, theft or loss of the weapon. The U.S. admits to having 32 broken arrows worldwide, with **six** nuclear weapons having been lost and never recovered.

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In the simplest terms, the way a nuclear weapon works (<https://www.ucsusa.org/nuclear-weapons/how-do-nuclear-weapons-work>) is that a chemical high explosive compresses nuclear material until a critical mass is reached and fission is achieved. During fission, the nuclei of certain heavy atoms split into smaller, lighter nuclei, and release excess energy in the process. In some elements, such as certain isotopes of uranium and plutonium, the fission process releases excess neutrons which trigger a chain reaction if they're absorbed by nearby atoms.

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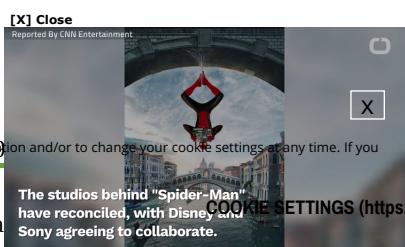
Thermonuclear weapons (hydrogen bombs) utilize a different process, that of *fusion*. When exposed to extremely high temperatures and pressures, some lightweight nuclei can fuse together to form heavier nuclei, releasing energy in the process. Those high temperatures and pressures are achieved by fission, so the trigger for a thermonuclear weapon is a nuclear weapon.

## The 1950s

The first broken arrow ([https://www-tc.pbs.org/wgbh/americanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbh/americanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)) occurred on **February 14, 1950**, when a U.S. Convair B-36 en route from Eielson Air Force Base near Fairbanks, Alaska to Carswell AFB in Fort Worth, Texas, crashed in northern British Columbia after jettisoning a Mark 4 nuclear bomb into the Pacific Ocean. The bomb was never found, and it contained a substantial amount of natural uranium plus 5,000 pounds (2,300 kg) of high explosives. According to the U.S. Air Force, the bomb didn't contain the plutonium core necessary for a nuclear detonation. This was the first loss of a nuclear weapon in history.

Sponsored Video

On **April 11, 1950**, a B-29 bomber carrying a nuclear weapon ([https://www-tc.pbs.org/wgbh/americanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbh/americanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)), four spare detonators, and a crew of 13 crashed into a mountain near Albuquerque, New Mexico. The nuclear capsule was damaged but it was recovered. All thirteen crew members onboard the a



On **August 5, 1950**, at Fairfield-Suisun AFB, California, a B-29 bomber carrying a Mark 4 nuclear bomb ([https://www-tc.pbs.org/wgbhamericanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbhamericanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)) experienced problems with two of its propellers and crashed while attempting an emergency landing. In the ensuing fire, the bomb's high explosives detonated and killed 19 crew members and rescue personnel.

On **November 10, 1950**, near Riviere-du-Loup, Quebec, Canada, which is about 300 miles northeast of Montreal, a U.S. B-50 aircraft jettisoned a Mark 4 nuclear bomb ([https://www-tc.pbs.org/wgbhamericanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbhamericanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)) over the St. Lawrence River. The weapon's high explosive detonated on impact, but the core was lacking a necessary component and did not detonate. The explosion did scatter almost 100 pounds (45 kg) of uranium. The airplane went on to land safely.

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On **March 10, 1956**, a B-47 aircraft, carrying three crewmen and two nuclear cores from MacDill Air Force Base near Tampa, Florida, was en-route to Ben Guerir Air Base, Morocco, and had completed its first aerial refueling without incident. It failed to make contact with the tanker for a second refueling somewhere over the Mediterranean Sea, and it was reported missing ([https://www-tc.pbs.org/wgbhamericanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbhamericanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)). The kind of weapons the plane was carrying remains undisclosed, but the type of nuclear bombs commonly carried by B-47s was the Mark 15, which would have had a combined yield of 3.4 megatons (<https://en.wikipedia.org/wiki/Megaton>). No trace of the plane or the two nuclear cores has ever been found.

