

EG:340-L1  
main title  
this section on railing  
by aircraft starboard  
side

### **THE B-29 SUPERFORTRESS ENOLA GAY**

On August 6, 1945, the Enola Gay dropped an atomic bomb on Hiroshima, Japan, and changed the face of warfare. The night before the mission, pilot Col. Paul Tibbets named the aircraft after his mother.

Manufactured under license by Martin Aircraft in Omaha, Nebraska, the Enola Gay was delivered to the 393rd Bombardment Squadron, 509th Composite Group, on June 14, 1945. Like the other 509th aircraft, it was specially modified for atomic missions. It was armed only with tail guns and incorporated the latest technology: the newest version of the huge R-3350 engines, Curtiss Electric reversible propellers, and pneumatic bomb-bay doors.

The Enola Gay arrived at Tinian on July 2, 1945, and flew its first combat mission with conventional bombs four days later. After returning to the United States in November 1945, the aircraft was modified for the Bikini atomic tests of 1946. It flew back to the Pacific in April 1946, but was not used in those tests.

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EG:340-L1a-S1a

A 1:48 scale model of the Enola Gay as it appeared on August 6, 1945.

Model built and donated by Peter Espada

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EG:340-L2  
specifications block

**BOEING B-29-45-MO SUPERFORTRESS ENOLA GAY**

Wingspan: 43 m (141 ft 3 in)  
Length: 30.2 m (99 ft)  
Height: 9 m (29 ft 7 in)  
Weight, empty: 31,400 kg (69,000 lb)  
Weight, gross: 62,500 kg (137,500 lb)  
Top speed: 586 km/h (364 mph) at 7,600 m  
(25,000 ft)  
Armament: Two 12.7 mm (0.50 cal) machine  
guns in tail  
Engines: Four Wright Cyclone R-3350-57,  
18-cylinder radial engines,  
2,200 hp each  
Manufacturer: Glenn L. Martin Co., Omaha,  
Nebr. (under license from  
Boeing Aircraft Co., Seattle,  
Wash.), 1944-45

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EG:340-L3

**THE MARKINGS ON THE ENOLA GAY**

The crew names stenciled on both sides of the nose were added after the Hiroshima raid and do not include all 12 who were on the August 6 mission. Omitted were crew members who were from the Manhattan Project or were closely related to the bomb: Navy Capt. William S. Parsons, "Little Boy" project leader and bomb commander; Army Air Forces Lt. Morris R. Jeppson, Parson's assistant in arming the atomic bomb; and Army Air Forces Lt. Jacob W. Beser, the radar countermeasures officer. Not all ground crew who worked on the Enola Gay were included in the stencils either.

The Enola Gay flew on August 6 with the "circle R" tail markings of another B-29 squadron to confuse Japanese intelligence. The 509th's regular tail insignia was a horizontal arrow in a circle.

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EG:340-L3a-P3a  
Aero. curatorial file

The Enola Gay on Tinian, shortly after the Hiroshima mission, displaying the 509th Composite Group's regular tail insignia.

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EG:340-L4

**THE RESTORATION OF THE ENOLA GAY**

In July 1946, the Army Air Forces stored this historic aircraft in Arizona. Colonel Tibbets flew it to Park Ridge, Illinois, on July 3, 1949, and turned it over to the Smithsonian. The Enola Gay was moved to Pyote Air Force Base, Texas, in February 1952 and remained there until December 2, 1953, when it made its last flight, to Andrews Air Force Base, Maryland, just outside Washington, D.C. Unfortunately, the Air Force had no available hangar space, and the Smithsonian had no appropriate storage facilities for an aircraft of this size. The aircraft sat outdoors and suffered corrosion and vandalism. Fearing further deterioration, in 1960-61, Smithsonian technicians disassembled the Enola Gay and stored it indoors at what is now the Paul E. Garber Preservation, Restoration, and Storage Facility in Silver Hill, Maryland.

