Operation Grapple

First successful British H-bomb test - Operation Grapple X Round C1, which took place over Kiritimati (Christmas Island).

With the experience and knowledge gained from the first Grapple tests, the weaponeers had developed a new H-bomb design with a 50 percent more powerful fission primary stage and a simplified thermonuclear secondary. Grapple X was dropped and detonated over the southern end of Christmas Island on November 8, 1957. The two-stage thermonuclear bomb exploded with a yield of about 1.8 megatons. This was close to being the real hydrogen bomb Britain wanted, but used a relatively large quantity of (expensive) highly enriched uranium.

The explosion did some damage to the island, resulting in some demolished and damaged military buildings. This damage was due to the higher-than-expected yield of the explosion.

Grapple X was spectacularly successful, exceeding its predicted yield of one megaton by about 80 percent. The U.K. had become an actual thermonuclear power with the detonation of Grapple X.

Grapple Y

Grapple Y sought to develop a more efficient thermonuclear bomb based on the successful Grapple X design. Like Grapple X, only one detonation was conducted during Grapple Y. The bomb was detonated off Christmas Island on April 28, 1958. This bomb had an explosive yield of about 3.0 megatons, and it was the largest British nuclear weapons test ever executed anywhere.

Grapple Z

With a nuclear testing moratorium quickly approaching, Operation Grapple Z was carried out at Christmas Island durimg mid-1958. This was a four-bomb test series, and the largest of the four in the Grapple series. Grapple Z sought to develop lighter nuclear warheads as well as weapons that were *radiologically hardened* - meaning they would not detonate prematurely if they were exposed to nuclear radiation from other nuclear

explosions. Two of the Grapple Z tests were fission bombs tested for development of the primary stage of a two-stage hydrogen bomb.

The first shot, with the code name of *Pendant*, was detonated on August 22, 1958. Rather than being dropped from a bomber, this bomb was suspended from a string of four vertically stacked barrage balloons. The Pendant test had a yield of about 24 kilotons, and it used solid hydrogen fusion boosting using lithium deuteride. The next shot, called **Flagpole**, was dropped by a bomber flying over Christmas Island on September 2, 1958. This bomb was a smaller version of the one exploded in Grapple Y, and it detonated with a yield of about 1.2 megatons. This test was followed by one called **Halliard 1**, on September 11, 1958, which was an unusual three-stage bomb with two nuclear-fission components followed by one thermonuclear stage. This bomb had its predicted yield of 800 kilotons, and it was supposedly immune to exposure from another bomb despite its not using boosting. The final test was called **Burgee**, on September 23, 1958, which another balloon-borne test which was an atomic bomb boosted with gaseous tritium. It had a yield of about 25 kilotons.

The last bomb in the Grapple Z series was the very last nuclear explosion carried out in the atmosphere by the U.K. The result of it was that the weaponeeers of the U.K. had demonstrated all of the technologies that were needed to produce a one-megaton hydrogen bomb that weighed no more than one ton (2,200 pounds), and it was also immune to premature detonation caused by nearby nuclear explosions.