

US backs revamp of nuclear warheads

The US government is pushing ahead with a plan to overhaul its nuclear stockpile, despite a scientific review showing that existing warheads will last at least another half-century.

On 1 December, the National Nuclear Security Administration — the agency that oversees the US nuclear stockpile — announced that it will pursue plans to develop a new Reliable Replacement Warhead (RRW), which it claims will be safer and more robust than current designs. But the announcement came just two days after the release of research showing that the plutonium in existing warheads has a shelf-life of at least a century. Most warheads in the US stockpile are only about 20 years old.

Critics say the decision to proceed is an example of politics trumping science. "It is clear that the present stockpile is going to be reliable beyond our lifetime," says Jay Coghlan, executive director of Nuclear Watch, a watchdog group in Santa Fe, New Mexico. "It's not the science that rules, it's the special interests."

But officials maintain that the programme was never solely about replacing old warheads. "I believe the reasons for the RRW are in some ways independent of plutonium ageing," says Charles McMillan, associate director for weapons physics at Los Alamos National Laboratory in New Mexico. "RRW enables us to bring new technologies to the table."

Since 2004, the RRW concept has been

gathering momentum — both at the nation's nuclear weapons labs and in Congress (see *Nature* 442, 18–21; 2006). The idea is to build a new generation of robust warheads to replace existing designs. They would be larger than existing warheads, but would have a greater margin of error, be easier to manufacture and include more safeguards.

The proposed designs have mainly focused on making changes to the plutonium triggers, or pits, of the current warheads. Some argue that adding more plutonium or changing the way they are cast would result in a more stable, dependable trigger that could sit on the shelf for years without testing.

Officials have pushed for the programme to proceed quickly because of concerns that the ageing triggers on the current warheads might become unreliable within a few decades. The chief worry was that the constant stream of radiation that comes from the plutonium itself could create cavities in its crystalline structure, causing the weapon to fail.

But a trawl of old nuclear test data and a battery of lab tests have shown this isn't the case. Some of the 1,054 nuclear tests carried out by the United States before 1992 were done with ageing weapons, and the data helped scientists

understand how older plutonium triggers behave. Meanwhile, researchers also discovered that artificially aged plutonium heals itself by shifting new atoms back into its crystalline lattice. The current generation of weapons can therefore last for at least 85–100 years.

These findings are likely to have implications elsewhere, especially in Britain, which is thought to have warheads similar to the US design. Other nations such as France use plutonium triggers and have stockpile stewardship programmes.

The findings were "a real surprise," says

Raymond Jeanloz, a geologist at the University of California, Berkeley, and a member of the JASONs — an independent scientific group that advises the US government on security issues and that reviewed the work. "The labs have done

an outstanding job."

The revised lifetimes call into question the need for an RRW programme, say many critics. RRW was sold to congressional supporters on the basis that the ageing stockpile would soon have to be replaced anyway. But as it will be in good condition for the conceivable future, such a plan now seems unnecessary, says Christopher Paine, a nuclear analyst at the Natural Resources Defense Council, an environmen-

"The arguments with which replacement warheads won congressional support have fallen apart."

Bush faces rough ride over climate change

With President George W. Bush and his administration continuing to avoid the issue, the courts and Congress are poised to shape climate-change policy in the United States.

Last week, the Supreme Court heard a high-profile case in which Massachusetts, along with numerous other states, cities and environmental groups, argued that the Environmental Protection Agency (EPA) should be forced to regulate greenhouse-gas emissions from cars and trucks as a pollutant. Massachusetts itself stands to lose 300 kilometres of its coastline as a result of the rise in sea level as the planet warms.

The suit can be read as an

expression of many states' impatience with the federal government's inaction on climate change (see *Nature* 443, 486–487; 2006). Meanwhile, staff in the offices of Democratic politicians are sharpening their pencils for

January, when the more liberal party takes over Congress, and supporters hope that climate-change bills will fly.

The verdict will be announced by the Supreme Court by the end of its term in June. Although the EPA trotted out the same old administration line that the "scientific uncertainty" was too great to act upon, the discussions

during the 29 November hearing hint that the case might be decided on the technical grounds of standing — Massachusetts could sue the agency only if the harm suffered will be redressed if the EPA does act.

