

test fuzes, and contribute to component development. These changes kept Los Alamos on track as weapon design reached its final stages.

Freezing Weapon Design

Weapon design for the uranium gun bomb was frozen in February 1945. Confidence in the weapon was high enough that a test prior to combat use was seen as unnecessary. The design for an implosion device was approved in March with a test of the more problematic plutonium weapon scheduled for July 4. Oppenheimer shifted the laboratory into high gear and assigned Allison, Bacher, and Kistiakowsky to the Cowpuncher Committee to "ride herd" on the implosion weapon. He placed Kenneth T. Bainbridge in charge of Project Trinity, a new division to oversee the July test firing. Parsons headed Project Alberta, known as Project A, which had the responsibility for preparing and delivering weapons for combat.

During these critical months much depended upon the ability of the chemists and metallurgists to pro-

cess the uranium and plutonium into metals and craft them into the correct shape and size. Plutonium posed by far the greater obstacle. It existed in different states, depending upon temperature, and was extremely toxic. Working under intense pressure, the chemists and metallurgists managed to develop precise techniques for processing plutonium just before it arrived in quantity beginning in May.

As a result of progress at Oak Ridge and metallurgical and chemical refinements on plutonium that improved implosion's chances, the nine months between July 1944 and April 1945 saw the American bomb project progress from doubtful to probable. The August 1 delivery date for the Little Boy uranium bomb certainly appeared more likely than it had when Groves briefed Marshall. There would be no implosion weapons in the first half of 1945 as Groves had hoped, but developments in April boded well for the scheduled summer test of the Fat Man plutonium bomb. And recent calculations provided by Bethe's theoretical group gave hope that the yield for the first weapon would be in the vicinity of 5,000 tons of TNT rather than the 1,000-ton estimate provided in fall 1944.