Hiroshima & Nagasaki
Roosevelt dies on April 12, 1945 in Warm Springs, Georgia. Vice President Harry S Truman is sworn in.

Truman is out of the loop and does not know about the atomic bomb. He is the one to decide if it should be used, and when. The atomic scientists, driven by the possibility of a Nazi bomb, begin to debate the morality of using the bomb in combat.

Truman has no such moral complications. The election of 1944 was characterized by the realization the American public is tired of war, and if he had a wizard weapon and failed to use it, he might be impeached.

In Washington, the use of the bomb is never questioned. Targets are set aside, preserving them to test the full power of the bomb.
German Unconditional Surrender!
A Missed Opportunity!

In spring 1945 it became obvious that project would not be ready before Germany’s collapse. That triggered discussion of plan modifications.

- Should the bomb be used for Japan?
- Is bomb use justified like it seemed justified for Germany?
- Would the scientists continue their work with new goal?

Hans Bethe, who headed the Theoretical Division at Los Alamos, was astonished Groves presented the situation and new plans in February: "I am amazed both by the conclusion not to use [the bomb] on Germany and secondly by their reasons [for targeting the Japanese fleet]. We [the scientists] had no idea of such a decision. We were under the impression that Germany was the first target until the German surrender. That was my belief. Obviously, it was wrong."
Opportunities & Alternatives?

Definition of new goal for demonstrating new weapon:
Forcing Japanese unconditional surrender to avoid extended jungle war and invasion of Japanese islands

Conventional areal target bombing or devastation by single bomb?
To Use or Not to Use?

Japan had never been a threat to develop a bomb. General Groves definitely wanted to use the bombs. This triggered discussion in bomb development community:

Target Committee, Los Alamos, May 10-11, 1945 – Identified bombing conditions and four possible target sites in Japan; Kyoto (old capital), Hiroshima (urban industrial area), Yokohama (industrial center), Kokura Arsenal (military industrial complex)

The Franck Report, June 11, 1945 - The Franck Report, written by a seven-man panel of scientists at the University of Chicago, urged that the bomb be demonstrated "before the eyes of representatives of all United Nations, on the desert or a barren island."

Scientific Panel, June 16, 1945 - Despite the arguments against using the bomb made by the Franck Report, a panel composed of Oppenheimer, Fermi, Compton, and Lawrence found "no acceptable alternative to direct military use."
Target Identification
The Szilard petition

Groves Seeks Evidence, July 4, 1945 – As Szilard prepared a petition to the president calling atomic bombs "a means for the ruthless annihilation of cities."

General Groves sought ways to take action against him, considered charging Szilard with violating the Espionage Act.

Szilard Petition, July 17, 1945 – Leo Szilard, and 69 co-signers at the Manhattan Project "Metallurgical Laboratory" in Chicago, petitioned the President of the United States against the use of the bomb. Several petitions from scientists at Los Alamos and Oak Ridge followed.
Bombing Civilian Targets

By all international law, the bombing of civilians was regarded as a barbaric act!

President Roosevelt on Aerial Bombardment of Civilian Populations,
The President of the United States to the Governments of France, Germany, Italy, Poland and His Britannic Majesty,
September 1, 1939

The ruthless bombing from the air of civilians in unfortified centers of population during the course of the hostilities which have raged in various quarters of the earth during the past few years, which has resulted in the maiming and in the death of thousands of defenseless men, women, and children, has sickened the hearts of every civilized man and woman, and has profoundly shocked the conscience of humanity.
I am therefore addressing this urgent appeal to every government which may be engaged in hostilities publicly to affirm its determination that its armed forces shall in no event, and under no circumstances, undertake the bombardment from the air of civilian populations or of unfortified cities, upon the understanding that these same rules of warfare will be scrupulously observed by all of their opponents. I request an immediate reply.

FRANKLIN D. ROOSEVELT

Bard Memorandum, June 27, 1945 - Undersecretary of the Navy Ralph A. Bard wrote that use of the bomb without warning was contrary to "the position of the United States as a great humanitarian nation," especially since Japan seemed close to surrender.
The Potsdam Declaration

Proclamation Defining Terms for Japanese Surrender
Issued, at Potsdam, July 26, 1945

1 We-the President of the United States, the President of the National Government of the Republic of China, and the Prime Minister of Great Britain, representing the hundreds of millions of our countrymen, have conferred and agree that Japan shall be given an opportunity to end this war.

13 We call upon the government of Japan to proclaim now the unconditional surrender of all Japanese armed forces, and to provide proper and adequate assurances of their good faith in such action. The alternative for Japan is prompt and utter destruction.

Only obstacle for Japanese acceptance the term “unconditional surrender”
Meaning humiliation, loss of face, loss of emperor, loss of Japanese soul.
Setting the Test Date, July 2, 1945 - President Truman had delayed his meeting with Stalin until the atomic bomb could be tested. On July 2, General Groves told Robert Oppenheimer that the test date was being set by "the upper crust."

Truman Tells Stalin, July 24, 1945 - At the Potsdam Conference in defeated Germany, President Truman told Stalin only that the U.S. "had a new weapon of unusual destructive force."
**The Decision**

**Truman Diary, July 25, 1945** –
President Truman told his diary that he had ordered the bomb dropped on a "purely military" target, so that "military objectives and soldiers and sailors are the target and not women and children. Even if the Japs are savages, ruthless, merciless and fanatical, we as the leader of the world for the common welfare cannot drop that terrible bomb on the old capital or the new. The target will be a purely military one!"