The problem is that climate change is such a large and global problem that the emissions in question — from the tailpipes of US vehicles — may not make a huge difference by themselves. Massachusetts will probably still lose a considerable chunk of coastline.

Beneath the issue of standing, there seems to be a schism of

opinion on more ideological grounds, with the more conservative judges looking likely to support the EPA, and the more liberal judges lining up with the Massachusetts group. With four justices on each side, Justice Anthony Kennedy, a noted moderate, may have the casting vote.

But many observers say that the decision itself will be less important than the buzz around the case. "I think no matter which way it breaks, it will put more pressure on Congress," says Andrew Aulisi of the World Resources Institute, an environmental think-tank in Washington DC. If the Supreme Court sides with the EPA, he says, "everybody is going to throw up

"I think no matter which way the law suit breaks, it will put more pressure on Congress."



P. SHAMBOOM/NUKEPHOTO.COM

Research suggests that the present crop of US nuclear warheads should last for at least 80 years.

tal group based in New York. "The arguments with which they won congressional support have fallen apart."

McMillan counters that the RRW has always been about more than just replacing older warheads. "RRW will bring to the stockpile the most modern technologies for safety and security," he says. In addition, he says, the process of

developing and producing the RRW will help transform the weapons complex into a smaller, more responsive one.

If nothing else, the extended shelf-life of the current warheads should allow more time for debate.

Geoff Brumfiel

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their hands and say that the judiciary isn't doing anything and Congress needs to step in".

When the Democrats take control of Congress in January, the prediction for the first months is a steady diet of hearings, with bills taking a little longer. No one is quite sure if the votes are there for a tough bill on climate change. "What the elections did, to a large extent, was replace Republican moderates with Democratic moderates," says Manik Roy, director of congressional affairs at the Pew Center on Global Climate Change. "You don't have many more votes. What has changed is who controls the agenda."

Senator Barbara Boxer (Democrat, California), who will

head the Senate Committee on Environment and Public Works, has promised lots of talk and action on climate change, and on 15 November sent a letter with two other heads of related committees to President Bush, asking for a commitment to "pass meaningful climate change legislation in 2007". Republican Senator (and probable presidential candidate) from Arizona, John McCain, will also undoubtedly reintroduce the McCain-Lieberman Climate Change Act, a cap-and-trade bill, for its third outing.

Frank Maisano, a spokesman for Bracewell & Giuliani, a law firm representing oil and gas industries, cautions that advocates for climate-change

regulation have been overtaken by unrealistic exuberance. The complexity of the issue will push substantive action way past the verdict, he says. "It is not something that is going to be slam-dunked in 12 months."

But even if the rounds of hearings seem to produce nothing but hot air, Roy points out that they will at least educate members of Congress, where, for example, Senator James Inhofe (Republican, Oklahoma) has been holding forth on his view of climate change as some sort of conspiracy theory. "I would not in any way consider it a delay tactic if Congress spends a year holding hearings on this issue," Roy says.

Emma Marris

ON THE RECORD

Justice Antonin Scalia

(pictured):

"Your assertion is that after the pollutant leaves the air and goes up into the stratosphere it is contributing to global warming."



B. CHILD/AP

James Milkey:

"Respectfully, Your Honour, it is not the stratosphere. It's the troposphere."

Justice Scalia:

"Troposphere, whatever. I told you before I'm not a scientist. That's why I don't want to have to deal with global warming."

The US Supreme Court tackles climate change (see left).

OVERHYPED

Radioactive products

After the news that Russian ex-spy Alexander Litvinenko was poisoned with polonium-210, a number of blogs and news stories sounded shrill warnings about companies selling polonium-210 over the Internet.

One such company, United Nuclear in Sandia Park, New Mexico, posted a notice on its website explaining that the amounts of polonium-210 it sells are microscopic. The company estimates it would take about 15,000 of its polonium-210 sources to poison someone — at a cost of \$1 million.

"An order for 15,000 sources would look a tad suspicious," the company points out, "considering we sell about one or two sources every three months."