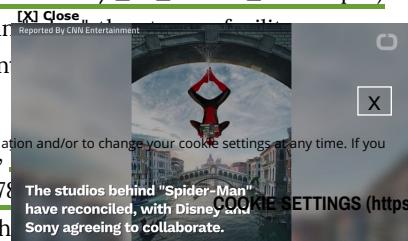
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U.S. B-47 aircraft

On **July 27, 1956**, a U.S. B-47 bomber was on a training exercise when it crashed into a nuclear weapons storage facility ([https://www-tc.pbs.org/wgbhamericanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbhamericanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)) at the Lakenheath Air Base in Suffolk, England. The entire crew of the aircraft was killed. Known as an "accident," the aircraft contained three Mark 6 nuclear bombs, one of whose detonators had been sheared off in the accident. The fact that the bomb was a miracle that the bomb hadn't exploded.

On **May 22, 1957**, the plane was transporting a nuclear bomb to Kirtland Air Force Base when suddenly, the aircraft's doors ([https://www-tc.pbs.org/wgbhamericanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbhamericanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)) and crashed into a field near Albuquerque, New Mexico. The



creating a crater 12 feet deep and 25 feet wide, however, the nuclear capsule was found intact. The only casualty was a cow who had been grazing close to the crash site.

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On **July 28, 1957**, a U.S. Air Force C-124 aircraft from Dover Air Force Base, Delaware was carrying three nuclear bombs over the Atlantic Ocean. The plane experienced a loss of power, and the crew jettisoned two nuclear bombs ([https://www-tc.pbs.org/wgbh/americanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbh/americanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)) into the ocean, and they have never been recovered.

On **October 11, 1957**, a plane carrying a nuclear bomb crashed ([https://www-tc.pbs.org/wgbh/americanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbh/americanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)) on takeoff at Homestead Air Force Base, Florida. The plane burned for four hours, and the high explosives detonated, however, the nuclear capsule and its carrying case were found intact and only slightly damaged.

On **February 5, 1958**, near Savannah, Georgia, during a practice exercise, an F-86 fighter plane collided with a B-47 bomber ([https://www-tc.pbs.org/wgbh/americanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbh/americanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)) that was carrying a 7,600-pound (3,400 kg) Mark 15 nuclear bomb. The F-86 crashed after the pilot ejected from the plane. The crew of the B-47 requested permission to jettison the bomb in order to reduce weight and prevent the bomb from exploding during an emergency landing. The bomb was jettisoned at 7,200 feet (2,200 m) over the Wassaw Sound off the shores of Tybee Island. Subsequent searches failed to locate the weapon.

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It is not known if the bomb had its plutonium trigger, but if it did, the blast effects of a detonation would have been a fireball having a radius of 1.2 miles (2 km) and thermal radiation causing third-degree burns for 12 miles.



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MK-15 nuclear weapon

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The studios behind "Spider-Man" have reconciled, with Disney and Sony agreeing to collaborate.

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On March 11, 1958, a U.S. Air Force Boeing B-47E-LM Stratojet took off from Savannah, Georgia, and was scheduled to fly to the U.K. The aircraft was carrying nuclear weapons in case a war with the Soviet Union broke out. Captain Earl Koehler noticed a fault light in the cockpit, indicating that the bomb harness locking pin had not engaged. He sent Captain Bruce Kulka to the bomb bay area to fix the problem.

