Questions

1. What is the purpose of the heavy water in the German reactor in Haigerloch

2. What concept used v. Weizsäcker for his 1941 patent of a bomb

3. Given the sparse and often only tell-tale evidence, do you think there was a competitive German bomb program?
Hiroshima
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.
A Notre Dame Panel Discussion: Harry Truman and the Bomb

On Thursday, February 16, 2012 at 7:30 p.m. in the Hesburgh Center Auditorium, we host a panel discussion between Prof. David Solomon, Prof. Michael Baxter, and Rev. Bill Miscamble, CSC, on the decision to drop atomic bombs on Hiroshima and Nagasaki to end World War II. The Center's permanent senior research fellow, Fr. Bill Miscamble, CSC, a member of Notre Dame's history department, published his most recent book on this issue this past spring, entitled *The Most Controversial Decision: Truman, the Atomic Bombs, and the Defeat of Japan*. He argues for the necessity of using the bombs to end the war, based on his historical research into the event. Prof. Solomon, the Center's director, and a member of Notre Dame's philosophy department, offers a response, as does Prof. Baxter, formerly of Notre Dame, now a visiting fellow at DePaul University, a respected theologian and peace activist. Prof. Dan Philpott of Notre Dame's political science department is the moderator for the evening. Afterwards, a reception follows in the atrium of the Hesburgh Center.
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 when 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?
Discussion of Alternatives

Colonel Henry Stimson, Secretary of War  
Harry Truman, President of the United States
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."

URL: http://www.dannen.com/decision
There is no record that James Byrnes spoke to Truman about Leo Szilard’s visit.
Psychological Factors in Target Selection

A. It was agreed that psychological factors in the target selection were of great importance. Two aspects of this are (1) obtaining the greatest psychological effect against Japan, (2) making the initial use sufficiently spectacular for the importance of the weapon to be internationally recognized when publicity on it is released.

B. In this respect Kyoto has the advantage of the people being more highly intelligent and hence better able to appreciate the significance of the weapon. Hiroshima has the advantage of being such a size and with possible focusing from nearby mountains that a large fraction of the city may be destroyed. The Emperor’s palace in Tokyo has a greater fame than any other target but is of least strategic value.
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.
Political Discussions

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."
July 24th, 1945
The ‘Big Three’ continue to meet in Potsdam
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.
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.
The Observer Crew

LA-8819 Report UC-34

The growth of the fireball was to be recorded with a Fastax™ camera mounted on the gyrostabilizer of the Norden™ bomb sight of the photographic aircraft; the camera was to be operated on the first mission by B. Waldman and by R. Serber on the second.

509th Composite Group

Instrument aircraft
Position
Aircraft commander
Bombardier
Scientists, observers

**Hiroshima**
V-89, Great Artiste
300 ft behind V-82
Maj. C. W. Sweeney
Capt. K. K. Beahan
L. W. Alvarez
H. M. Agnew
L. Johnston

Photo aircraft
Aircraft commander
Scientists, observers

V-91, Strange Cargo
Capt. Marquardt
B. Waldman
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 on August 6 1945 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
I worked hard the next day and got my stuff ready and at about 2:00 AM off we went. It certainly was an experience. After about 5 hours we sighted Japan and in we went. The bomb was dropped and it was another Trinity except that I was in the best possible observation position. The sight was magnificent but the destruction horrible. We had an uneventful trip home. We never saw flak or an enemy plane the entire trip.

Then we awaited the press release with great anxiety. At last it came. I hope you heard it. I feel rather fortunate to have been there as an official observer when the first one was used but somehow the destruction and horror of it is terrifying. It is a most burdensome device. I hope we do not have to use again.
Areal Devastation

Shock, blast, and firestorm
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
<table>
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<th>Distance from Ground Zero (km)</th>
<th>Killed</th>
<th>Injured</th>
<th>Population</th>
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<tbody>
<tr>
<td>0 - 1.0</td>
<td>86%</td>
<td>10%</td>
<td>31,200</td>
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<tr>
<td>1.0 - 2.5</td>
<td>27%</td>
<td>37%</td>
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<td>25%</td>
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<tr>
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<td>27%</td>
<td>30%</td>
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They grabbed my ankle...