Hiroshima bomb replica is aid to cancer prevention

By IAN BALL in New York

ON the eve of the 40th anniversary today of the dropping of the atomic bomb on Hiroshima, it was disclosed yesterday that physicists at the Los Alamos National Laboratory in New Mexico have been putting together a meticulous replica of the weapon used, the pioneer bomb dubbed "Little Boy".

Despite the sophistication of today's nuclear physics, an enormous amount remains to be learned about the weapon that levelled the Japanese city.

For example, the exact strength and radiation output of that bomb are still a deep scientific mystery. Solving that and other mysteries, according to scientists at Los Alamos, would contribute to understanding the dangers of radiation to human health.

Using their replica of the Hiroshima bomb, the research scientists have conducted painstaking tests to measure the radiations of "Little Boy II," carefully bringing its uranium core to the point where it started to undergo nuclear fission but short of the point of explosion.

"It's kind of a detective story," said Mr Wayne Lowder, an official of the Federal Department of Energy, who oversees the work at Los Alamos.

Re-evaluation effort

The *New York Times*, in a report yesterday, said that the building of a replica of the Hiroshima bomb was part of an international effort to re-evaluate the bomb and its impact on Japanese survivors.

"The effort started in the early 1980s when researchers found that the original calculations of the bomb's output were flawed," the report added.

About $15 million (£10·9 million) is being spent on the project. According to American Press reports, the effort involves about 60 scientists from the United States and Japan.

The final results are expected early next year. The work has relevance not only to estimating the effects of nuclear weapons, but also to assessing risks of exposure to radiation wherever it occurs: in the workplace, for example, or after a mishap at a nuclear power plant.

'Excess' deaths

One aspect of the project is a detailed study of the "excess' cancer deaths that have been occurring in Hiroshima and Nagasaki, the second city on which an atomic bomb was dropped, the weapon known as "Fat Man."

Together, these two cities offer the largest existing body of data on how radiation induces cancer in human beings.

'What we're trying to do is make the maximum use of this data to set safety limits for human exposure to X-rays and gamma rays," said Dr Robert Christy, the scientific co-ordinator of the American end of the programme.

"This re-assessment effort is going to lead to some significant changes in dosimetry, in calculating the amount of radiation it takes to induce cancers."

The Hiroshima bomb was dropped without any test-firing of a prototype. It was very different in design and construction from the first atomic device detonated, the bomb known as "the Gadget" that was blown up in the New Mexico desert on July 16, 1945, 21 days before the bombing of Hiroshima.

'The Gadget'

The first bomb used plutonium. The fission reactions began when conventional explosives caused a sphere of plutonium metal to implode. This device was detonated in a controlled setting where measurements could be made of its strength and radiations.

The Hiroshima bomb, however, employed uranium. The chain reactions were triggered, not by imploding, but by quickly bringing together two separate pieces of uranium metal when one was fired into the other in a gun-type assembly. It was "tested" in the crucible of war, far from the scientific experts and instruments at Los Alamos.

"The upshot was that the Hiroshima bomb remained abstract from a scientific point of view," the *New York Times* commented.