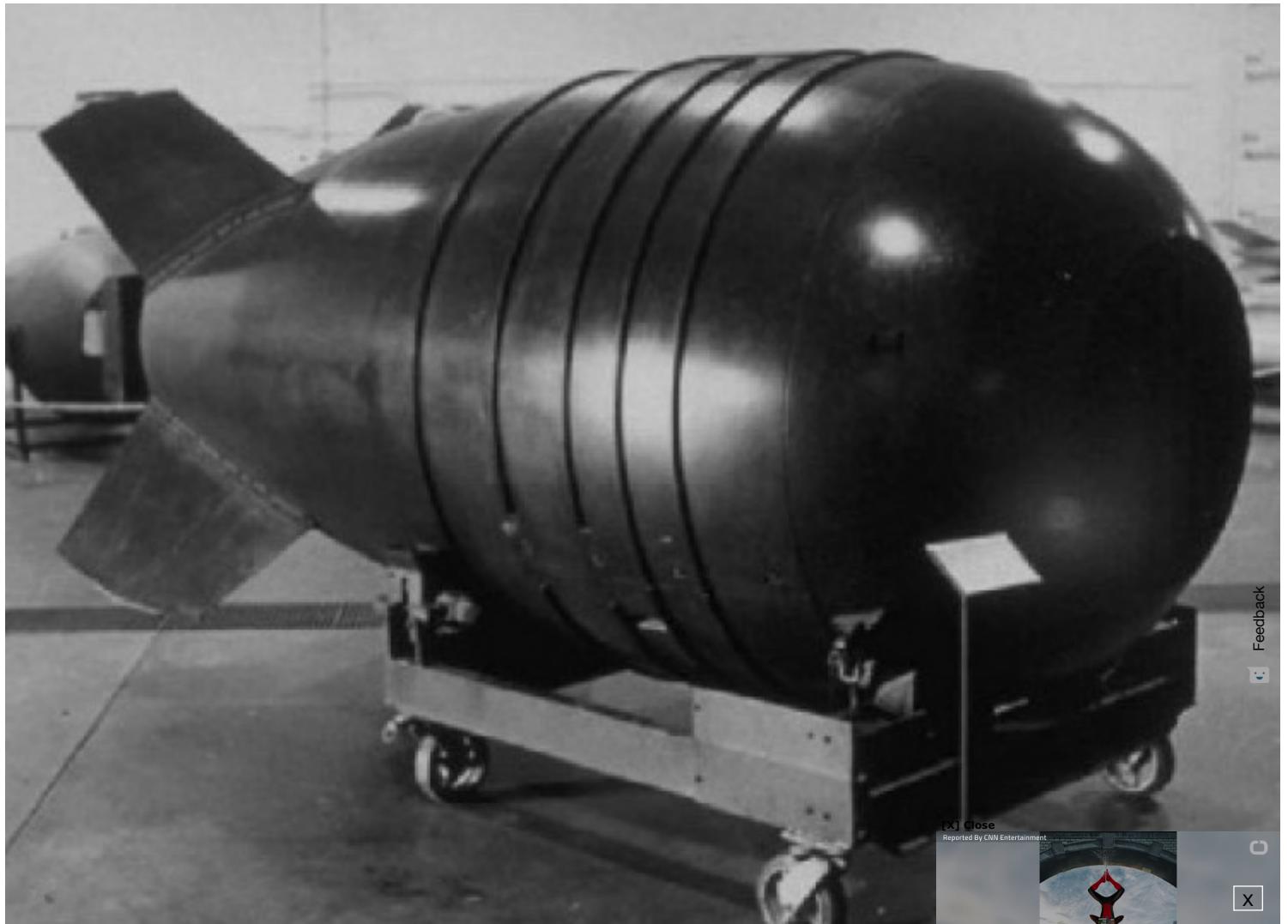
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As Kulka reached around the bomb to pull himself up, he mistakenly grabbed the emergency release pin, and the Mark 6 bomb dropped onto the bomb bay doors. The bomb's weight forced the doors open, and the bomb dropped 15,000 ft (4,600 m) to the ground ([https://www-tc.pbs.org/wgbh/americanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbh/americanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)). Two sisters, six-year-old Helen and nine-year-old Frances Gregg, along with their nine-year-old cousin Ella Davies, were playing 200 yards (180 m) from a playhouse their father had built for them.