Restoration began at the Garber Facility in December 1984 and was completed in (month) 1995. It is by far the largest aircraft restoration project ever undertaken by the National Air and Space Museum, consuming over 25 worker-years and nearly \$1 million. This extremely thorough restoration will ensure the preservation of the Enola Gay for future

generations.

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EG:340-L4a-d-P4a-d

Scenes from the restoration of the Enola Gay at the National Air and Space Museum's Garber Facility.

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EG:340-L5

**WHEN WILL THE ENOLA GAY BE RE-ASSEMBLED?**

Because of its huge size, the Enola Gay cannot be reassembled and displayed as a complete aircraft inside the National Air and Space Museum or even at the present restoration facility outside Washington. Therefore, except for a propeller and some small components, this exhibit contains only the forward fuselage section, which is slightly less than two-thirds the airplane's 30-meter (99-foot) length.

The Enola Gay will be reassembled and put on permanent display at the Museum's new extension facility, to be built at Washington's Dulles International Airport sometime in the next decade.

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EG:340-L5a-S5a

A copy of the act authorizing the construction of the National Air and Space Museum extension at Dulles Airport.

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EG:341-L1

**THE "LITTLE BOY" ATOMIC BOMB**

A bomb of this type was dropped by the Enola Gay on Hiroshima, Japan, on August 6, 1945. Unlike the "Fat Man" plutonium bomb dropped on Nagasaki, the "Little Boy" used uranium 235. Inside the bomb, a shortened smooth-bore naval gun fired a uranium bullet at target rings also made of uranium 235. At the moment of impact, a critical mass was formed, initiating a nuclear explosion. Due to the gun barrel and the heavy casing, the "Little Boy" weighed over 4 metric tons (8,900 pounds), almost as much as the much larger "Fat Man."

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EG:341-L2-S2

**"LITTLE BOY" ATOMIC BOMB CASING**

The bomb casing shown here was built after the war as a training version of the uranium bomb. Except for the absence of electronic firing circuitry and nuclear material, this bomb casing is very similar to the Hiroshima weapon. It contains no nuclear material and presents no radiation hazard.

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EG:341-L2a  
specifications block

**"LITTLE BOY" ATOMIC BOMB**

Weight: 4,045 kg (8,900 lb)  
Diameter: 0.7 m (2 ft 4 in)  
Length: 3.2 m (10 ft 6 in)  
Yield: 12 kilotons (the equivalent of  
12,000 tons of TNT)  
Manufacturer: Manhattan Project (1944-46),  
Atomic Energy Commission  
(1947-50)

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EG:341-L2b-P2b  
redraw diagram from "U.S.  
Nuclear Weapons"

[No label needed.]

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EG:350-L1  
Main label

**MISSION NO. 13: HIROSHIMA**

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EG:350-L2  
Main text

On August 4, 1945, seven crews were ordered to attend the first briefing for Mission No. 13. Although they arrived at the briefing hut in high spirits, their mood quickly changed. Military police armed with carbines surrounded the building, and the curtains inside were drawn. In the darkened hut, they quietly awaited their commanding officer's arrival.

Tibbets spoke to the point. He informed them the bomb was ready to be dropped, announced crew assignments and then unshrouded bulletin boards to reveal aerial photographs of the potential target cities: Hiroshima, the primary target, and Kokura and Nagasaki, the backup targets to be bombed if Hiroshima was clouded over.

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EG:350-L2a-P2a

Capt. Joe Buscher, intelligence officer, describes the potential targets.

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EG:350-L3

**CREW SUBSTITUTIONS**

Tibbets announced that No. 82's regular crew, with a few substitutions, would deliver the bomb. Basing his decision on rank and experience, he assigned himself as pilot and chose van Kirk as navigator and Ferebee as bombardier--the three had flown together in combat in Europe. As commanding officer, he had the right to make such changes, and they came as no surprise to most of the 509th.

