

Nuclear ambition

The US weapons labs need to develop a twenty-first-century vision of deterrence — one that does not include making new bombs.

In the past two weeks, US President Barack Obama has signed a new arms treaty with Russia, scaled back the role of the nuclear arsenal in US foreign policy and negotiated agreements to secure highly enriched uranium and other nuclear materials around the globe. Much work remains to be done, but the president has laid out a broad vision for combating twenty-first-century nuclear threats. This makes it all the more disappointing that he wasn't able to rein in remnant cold-war thinking among his own scientists at the US nuclear weapons labs.

The administration laid out its latest policy in the 6 April Nuclear Posture Review, which represents progress both in form — it is the first such review to be unclassified — and substance. In keeping with an earlier decision to abandon plans to build a reliable replacement warhead (RRW), the policy says that the United States will not pursue new weapons in the future. Yet the text contains lawyerly caveats that could allow designers to mix and match older designs, and then add non-nuclear components to produce what is effectively a brand new thermonuclear device. Indeed, some critics suggest that the cancelled RRW itself could be squeezed through these loopholes.

This was no accident. During the administration's internal debate on the review, managers of the energy department's weapon labs — Los Alamos and Sandia in New Mexico and Lawrence Livermore in California — secured ambiguous language that would allow business to continue as usual. Worried about morale, recruitment and the retention of quality scientists in the weapons programme, the labs' leaders are zealously protecting the craft and its practitioners. Their argument is that scientists learn important lessons when they translate equations and simulations into reality. In addition, the labs hint that the current arsenal is so finely tuned that even minor defects resulting from ageing materials could compromise the entire system; from this perspective, a new warhead would actually be safer, more secure and have a larger margin for error.

None of these arguments can be ignored. However, they have to be weighed up in the larger strategic context — including the strong possibility that the labs' political manoeuvring could damage US

credibility in its quest for global cooperation on nuclear non-proliferation. In particular, the labs' insistence on maintaining all options for managing the arsenal could undercut Obama's already dim hopes of getting the US Senate to ratify the Comprehensive Nuclear-Test-Ban Treaty, which has been languishing since 1996.

What is needed now is absolute clarity of purpose. Obama could achieve this with an executive order stating that the primary role of nuclear scientists will be the surveillance and maintenance of an ever-shrinking nuclear stockpile — a fundamental task on which the labs have come up short, according to government reports. Nuclear scientists and engineers would be able to engage in serious design efforts, backed by a modernized scientific infrastructure, but it must be abundantly clear that new designs will not move through to development.

Such an executive order would doubtless come under political attack for compromising US security. But it would be consistent with the thinking of the JASON group, a panel of independent scientific advisers to the US government who looked at this issue last year and found no evidence that the current weapons could not be maintained for decades into the future under the current system.

Such an order would also accelerate a gradual transformation of the US nuclear deterrent from one based on bombs and warheads held at the ready to one based on capabilities: knowledge held by nuclear scientists and engineers at the labs would help the nation to police the international non-proliferation regime and serve as a deterrent to those who pursued nuclear weapons. That kind of deterrent would be in line with the commitment to disarm that major nuclear powers have already made under the 1970 Nuclear Non-Proliferation Treaty, which is up for a five-year review next month. Just as importantly, it is a vision that a new generation of nuclear scientists and engineers would be much more likely to embrace. ■

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The weight of evidence

Better chemical-control legislation is a good start, but scientific reform should parallel legal reform.

Last week, US Senator Frank Lautenberg (Democrat, New Jersey) introduced legislation to overhaul one of the key US chemical regulatory laws. The 1976 Toxic Substances Control Act (TSCA), which covers chemicals other than medicines, cosmetics and pesticides, essentially assumes that compounds introduced into the marketplace are safe until proven otherwise: potential risks to the

environment or human health are acted on only if the Environmental Protection Agency (EPA) can uncover and prove them. The Lautenberg legislation, and complementary legislative language being drafted in the House of Representatives by Bobby Rush (Democrat, Illinois) and Henry Waxman (Democrat, California) would place the burden of proof where it belongs, requiring industries to provide a certain quantity of safety data before releasing a new chemical into wide use. It would also give the EPA the authority to request additional data from manufacturers as it deems necessary. These changes would bring the TSCA more in line with Europe's Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) legislation from 2007 (see *Nature* 460, 1065; 2009).