The bomb struck the playhouse, its high explosives detonated and it created a crater 70 feet (21 m) wide and 35 feet (11 m) deep. Fortunately, the fissile nuclear core had been stored elsewhere on the plane. All three children were hurt, as were their father, mother and brother. The family sued the Air Force and received US \$54,000. Today, the crater is still visible although overgrown by vegetation.

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**Sometime in 1958**, a B-47 aircraft carrying a nuclear weapon inadvertently released the bomb over Mars Bluff, South Carolina. Luckily, the bomb lacked the fissile nuclear core, but the conventional explosives detonated (<https://www.roadsideamerica.com/story/24951>), injuring six people and damaging buildings.



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MK-6 nuclear weapon

The studios behind "Spider-Man" have reconciled, with Disney and Sony agreeing to collaborate. [COOKIE SETTINGS](#) (<https://interestingengineering.com/spider-man-disney-and-sony-agreeing-collaborate>)

At a U.S. air base at Greenham Common, England on **February 28, 1958**, a B-47 carrying a nuclear weapon caught fire and completely burned. While the weapon didn't explode, in 1960, a group of scientists found high levels of radioactive contamination at the base. The U.S. government has disclosed no further information about the incident.

On **November 4, 1958**, at Dyess Air Force Base in Texas, a plane carrying a nuclear weapon burst into flames during takeoff ([https://www-tc.pbs.org/wgbhamericanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbhamericanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)). The weapon's high explosives detonated, killing a crewman, but the nuclear core remained intact. Only half a mile from the crash site was Butterfield Elementary School.

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On **November 26, 1958**, at Chennault Air Force Base, Louisiana, a B-47 carrying one nuclear weapon caught fire while on the ground. This fire damaged the nuclear capsule and its protective case, and there was nuclear contamination of the area ([https://www-tc.pbs.org/wgbhamericanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbhamericanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)).

In Hardinsburg, Kentucky, on **October 15, 1959**, a B-52 carrying two nuclear weapons and a KC-135 refueling plane collided midair. Both planes and both bombs fell to the ground ([https://www-tc.pbs.org/wgbhamericanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbhamericanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)). The crash killed four crew members, and the two nuclear weapons were only slightly damaged. No radiation leakage was detected.

## The 1960s

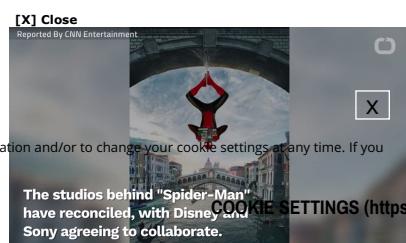
On **January 24, 1961**, a B-52 carrying two three- or four-megaton nuclear bombs was over Goldsboro, North Carolina when it suffered the structural failure of its right wing. The aircraft broke apart and the two nuclear weapons were released ([https://www-tc.pbs.org/wgbhamericanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbhamericanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)). On one bomb, three of its four arming mechanisms had activated.

In 2013, a Freedom of Information Act request confirmed that only a single switch out of four had prevented the bomb's detonation. One of the recovery team recalled (<https://historycollection.co/1961-two-nuclear-bombs-250-times-power-hiroshima-nuclear-bomb-dropped-north-carolina/2/>), "Until my death, I will never forget hearing my sergeant say, 'Lieutenant, we found the arm/safe switch.' And I said, 'Great!' He said, 'Not great. It's on arm.'"

The second bomb plunged into a muddy field, and its tail was discovered 20 feet below ground. A decision was made to leave the uranium and plutonium in place, and The United States Army Corps of Engineers purchased a 400-foot (120 m) circular easement over the buried components. Had either of the bombs gone off, everyone within an 8.5 mile (13.7km) radius would have been killed.