Even so, the decision aroused discontent. No. 82's regular pilot, Capt. Robert Lewis, was furious at being relegated to co-pilot at the last minute. Some members of the final strike crew felt uneasy because they had never before flown in combat together.

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EG:350-L3a-P3a

Bob Lewis, No. 82's regular pilot, flew as co-pilot during the atomic strike.

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EG:350-L3b-S3b

Van Kirk used this navigator's kit and plotter on the Hiroshima strike.

Courtesy of Theodore "Dutch" van Kirk

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EG:350-L3c-S3c

Van Kirk used this master clock to coordinate the Enola Gay's rendezvous with the photography and instrument planes over Iwo Jima.

Courtesy of Theodore "Dutch" van Kirk

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EG:350-L3d-S3d

Each crew member carried a .45 caliber automatic pistol.

Courtesy of Theodore "Dutch" van Kirk

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EG:350-L4

**"SOME WEIRD DREAM"**

"It was like some weird dream, conceived by one with too vivid an imagination."

Radio operator Abe Spitzer's diary, Tinian 1945

After Tibbets announced crew assignments and described targets, Manhattan Project scientist and Navy Capt. Deak Parsons briefed the crews about the power of the bomb, without divulging its atomic nature. He could not show them the film footage of the Trinity explosion, because the projector failed. But even without it, Parsons's first-hand descriptions of the bomb test and still photographs astounded the crews.

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EG:350-L4a-P4a

Capt. Deak Parsons briefs the seven crews who would carry out the first atomic strike.

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EG:350-L4b-S4b

Parsons explained that the bomb would create such a bright flash that crews would need to wear goggles, similar to those worn by welders, to protect their eyes.

Courtesy of...

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EG:350-L5

**"LITTLE BOY" GOES TO TINIAN**

On July 26, the cruiser USS Indianapolis arrived at Tinian, carrying the gun and bullet elements of the "Little Boy" bomb. That same day, two air transports departed for Tinian, each carrying a uranium target element.

Once all parts were delivered, Manhattan Project scientists and 509th ordnance specialists assembled the bomb, but did not arm it. Having considered the possible catastrophic results if the Enola Gay, loaded with a live atomic bomb, crashed on takeoff, Parsons decided to finish arming the bomb once the Enola Gay had reached cruising altitude.

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EG:350-L5a-P5a

Receipt for the uranium components of the "Little Boy" bomb.

Lent by the Smithsonian Institution Libraries

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EG:350-L5b

**THE SINKING OF THE INDIANAPOLIS**

Only three days after leaving the atomic bomb components on Tinian, the USS Indianapolis was torpedoed and sunk by a Japanese submarine. Because the whereabouts of warships at sea were confidential, the sinking at first went unnoticed. The majority of those who had escaped the wreck perished in the ensuing five-day ordeal in shark-infested waters. Only 317 of the Indianapolis's 1,197-man crew of sailors and Marines survived--the greatest single U.S. naval tragedy of World War II.

The sinking was a powerful reminder to the 509th of the human costs of the ongoing war. Someone inscribed the "Little Boy" bomb with the message, "Greetings to the Emperor, from the men of the Indianapolis."

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EG:350-L5c-P5c

[Photograph of the Indianapolis or the rescued crew.]

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EG:350-L5d-S5d

[Artifact from the Indianapolis sinking, if available.]

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EG:350-L6

**"A TICKLISH PROCEDURE": LOADING THE BOMB**

On August 5, the completed bomb was placed on a transport dolly, shrouded for secrecy, and rolled out to the pit, where it was loaded onto the Enola Gay.

The bomb bays of the 509th's B-29s had been modified to carry the unusually large and heavy atomic bombs. Because there was little clearance with the bomb bay catwalks, and only a single shackle and adjustable sway braces held the bomb, loading it was "a rather ticklish procedure," according to one engineer.

