U.S. starts designing sturdy nuclear arms

Goal is reliability, but critics see risks

By William J. Broad

NEW YORK: Worried that America's ing their rivals in an effort to avoid the aging nuclear arsenal is increasingly uncertainties and deteriorations of nufragile, U.S. bomb makers have begun clear old age. designing a new generation of nuclear arms meant to be sturdier and more reliable and to have longer lives, federal officials and private experts say.

help shrink the arsenal and the high could needlessly resuscitate the commake nuclear weapons and could possi- ground test detonations.

bly ignite a new arms race. Federal bomb experts at these heavily guarded facilities are now scrutinizing secret arms data gathered over a halfcentury for clues about how to achieve

the new reliability goals.

The relatively small initial program. involving fewer than 100 people, is expected to grow and produce finished designs in the next 5 to 10 years, culminating, if approval is sought and won, in not only "inherently reliable" but also prototype warheads. Most important, officials say, the effort marks a fundamental shift in design philosophy.

For decades, the bomb makers sought to use the highest technologies and most innovative methods. The resulting warheads were lightweight, yery powerful and in some cases so small that a dozen could fit atop a slender missile. The American style was distinctive. Most other nuclear powers, years behind the atomic curve and often lacking top skills and materials, settled for less. Their nuclear arms tended to be ponderous if dependable. more like Chevys than race cars.

to reverse course and make arms that are more robust, in some ways emulat-

Originally, the approximately 10,000 warheads in the U.S. arsenal had an expected lifetime of about 15 years, officials say. The average age is now about The officials say the program could 20 years, and some are much older. Experts say a costly federal program to ascost of its maintenance. But critics say it sess and maintain their health cannot ultimately confirm their reliability beplex of factories and laboratories that cause a global test ban forbids under-

In late November, Congress approved. So far, the quiet effort involves only a small, largely unnoticed budget item \$9 million for warhead designers at the that started the design effort, known as three U.S. nuclear-weapon laboratories: the Reliable Replacement Warhead pro-Los Alamos, Livermore and Sandia. gram. Federal officials say the designs could eventually help recast the nuclear arsenal with warheads that are more rugged and have much longer lifetimes.

"It's important," said John Harvey, director of policy planning at the National Nuclear Security Administration, which oversees the arsenal. In an interview, he said the goal of the new program was to create arms that were easier to make and certify as potent.

"The goal," Harvey said, "is to see if we can make smarter, cheaper and more easily manufactured designs that we can readily certify as safe and reliable for the indefinite future - and do so without nuclear testing."

Representative David Hobson, Republican of Ohio, the chairman of the House Appropriations Subcommittee on Energy and Water Development, praised the program in a speech on Thursday and said it could lead to an opportunity for drastic cuts in America's nuclear arsenal. "A more robust replacement warhead, from a reliability standpoint," he

Little Boy: 1940s Dropped on Hiroshima Weight: 9,000 lbs Yleid: 15 kilotons

Changing bombs

8-17 (950s Largést bomb deployed by U.S. Weight:42,000 lbs. Yield: 11 mégalons (as much as 1,000 times as powerful as Little Boy)

abilially, nuclear devices grew in size along with their destructive power. As technology advanced, designers locused on trimming the warnead's dimensions, allowing multiple warneads to be carried by a single injustile.

Some say it is the most abundant U.S huclear weapon Weight: 362 lbs. Yjeld: 100 kilotons (7 times as powerful as Little Boy)

W-76 1970s

Relative scale is approximate

rently provided by retaining thousands bomb, which made its debut in 1954, fornia, told Congress in 2001, "will of unnecessary warheads."

But arms control advocates said the program was probably unneeded and dangerous. They said that it could start a new arms race if it revived underground testing and that its invigoration of the nuclear complex might aid the design of warheads with new military capabilities, possibly making them more tempting to use in a war.

"The existing stockpile is safe and reliable by all standards," Daryl Kimball. executive director of the Arms Control Association in Washington, said in an interview. "So to design a new warhead that is even more robust is a redundant activity that could be a pretext for designing a weapon that has a new military mission." He said the ultimate quessions for nuclear weapons anyway."

The first one, dropped in 1945, weighed

weighed four times as much and had hundreds of times the destructive meters, from nose to tail fins.

Over the decades, U.S. designers worked hard to trim the dimensions. By the 1970s, warheads for missiles weighed a few hundred pounds and packed the explosive power of dozens of Hiroshima-sized bombs. The arms continued to shrink and grow more powerful. The last one for the U.S. arsenal was built around 1990.

began at \$4 billion a year. It is now more than \$6 billion and includes a growing number of efforts to refurbish and extend the life of aging warheads.

By the late 1990s, top officials and extion was whether the existing stockpile perts began to openly question whether was sufficient for existing missions. such maintenance could continue to "The answer is yes," he said, "because stave off deterioration and ensure the there are extremely few remaining mis- arsenal's reliability. As a solution, some called for a new generation of sturdier The reliability issue goes back to the designs. "Robust, alternative warearliest days of the nuclear era. At first, heads," John Foster Jr., chairman of a the bombs were huge and trustworthy. federal panel on stockpile reliability and a former director of the Lawrence Now, U.S. designers are studying how said, "will provide a hedge that is cur- 5 tons. The first deliverable hydrogen Livermore weapons laboratory in Cali-

provide a hedge if problems occur."

The current goal of the program, power. It measured nearly 25 feet, or 8 Harvey said, is to "relax some of the design constraints imposed on the Cold War systems." He added that possible areas of investigation included using \ more uranium than plutonium, a finicky metal that is chemically reactive. Another is easing design specifications, which could make the weapons sturdier but also heavier, less destructive or both

He said the new designs would also The cost of the nuclear program stress easier manufacturing techniques and avoid hazardous and hard-to-find materials. "Our goal is to carry out this program without the need for nuclear testing," Harvey said. "But there's no guarantees in this business, and I can't prove to you that I can do that right

> Another official, speaking on the condition of anonymity because the topic is politically delicate, said that such testing would come only as a last resort and that the Bush administration's current policy was to maintain the moratorium.

> > The New York Times