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MK-39 nuclear weapon

### Nuclear 911 - the Goldsboro Nuclear Weapon Accident

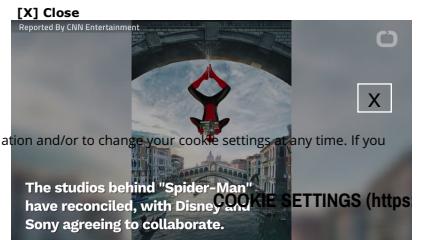


On **March 14, 1961** a B-52F-70-BW Stratofortress bomber carrying four nuclear weapons experienced a problem with its cabin temperature. After temperatures climbed to between 125 degrees F and 160 degrees, the crew descended to 12,000 feet and depressurized the plane. After all four engines flamed out, the pilot put the plane into a dive and all crew members bailed out.

The plane crashed into a barley field near Yuba City, California, and the nuclear weapons were released ([https://www-tc.pbs.org/wgbh/americanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbh/americanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)). The weapons' multiple safety measures protected against a nuclear explosion or release of radioactive material. A fireman was killed and several others were injured while rushing to the accident scene.

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B-52 Stratofortress

On **July 4, 1961**, a K-19 "Hotel"-class Soviet nuclear-powered ballistic missile submarine was off the coast of Norway. The cooling system of one of its two nuclear reactors failed, and the temperature of the nuclear core climbed to 800 degrees Celsius, threatening to melt down its fuel rods ([https://en.wikipedia.org/wiki/Soviet\\_submarine\\_K-19](https://en.wikipedia.org/wiki/Soviet_submarine_K-19)). The crew and the submarine itself were contaminated by radiation and several fatalities were reported.

On **October 25, 1962**, at the Duluth Sector Direction Center near Duluth, Minnesota, an intruder was shot while scaling a fence around the facility. This triggered a "sabotage alarm", which triggered a warning at Volk Field in Wisconsin. This alarm triggered nuclear armed F-106A interceptor aircraft to be sent to the source of the original alarm - Duluth.

Because of the Cuban Missile Crisis, the U.S. was at DEFCON 3 (<https://en.wikipedia.org/wiki/DEFCON>), and there were no practice drills, everything was the real deal. When Duluth communicated that nothing was seriously wrong, the planes were only stopped (<https://www.deseretnews.com/top/2605/2/October-25-1962-Duluth-Minnesota-13-times-the-US-almost-destroyed-itself-with-its-own-nuclear.html>) by a car that raced down the runway after them. The intruder turned out to have been a black bear.

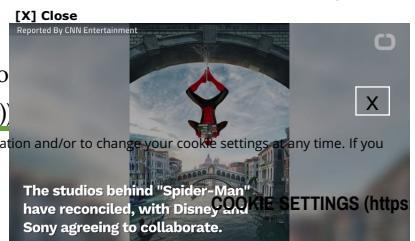
On **January 13, 1964**, a U.S. B-52 carrying two nuclear bombs suffered severe turbulence, and its vertical stabilizer broke off. The crew bailed out and the plane crashed near Savage Mountain outside Barton, Maryland. The bombs were found "relatively intact in the middle of the wreckage" ([https://www-tc.pbs.org/wgbh/americanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbh/americanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)). Three crewmen were killed as a result of the accident.

On **December 8, 1964**, at Bunker Hill Air Force Base, Indiana, several Strategic Air Command (SAC) aircraft were taxiing down a runway. The jet blast from one aircraft caused the plane behind it to slide off the runway and catch fire. The five nuclear weapons onboard the plane burned ([https://www-tc.pbs.org/wgbh/americanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbh/americanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)), but radioactive contamination was limited to the immediate area of the crash and was subsequently removed.

On **December 5, 1965**, an A-4E Skyhawk attack aircraft carrying a 1-megaton thermonuclear weapon, rolled off the deck of the U.S.S. Ticonderoga ([https://www-tc.pbs.org/wgbh/americanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbh/americanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)) and fell into the Pacific Ocean. The plane, its pilot, Douglas Webster, and the weapon sank in 16,000 feet of water and were never found. It wasn't until 15 years later that the U.S. Navy finally admitted that the accident had taken place only 80 miles from Japan's Ryuku island chain, and this caused an uproar in Japan, which prohibits nuclear weapons from being brought into its territory.