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EG:350-L6a-d-P6a-d  
loading procedure

Courtesy of Los Alamos National Laboratory

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EG:350-L10

**BOMB AWAY**

While Tibbets maintained the plane's altitude and airspeed, bombardier Ferebee began to track the T-shaped Aioi bridge in the center of Hiroshima with the Norden bombsight. In coordination with navigator van Kirk, Ferebee monitored wind, temperature, altitude, and airspeed and adjusted the bombsight's controls accordingly. His adjustments directed the aircraft along the desired approach path and programmed the bombsight to automatically release the bomb when the plane reached the target. At 8:15 a.m., Hiroshima time, the bombsight's crosshairs aligned perfectly over the target. Ferebee yelled "Bomb away." As a backup measure, he toggled a switch that would manually drop the bomb in the unlikely case that the bombsight circuitry failed. Forty-three seconds later, the bomb exploded over Hiroshima.

As the lightened plane lurched upward, Tibbets took back the controls and executed the violent escape turn. Forty-three seconds later, a flash of light filled the cockpit, and soon thereafter the first of two shock waves hit the plane. Tibbets announced, "Fellows, you have just dropped the first atomic bomb in history."

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EG:350-L11

**THE FIRST ATOMIC BOMB: HIROSHIMA**

"The flash after the explosion was deep purple, then reddish and reached to almost 8,000 feet; the cloud, shaped like a mushroom, was up to 20,000 feet in one minute, at which time the top part broke from the "stem," and eventually reached 30,000.

"The stem of the mushroom-like column of smoke, looking now like a giant grave marker stood one minute after the explosion upon the whole area of the city, excepting the southern dock area. This column was a thick white smoke, darker at the base, and interspersed with deep red.

"Though about fifteen miles from the target when the explosion occurred, both escort aircraft, as well as the strike plane reported feeling two shock waves jar the aircraft. Approximately 390 statute miles away from the target area, the column of smoke still could be seen piercing the morning sky."

509th Composite Group Administrative Report

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EG:350-L11a-P11a  
photograph #1 of  
explosion

"I don't believe anyone ever expected to look  
at a sight quite like that. Where we had  
seen a clear city two minutes before, we  
could now no longer see the city."

Co-pilot Bob Lewis, post-war interview

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EG:350-L11b

"That city was burning for all she was worth  
It looked like...well, did you ever go to the  
beach and stir up the sand in shallow water  
and see it all billow up?"

Jacob Beser, radar countermeasures officer

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EG:350-L11c-P11c  
picture #2 of explosion

As Tibbets tamped down the tobacco in his  
pipe, he commented to Bob Lewis on the bomb's  
impact. "I think this is the end of the  
war."

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EG:350-L12

**A HERO'S RETURN**

Over 200 officers and enlisted men waited anxiously for the Enola Gay's return. Twelve hours and 13 minutes after leaving Tinian, Tibbets landed the plane on North Field.

Lt. Gen. Carl Spaatz, commander of the U.S. Army Strategic Air Forces, and "all the ranking military brass that could be mustered in the Marianas at that time," met the crew as they disembarked. To Tibbets' surprise, Spaatz greeted him, shook his hand, and then pinned a Distinguished Service Cross to his rumpled flying suit.

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EG:350-L12a-P12a

Lt. Gen. Carl Spaatz awards Paul Tibbets the Distinguished Service Cross for his historic flight.

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EG:350-L12b-S12b  
August 7-9 issues

The flight of the Enola Gay made the front page of the "Daily Mission," published by the 313th Bomb Wing Education Office on Tinian.  
Courtesy of Charles Levy

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EG:350-L12c-S12c  
(if available)

Sixteen hours after the 509th dropped the "Little Boy" bomb on Hiroshima, the White House released a prepared statement announcing the atomic bomb to the American public. This is an original copy distributed on Tinian.