**Official Bombing Order, July 25, 1945** –
The bombing order issued to General Spaatz made no mention of targeting military objectives or sparing civilians. The cities themselves were the targets.
Mission to Hiroshima

At approximately 2:00 on the morning of August 6th, the Enola Gay, which was carrying an atomic bomb (Little Boy), started on the long flight from Tinian. At about 7:00 o’clock, the Japanese radar net detected aircraft heading toward Japan, and they broadcast the alert throughout the Hiroshima area. There was no sign of bombers. The people began their daily work since they thought that the danger had passed.
City of Hiroshima on August 5, 1945

Middle size coastal city founded 1594 and built on six islands. In 1945 the city had a population of 350,000 people, served as local military command center but was mainly commercial and industry oriented around several small shipyards.
Little Boy exploded at approximately 8:15 a.m. above the “A-Bomb Dome” at an altitude of 2,000 ft.

The Hiroshima Bomb

A mushroom cloud extends 20,000 feet into the sky and 10,000 feet in diameter over the city after the first atomic attack in history.

The photo was taken by Bob Caron, tail gunner of the “Enola Gay,” the B-29 Superfortress that dropped the bomb.

“Little Boy” atomic bomb — 29" diameter, 126" length, 9,700 pounds weight, 20,000 tons of TNT equivalent yield.
Report of the Pilot
City of Hiroshima on August 7, 1945
Building Destruction

The shock wave traveled the first 2.3 miles in 10 seconds.

Wind speed 1000 miles/hour
Shock pressure of 700000 lbs/m²
Shock temperature ~2000000 °C

70,000 immediate deaths
140,000 subsequent deaths
### Population Injured and Killed

<table>
<thead>
<tr>
<th>Distance from Ground Zero (km)</th>
<th>Killed</th>
<th>Injured</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1.0</td>
<td>86%</td>
<td>10%</td>
<td>31,200</td>
</tr>
<tr>
<td>1.0 - 2.5</td>
<td>27%</td>
<td>37%</td>
<td>144,800</td>
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<tr>
<td>2.5 - 5.0</td>
<td>2%</td>
<td>25%</td>
<td>80,300</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>27%</strong></td>
<td><strong>30%</strong></td>
<td><strong>256,300</strong></td>
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</tbody>
</table>

The map illustrates the areas of fire and blast damage in Hiroshima, with different zones marked for distances from Ground Zero.
Why Nagasaki?

Nagasaki was at the bottom of the pre-identified list of the Target Committee, weather conditions dictated the choice.

The reason for being on the target list was a concern for psychological effect. Nagasaki was added shortly before the first mission as the last on the list of alternate targets. Kyoto was considered to be the first choice because of its history, as the ancient capital, and "the advantage of the people being more highly intelligent and hence better able to appreciate the significance of the weapon."

These factors were present in Nagasaki as well. The city had been an ancient center of trade with foreign countries, first with China, Vietnam and south Asia. Later when trade with the outside world was cut off, Nagasaki remained a Portuguese outpost. Nagasaki was a religious center for Catholicism as well as Buddhism. As a result literacy was high. In addition it held vital war related industry, being the home of the Mitsubishi Aircraft plant and the Ohashi Arms factory.
Why drop a second bomb?

Why drop the second bomb at all? Hiroshima has been justified as a way to save the lives that an invasion of Japan would cause. It has been explained as a way to impress the Russians and ensure American superiority in Asia.

By August 1945 the Japanese were all but defeated. The Soviet declaration of war was scheduled for August 15. Truman wrote in his diary about this event, "When this happens, Fini Japs."

On August 9, 1945 the Japanese were reeling from the effects of the bomb on Hiroshima. Their surrender was inevitable before the 15th.

Why drop a second bomb?

Is it revenge for Pearl Harbor or is the only reason that:

the Americans had two bombs?

“When you have to deal with a beast you have to treat him as a beast.”
—President Harry S. Truman, August 1945

"Now is the time to exterminate the Yellow Peril for all time... Let the rats squeal."
—Congressman Charles A. Plumley, August 1945
Nagasaki

“Fat Man” detonates over Nagasaki
August 9, 1945

The “Fatman” atomic bomb used plutonium as its fissionable core.
On August 9, 1945 at 9:44 a.m. “Bockscar”, a B-29 carrying Fat Man, the world's third atomic bomb, arrives at its primary target, Kokura. The city is covered in haze and smoke from an American bombing raid on a nearby city. Bockscar turns to its secondary target Nagasaki. At 11:02 a.m. the world's third atomic bomb explosion devestates Nagasaki, the intense heat and blast indiscriminately slaughters its Inhabitants, 74,000 people died immediately. 10,000 Catholics died since target was suburb Urakami, a center of Japanese Catholicism.
Report of the Pilot
The effects of the blast
Urakami Cathedral was the largest church in the entire Orient. The Urakami parish counted 14,000 members.

Cultural and religious centers

Battered religious figures stand watch on a hill above a tattered valley

Nagasaki, Japan
September 24, 1945

Uarakami Cathedral was the largest church in the entire Orient. The Urakami parish counted 14,000 members.
<table>
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<th>Population</th>
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<tbody>
<tr>
<td>0 - 1.0</td>
<td>88%</td>
<td>6%</td>
<td>30,900</td>
</tr>
<tr>
<td>1.0 - 2.5</td>
<td>34%</td>
<td>29%</td>
<td>144,800</td>
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<td>2.5 - 5.0</td>
<td>11%</td>
<td>10%</td>
<td>115,200</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>22%</strong></td>
<td><strong>12%</strong></td>
<td><strong>173,800</strong></td>
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</table>
Between triumph and revenge feelings
Japan’s Unconditional Surrender

September 2, 1945
On board of battleship Missouri in Tokyo Bay
Gen. MacArthur referred to the nuclear bomb attacks on Hiroshima and Nagasaki, saying they had "revised the traditional concept of war".