**Sometime during the mid-1960s**, in the Kara Sea, the Soviet nuclear-powered icebreaker Lenin encountered reactors, possibly experiencing a meltdown ([https://en.wikipedia.org/wiki/Lenin\\_\(1957\\_icebreaker\)](https://en.wikipedia.org/wiki/Lenin_(1957_icebreaker)))

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The most well-known broken arrow occurred on **January 17, 1966** near Palomares, Spain. A U.S. B-52 aircraft, carrying four nuclear weapons, collided with its refueling tanker, a KC-135, at 31,000 feet (9,450 m) and crashed over the Mediterranean Sea. Of the four Mk28-type hydrogen bombs, three were found on land near the fishing village of Palomares. The high explosives in two of the bombs had detonated and released plutonium contamination across a 0.77-square-mile (2 km<sup>2</sup>) area. ([https://www-tc.pbs.org/wgbh/americanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbh/americanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)) The fourth bomb, was recovered intact after a 2 ½ month-long search. During the U.S. cleanup effort, over 1,400 tons of soil were sent to a nuclear storage site.



B28RI nuclear bomb ([https://en.wikipedia.org/wiki/B28\\_nuclear\\_bomb](https://en.wikipedia.org/wiki/B28_nuclear_bomb))

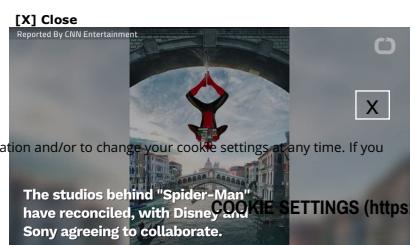
On **January 21, 1968**, a fire erupted onboard a B-52 bomber operating out of Thule Air Base in the Danish territory of Greenland. The plane was carrying four B28FI thermonuclear bombs, and it crashed onto the sea ice in North Star Bay. The conventional explosives detonated and the nuclear capsules ruptured ([https://www-tc.pbs.org/wgbh/americanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbh/americanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)) and dispersed their contents, resulting in radioactive contamination.

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## Nuclear Meltdown and How

### It Can be Prevented

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The U.S. and Denmark launched a clean-up operation, but the secondary stage of one of the nuclear weapons was never found. Workers involved in the clean-up operation have been experiencing radiation-related illnesses, and they have sought compensation.

On **April 11, 1968**, a Soviet diesel-powered "Golf"-class ballistic missile submarine sank 750 miles northwest of the Hawaiian island of Oahu. U.S. intelligence determined that the submarine had been carrying three nuclear-armed ballistic missiles and several nuclear-tipped torpedoes. The U.S. Central Intelligence Agency (CIA), partnered with industrialist [Howard Hughes](#) (<https://www.biography.com/people/howard-hughes-9346282>) to build a specially-designed deep-water salvage ship, the "[Glomar Explorer](#)" ([https://en.wikipedia.org/wiki/Project\\_Azorian](https://en.wikipedia.org/wiki/Project_Azorian)) to recover the lost sub. They were only partly successful when the Glomar raised approximately half of the submarine.

Also during the Spring of 1968, the U.S.S. Scorpion, a nuclear attack submarine, mysteriously sank (<https://www.military.com/daily-news/2018/05/28/navy-submarine-uss-scorpion-mysteriously-disappeared-50-years-ago.html>) about 400 miles southwest of the Azores islands. Besides the tragic loss of all 99 crew members, the Scorpion was carrying two nuclear-tipped weapons with yields of up to 250 kilotons.

## The 1970s

On **April 12, 1970**, in the Atlantic Ocean about 300 miles northwest of Spain, a Soviet "November"-class nuclear-powered attack submarine experienced a problem with its nuclear propulsion system (<https://uk.reuters.com/article/uk-argentina-submarine-factbox/factbox-major-submarine-disasters-idUKKBN1DM2F1>). A merchant ship attached a tow line and attempted to pull the submarine to safety, but the submarine sank, killing all 52 crew members on board.