Courtesy of Charles Levy

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EG:360-L13

**AN UNFORTUNATE MYTH**

One of the strangest myths that emerged after the war was the widespread belief that the aircrew on the Hiroshima mission had gone insane or killed themselves. These false stories had their root in the troubles of a former 509th Composite Group pilot, Claude Eatherly.

On the Hiroshima mission, Eatherly had commanded one of the B-29 weather planes, but had not witnessed the bombing. An unstable personality, Eatherly committed burglaries in the mid-1950s and began to claim that guilt had driven him over the brink. Rumors soon spread that he was the commander of the Enola Gay and that all the crew members had similar troubles. In fact, all the other 509th veterans returned home after the war and led active and successful lives.

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EG:360-L1  
main label  
(Kokura to be crossed out  
and Nagasaki written in  
for dramatic effect)

**MISSION NO. 16: KOKURA/NAGASAKI**

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EG:360-L2  
main text

Three days after Hiroshima, Maj. Charles Sweeney, piloted the Bockscar and its crew on the second and last atomic attack of the war. Because of poor visibility over the primary target--the industrial city of Kokura--Sweeney's crew dropped their plutonium "Fat Man" bomb on Nagasaki.

While perfect timing characterized the Hiroshima raid, haste, urgency, and problems marked the second. When deteriorating weather conditions threatened to postpone the mission by a week, Col. Tibbets and his staff quickly advanced the projected date from August 11 to August 9. Accelerated preparations introduced a high level of risk into every step of the mission.

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EG:360-L3

**WHY A SECOND BOMB?**

"Additional bombs will be delivered on the above targets as soon as made ready by the project staff."

General Handy, Acting Army Chief of Staff, to Lieutenant General Spaatz, Commander, Strategic Air Forces in the Pacific, July 25, 1945

There was no separate order to drop the second bomb, and no instructions were given to wait for a Japanese response to the first attack. Major General Groves, head of the Manhattan Project, felt it was important to drop another bomb immediately to show the Japanese that the United States possessed more than one atomic weapon. Acting on the July 25 directive, the 509th's Ordnance Squadron and Manhattan Project scientists on Tinian began to prepare the "Fat Man" plutonium bomb for the second mission.

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EG:360-L3a

"With the success of the Hiroshima weapon, the pressure to be ready with the much more complex implosion device became excruciating.... Everyone felt that the sooner we could get off another mission, the more likely it was that the Japanese would feel that we had large quantities of the devices and would surrender sooner."

Post-war interview with Bernard O'Keefe, a member of the "Fat Man" assembly team

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EG:360-L3b-P3b

Harold Agnew (right), one of the Manhattan Project scientists who flew in the instrument plane during the Nagasaki raid, helps carry the plutonium core for the second bomb to the assembly hut.

Courtesy of Frank Shelton

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EG:360-L3c-S3c

Receipt for the "Fat Man" plutonium delivered to Tinian on July 26, 1945.

Lent by the Smithsonian Institution Libraries

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EG:360-L3d,e-P3d,e  
(photos of the Japanese language leaflet and the original English text)

This leaflet, warning of the atomic bomb, was dropped on Nagasaki and two other Japanese cities the day before the second atomic bomb. It was largely disregarded because the Japanese people did not yet understand what had happened to Hiroshima.

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EG:360-L4

**THE PROBLEMS BEGIN**

At the pre-flight briefings, Tibbets assigned six crews and described the two potential targets, Kokura and Nagasaki. The mission's weaponeer then briefed them on the atomic bomb. In the early hours of August 9, the crews headed for the airfield.

A preflight check of the strike plane, Bockscar, piloted by Charles Sweeney, uncovered a malfunctioning fuel pump. With no time to fix the defective pump, Sweeney suggested changes in the flight plan. To compensate for unusable fuel, he would rendezvous with the escort planes over the coast of Japan instead of Iwo Jima, and would make a re-fueling stop at Okinawa on the return trip.

