HOW DID A COLD WAR NUCLEAR BOMB GO MISSING?

Cause Map

1 Problem

What	Problem(s)	Planes collided, nuclear bomb jettisoned over ocean, never retrieved
When	Date	February 5, 1958
	Time	2:00 AM
	Different, unusual, unique	Practice exercises
Where	Facility, site	Over Atlantic Ocean near Tybee Island (near Savannah, GA)
	Unit, area, equipment	B-47 Bomber
	Task being performed	Training mission

Impact to the Goals

Safety	Danger to pilots
	Danger to residents
Customer Service	Residents nervous
Property/ Equipment	Planes damaged
	Bomb missing

A Cause-and-Effect Analysis of the "Tybee Bomb"

Around 2 am on February 5, 1958, a training exercise was conducted off the coast of Georgia. Major Howard Richardson was flying a B-47 bomber carrying a Mark 15, Mod 0 Hydrogen bomb containing 400 pounds of conventional explosives and some quantity of uranium.

The realistic training mission also included F-86 'enemy' fighter jets. One of those jets, piloted by Lt. Clarence Stewart, did not see the bomber on his radar and accidentally maneuvered directly into the B-47. The damage to both planes was extensive Richardson had a very difficult quest ahead of him: to get himself and his co-pilot safely on the ground without detonating his payload in a heavily damaged aircraft. Richardson dropped the bomb over the water, observed that no detonation took place, and carefully landed the damaged bomber.

The Navy searched for the bomb for over two months, but bad weather and poor visibility did not make the search easy. On April 16, 1958, the search was ended without finding the bomb. The hypothesis was that the bomb was buried beneath 10 - 15 feet of silt and mud. Since then, other searches by interested locals and the government have still not identified the location of the bomb. In 2001, the Air Force released an assessment which suggests two interesting points. First, the bomb was never loaded with a 'detonation capsule', making the bomb incapable of a nuclear explosion. (Until this time, conventional wisdom suggested that the detonation capsule was included with the bomb.) Second, the report concluded that it would be more dangerous to try to move the bomb than to leave the bomb in its resting place.

In the simplest Cause Map, the safety goal was impacted as a result of the danger to the pilots and to the nearby communities as the result of a potential nuclear bomb explosion. This risk was caused by the bomb being jettisoned from the plane, which was a result of the collision between the fighter jet and the bomber. The planes collided due to the fact that they were performing a training mission to simulate a combat scenario.

More details are uncovered as this event is further broken down to include more information and to document the impact to other goals. The property goal is impacted through the loss of aircraft and the bomb. The bomb is missing because it was jettisoned from the bomber AND because it was never found during the search. The bomb was jettisoned because the pilot was worried that the bomb might break loose during landing. This was due to the fact that the planes collided. The planes collided due to the fact that the F-86 descended onto the top of the B-47 AND because they were in the midst of a training exercise. The fighter jet crashed into the bomber because the bomber was not on radar. The planes were performing an exercise because they were simulating bombing a Russian target, because it was the middle of the Cold War. The search was unsuccessful because the bomb is probably buried deep in the mud AND because the weather and visibility were bad during the search.

Finally, the 'customer service' goal is impacted by the fact that the residents in nearby communities are nervous about the potential danger of explosion/radiation exposure. This nervousness is caused by the fact that the bomb is still missing AND the fact that the bomb contained radioactive material, which was due to routine protocol at the time.

2 Analysis

Basic Level Cause Map - Start with simple Why questions.

More Detailed Cause Map - Add detail as information becomes available.

Cause Mapping is a Root Cause Analysis method that captures basic cause-and-effect relationships supported with evidence.

"A clever person solves a problem. A wise person avoids it." - Albert Einstein

Why?

Effect ← Cause

NOTE: Read the Cause Map from left to right with the phrase "Was Caused By" in place of each arrow.

Evidence: Atomic Energy Commission Bomb custody receipt signed by pilot Richardson stamped as 'simulated' meaning no detonation capsule was present.

Evidence: F-86 left wing ripped off; B-47 fuel tanks heavily damaged.

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