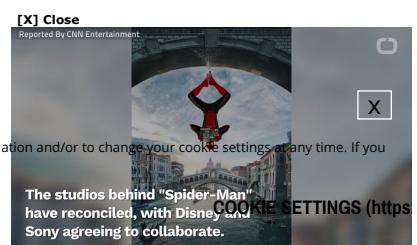
Off the coast of Sicily, Italy on **November 22, 1975**, twelve years to the day of his assassination, the U.S. aircraft carrier John F. Kennedy collided with the cruiser USS Belknap during an exercise. The collision occurred at night and during high seas. One, or possibly both ships, contained nuclear weapons (<https://www.warhistoryonline.com/instant-articles/uss-belknap-collided-aircraft-carrier.html>), but no nuclear contamination was detected by rescue personnel.

## The 1980s

On **September 19, 1980**, near Damascus, Arkansas, crewman were performing maintenance on a Titan II Inter-continental Ballistic Missile (ICBM). A crewman accidentally dropped a wrench into the silo, and it punctured the missile's fuel tank. The missile leaked fuel for over eight hours before finally exploding, killing one and injuring 21 others. The blast destroyed the entire compound, but the nuclear warhead was recovered intact ([https://www-tc.pbs.org/wgbh/americanexperience/media/filer\\_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/\\_cc\\_broken\\_arrows.pdf](https://www-tc.pbs.org/wgbh/americanexperience/media/filer_public/67/d8/67d8e5ce-78fe-4b95-922a-bb669d0947d7/_cc_broken_arrows.pdf)).

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Titan II ICBM launch silo

On **October 3, 1986**, 480 miles east of Bermuda, a Soviet "Yankee I"-class nuclear-powered ballistic missile exploded during a test launch, causing an explosion and fire in one of its missile tubes. An attempt was made to tow the submarine, but it sank.

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About 300 miles north of the Norwegian coast on **April 7, 1989**, a Soviet nuclear-powered attack submarine, the "Komsomolets", caught fire and sank. The vessel's two nuclear reactors and two nuclear-armed torpedoes (<https://en.wikipedia.org/wiki/Komsomolets>) were lost, along with 42 of the 69 crew members.

On **August 10, 1985**, at the Chazhma Bay repair facility, about 35 miles from the city of Vladivostok, Russia, an "Echo"-class Soviet nuclear-powered submarine suffered a reactor explosion ([https://vladivostok.com/archive/17/08/one\\_more\\_submarine\\_story.asp](https://vladivostok.com/archive/17/08/one_more_submarine_story.asp)) that released a cloud of radioactivity. Fortunately, the cloud never reached Vladivostok, but ten Soviet officers were killed by the explosion.

## The 1990s

Also in the White Sea, on **September 27, 1991**, a "Typhoon"-class nuclear-powered ballistic missile submarine suffered a missile launch malfunction ([http://www.pravdareport.com/history/119172-soviet\\_nuclear\\_fleet/](http://www.pravdareport.com/history/119172-soviet_nuclear_fleet/)) during a test. No other information is available about this incident.

In the Barents Sea on **February 11, 1992** a collision occurred ([https://en.wikipedia.org/wiki/Submarine\\_incident\\_off\\_Kildin\\_Island](https://en.wikipedia.org/wiki/Submarine_incident_off_Kildin_Island)) between a CIS (Commonwealth of Independent States) "Sierra"-class nuclear-powered attack submarine and the U.S. nuclear-powered attack submarine "Baton Rouge". The Commonwealth of Independent States is comprised of Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. The vessels reportedly suffered only minor damage, but a dispute arose over whether the incident had happened inside or outside of Russian territorial waters.

On **March 20, 1993**, in the Barents Sea, the U.S. nuclear-powered submarine Grayling collided with a Russian Delta III nuclear-powered ballistic missile submarine ([https://en.wikipedia.org/wiki/Submarine\\_incident\\_off\\_Kola\\_Peninsula](https://en.wikipedia.org/wiki/Submarine_incident_off_Kola_Peninsula)). Both vessels reportedly only suffered minor damage.