To add to the mechanical problems, weather conditions were unfavorable. Forecasters predicted that the crews would fly through tropical rain squalls all the way to Japan. At 3:47 a.m., Tinian time, Sweeney lifted the Bockscar off the tarmac. In the sky, "flashes of lightning [sic] stabbed into the darkness with disconcerting regularity."

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EG:360-L4a-P4a

Van Pelt, Sweeney, and Olivi (left to right) discuss flight plans after they learn about the defective fuel pump.

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EG:360-L4b-P4b

The strike plane's crew. Standing, left to right: bombardier Capt. Kermit Beahan, navigator Capt. James van Pelt, co-pilot Capt. Charles Albury, third pilot 2nd Lt. Fred Olivi, pilot Maj. Charles Sweeney. Kneeling, left to right: radar operator Staff Sgt. Edward Buckley, flight engineer Master Sgt. John Kuharek, assistant flight engineer Sgt. Raymond Gallagher, tail gunner Staff Sgt. Albert Dehart, radio operator Sgt. Abe Spitzer. Missing from the picture are weaponeer Cmdr. (U.S. Navy) Fred Ashworth, assistant weaponeer 2nd Lt. P. M. Barnes, and radar countermeasures officer Lt. Jacob Beser.

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EG:360-L4c-P4c  
crewman paints Bockscar  
insignia

No. 77, Bockscar. City names were added after the atomic strike. The aircraft can now be seen at the U.S. Air Force Museum at Wright-Patterson Air Force Base, Ohio.

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EG:360-L4d-S4d

An original strike order for the Kokura/Nagasaki mission.

Courtesy of the Hoover Institution

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EG:360-L5

**KOKURA: "NO DROP"**

Weather scouts had reported that both Kokura and Nagasaki were clear for visual bombing. But the Bockscar's arrival over its primary target, Kokura, was delayed by a missed rendezvous with one of the accompanying planes. The delay cost 45 minutes and more precious fuel. By the time the Bockscar flew over Kokura, thick haze and smoke from a regular B-29 incendiary attack on a neighboring city obscured the target. Sweeney made three passes over the city, but each time bombardier Kermit Beahan announced, "No drop."

A tense crew received flight engineer Kuharek's report that just enough fuel remained to drop the bomb on the secondary target and return to a friendly air field. Sweeney alerted special air-sea rescue forces that he might have to ditch the aircraft. He then turned the Bockscar toward the secondary target, Nagasaki.

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EG:360-L6

**THE SECOND ATOMIC BOMB: NAGASAKI**

Because clouds obscured Nagasaki, Sweeney's bombardier Kermit Beahan could not see the target. Although Tibbets had ordered them to bomb visually, Sweeney had to make a choice: either order Beahan to use radar--a fairly crude technology in 1945--or jettison the bomb in the ocean. Reluctant to waste the valuable and powerful weapon, he authorized the use of radar for the approach. At 11:02, Japanese time, the "Fat Man" was dropped and exploded seconds later over Nagasaki. Although relieved, the crew would later be disappointed to learn that they had missed the aiming point by 2.6 kilometers (1.6 miles).

The mission was far from over. By the time the Bockscar reached Okinawa, fuel reserves had dipped dangerously low. Sweeney's "Mayday" calls did little to clear the crowded Yontan Airfield runway; firing signal flares finally roused a response. After refueling and reporting to Tibbets, they took off for Tinian.

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EG:360-L6a-P6a

The "Fat Man" exploded with the energy of 22 kilotons, almost twice as powerful as the "Little Boy" bomb at Hiroshima.

Courtesy of Charles Levy

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EG:360-L6b-P6b

"After explosion, a balloon-like ring of white smoke formed, followed by a light-red ball of fire which covered two-thirds of the target area."

509th Composite Group Administrative Report  
courtesy of Charles Levy

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