

This article is by William J. Broad, David E. Sanger and Thom Shanker.

## U.S. SELECTING HYBRID DESIGN FOR NEW WARHEADS

WASHINGTON, Jan. 6 — The Bush administration is expected to announce next week a major step forward in the building of the country's first new nuclear warhead in nearly two decades. It will propose combining elements of competing designs from two weapons laboratories in an approach that some experts argue is untested and risky.

The new weapon would not add to but replace the nation's existing arsenal of aging warheads, with a new generation meant to be sturdier, more reliable, safer from accidental detonation and more secure from theft by terrorists.

The announcement, to be made by the interagency Nuclear Weapons Council, avoids making a choice between the two designs for a new weapon, called the Reliable Replacement Warhead, which at first would be mounted on submarine-launched missiles.

The effort, if approved by President Bush and financed by Congress, would require a huge refurbishment of the nation's complex for nuclear design and manufacturing, with the overall bill estimated at more than \$100 billion.

But the council's decision to seek a hybrid design, combining well-tested elements from an older design with new safety and security elements from a more novel approach, could delay the weapon's production. It also raises the question of whether the United States will ultimately be forced to end its moratorium on underground nuclear testing to make sure the new design works.

On Friday, Bryan Wilkes, a spokesman for the National Nuclear Security Administration of the Energy Department, said the government would not proceed with the Reliable Replacement Warhead "if it is determined that testing is needed." But other officials in the administration, including Robert Joseph, the under secretary of state for arms control and international security, have said that the White House should make no commitment on testing.

Congress authorized exploratory research for the weapon three years ago, and has financed it at relatively low levels since. But now the costs will begin to increase.

If Mr. Bush decides to deploy the new design, he could touch off a debate in a Democrat-controlled Congress and among allies and adversaries abroad, who have opposed efforts to modernize the arsenal in the past. While proponents of the new weapon said that it would replace older weapons that could deteriorate over time, and reduce the chances of a detonation if weapons fell into the wrong hands, critics have long argued that this is the wrong moment for Washington to produce a new nuclear warhead of any kind.

At a time when the administration is trying to convince the world to put sanctions on North Korea and Iran to halt their nuclear programs, those critics argue, any move to improve the American arsenal will be seen as hypocritical, an effort by the United States to extend its nuclear lead over other countries. Should the United States decide to conduct a test, officials said, China and Russia — which have their own nuclear modernization programs under way — would feel free to do the same. North Korea was sanctioned by the [United Nations Security Council](#) for conducting its first test on Oct. 9, and it may be preparing for more, experts said.

Both administration officials and military officers like Gen. James E. Cartwright, head of the Strategic Command, which controls the nation's nuclear arsenal, argue that because the United States provides a nuclear umbrella for so many allies, it is critical that its stockpile be as reliable as possible.

“We will not ‘un-invent’ nuclear weapons, and we will not walk away from the world,” General Cartwright said in a recent interview. “Right now, it is not the nation's position that zero is the answer to the size of our inventory.”

“So, if you are going to have these weapons, they should be safe, they should be able to be secured, and they should be reliable if used,” General Cartwright said in the interview, conducted before the Department of Energy's decision was announced.

The current schedule, which is subject to change, would call for the president to make a decision in a year or two and, if approved, to begin engineering development by fiscal year 2010 and production by 2012.

The two teams competing to design the weapon, one at Los Alamos in New Mexico, the other at the Livermore National Laboratory in California, approached the problem with very different philosophies, nuclear officials and experts said. Livermore drew on a single, robust design that, before the testing moratorium, was detonated in the 1980s under a desolate patch of Nevada desert. The weapon, however, never entered the nation's nuclear stockpile.

The Los Alamos team drew on aspects of many weapons from the stockpile and pulled them together in a novel design that has never undergone testing.

A winner of the competition was to have been announced in November. But federal officials said they had a hard time choosing between the two designs, calling both excellent.

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The question now, arms experts said, is whether a mix-and-match approach combining the two will produce a clever hybrid or an unworkable dud. They said the nuclear laboratories, bitter rivals for decades, have never before shared responsibility for designing a weapon.

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“There has not been what I would consider a real partnership,” said Philip E. Coyle III, a former director of weapons testing at the Pentagon and former director of nuclear testing for Livermore. “In some respects, it’s unprecedented.”

Ray E. Kidder, a senior Livermore scientist who pioneered early arms designs, said the hybrid approach appeared to be based more on the politics of survival for the laboratories than on technical merit.

“It’s spreading the wealth,” he said. Federal officials, Dr. Kidder added, “tend to do that fairly rigorously so as to keep the labs alive. To foreclose the possibility of closure, they try to divide the work load.”

General Cartwright cast that problem differently, saying that it is critical to keep America’s “intellectual capital” in producing weapons alive. “We are starting to get to the point where the people who actually have experience designing a weapon are reaching that point at which they will start to leave the industry,” he said. “And are we able to attract the minds that we will need to sustain this activity?”

Nonetheless, several nuclear experts expressed doubts about the wisdom of using a design that has never undergone testing, saying future presidents might lose confidence in the arsenal’s potency and be tempted to conduct test explosions.

“It’s one thing to have all the components working and another to have them all working together,” said Raymond Jeanloz, a geophysicist at the [University of California, Berkeley](#), who advises the government on nuclear arms. “To me, that’s the key technical issue that has yet to be resolved.”

In the few years since its debut, the reliability program has grown from a fringe effort at the nation's nuclear arms laboratories into a centerpiece of the Bush administration's nuclear policy.

Advocates say a generation of more reliable arms would give military commanders the confidence to abandon the current philosophy of holding onto huge inventories of old weapons, and could speed a shrinkage of the American arsenal from some 6,000 warheads to perhaps 2,000 or less.

Critics say a main justification for the program vanished in November when a secretive federal panel known as Jason found that the plutonium "pits" at the heart of many nuclear warheads aged far better than expected, with most able to work reliably for a century or more.

"This research eliminates a major rationale," Lisbeth Gronlund, a nuclear arms specialist at the [Union of Concerned Scientists](#), a private group based in Cambridge, Mass., said in a November statement.

Since that study was revealed, the administration has emphasized other reasons to build a new warhead, especially new, highly classified technologies to make the weapons virtually impossible to use if they fall into unfriendly hands. Other objectives are to simplify manufacturing, reduce toxic byproducts and improve safety of triggering devices.

As a signatory to the Nuclear Nonproliferation Treaty, the United States and other nuclear weapons states have committed, at least on paper, to the ultimate goal of "the liquidation of all their existing stockpiles" of weapons. But General Cartwright cautioned that much of the criticism of the program was cast in terms of achieving that disarmament, and he said the government's policy, and that of the new warhead program, was to maintain a nuclear stockpile "that would be the smallest practical to maintain its credibility."

He described the nation's nuclear weapons stockpile as "an artifact of the cold war — cold war both in its delivery systems and its characteristics and certainly in its technology."

"We stopped testing a while back. So, from the testing standpoint, we have not been fielding new weapons," General Cartwright said. "From the standpoint of engineering and design, there has been only marginal activity, mostly reacting to the age of components."

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