## The 2000s

On **August 12, 2000**, also in the Barents Sea, a CIS "Oscar II" class submarine, the "Kursk", suffered a torpedo failure and explosion ([https://en.wikipedia.org/wiki/Kursk\\_submarine\\_disaster](https://en.wikipedia.org/wiki/Kursk_submarine_disaster)). The ship sank with all 118 men onboard. No evidence of radiation contamination was detected.

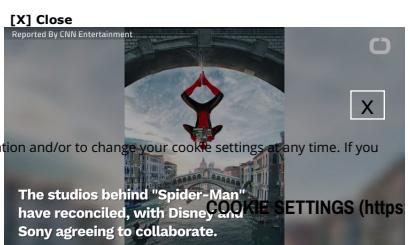
On **August 29, 2007**, at Minot Air Force Base in North Dakota, six AGM-129 ACM cruise missiles, each loaded with a W80-1 variable yield nuclear warhead, were mistakenly loaded onto a B-52H bomber (<https://www.reuters.com/article/us-usa-military-nuclear/air-force-fires-commanders-over-nuclear-mix-up-idUSN1930047820071019>), and transported to Barksdale Air Force Base in Louisiana. The nuclear warheads were supposed to have been removed before transport, but they weren't..

Once at Barksdale, the missiles with the nuclear warheads remained mounted to the aircraft for 36 hours and were not protected by the various mandatory security precautions for nuclear weapons. The missiles were never reported as missing, by Minot.

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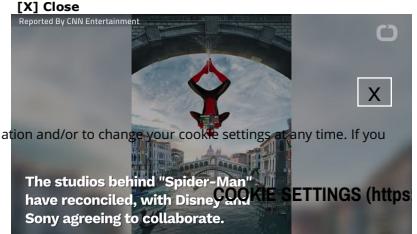
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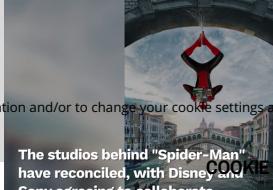
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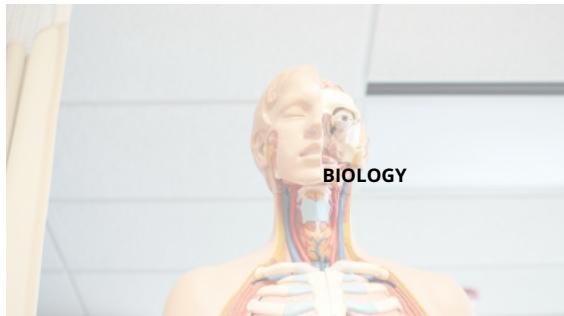
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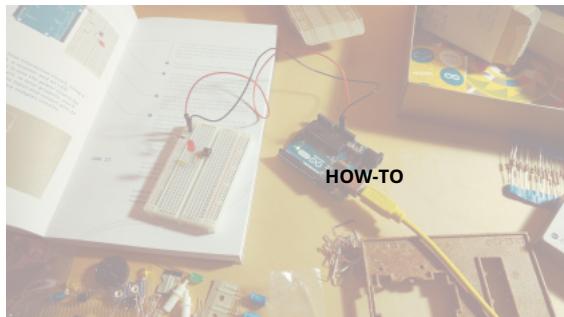
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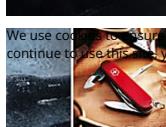
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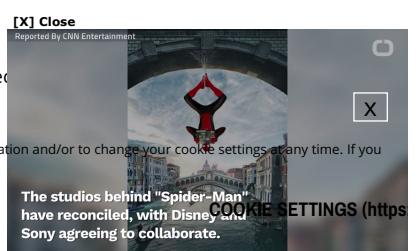
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