A case of dubious rationales

The real question about plutonium pits is not how fast they're aging, but why we need them at all.

The Bush administration has listed myriad reasons for funding a Reliable Replacement Warhead (RRW) Program, with the number of rationales increasing with time as critics attack many of the fundamental tenets on which the program is based.

One of the initial issues that prompted the National Nuclear Security Administration (NNSA), a division of the Energy Department, to scrutinize the nuclear arsenal was a concern over the health of the “plutonium pits” that fuel the primary fission explosion that triggers and helps sustain the more powerful fusion explosion. Because the plutonium disintegrates into uranium and alpha particles, there was a concern that these could disrupt the bulk crystal structure of the plutonium, causing possible cracks or faults that could compromise the effectiveness of the pits and reduce the destructive yield of nuclear weapons.

A review of NNSA statements over the years on plutonium aging reveals a slowly evolving change in its position. In 2002, NNSA spokesman Bryan Wilkes warned, “We know that plutonium pits have a limited lifetime . . . we could wake up and find out half our stockpile is gone to waste.” In 2005, then-NNSA Administrator Linton Brooks softened this somewhat, saying, “Sooner or later the effects of plutonium aging will require all our current pits to be remanufactured.” Then, less than one year later, Brooks told the San Francisco Chronicle, “I don’t know everything I need to know about plutonium aging.” (His suggested remedy for this uncertainty: Build heavier warheads, perhaps using more than the minimum amount of plutonium.) As late as May 2006, Energy officials stated that the lifetime of plutonium pits was 45 to 60 years, while news had already leaked that forthcoming scientific studies would likely extend that estimate. Still, the rumors prompted Wilkes to state, “Any further comment on plutonium aging would be purely speculative.” And Brooks acknowledged that the life span of plutonium pits could be “60-plus” years. Actually, the figure turned out to be 60 plus 40. In late 2006, a comprehensive study by the Los Alamos and Lawrence Livermore national laboratories, validated by a report by the independent Jason scientific advisory group, firmly established that plutonium pits will remain stable for at least a century. Since the oldest...
Taking RRW personally

The RRW Program will not close the growing generation gap among weapons designers.

For most of us, the Energy Department’s reliable replacement warhead (RRW) is just a thing. Some see it as a good thing—a way of assuring that the United States cuts its nuclear stockpile and avoids nuclear testing—while others see it as a bad thing—a sign that the United States is reinvesting in nuclear weapons. I see it in more human terms. That is because as an anthropologist who studies Lawrence Livermore National Laboratory, I know the people who designed it.

The RRW design that Energy picked in March is a variant on a Livermore device, tested in the 1980s but never deployed. The lead designer for that device was Seymour Sack, a mythically brilliant and gruff designer, now retired, who spent his days at work chain-smoking and drinking the strongest coffee the human constitution can withstand. His impatience for fools and refusal to negotiate his technical judgments was a source of legendary vexation to the administrators who tried to manage him. The female scientist who took the lead in re-working Sack’s primary design for the RRW—that is, the fission component—was mentored by a Sack student, a designer I knew in the 1980s for his love of medieval European cathedrals.

The group leader is another Sack student whom I met soon after I arrived in Livermore in 1987. I was a graduate student in my late twenties trying to find thesis material in conversations with weapons designers; she was a young physics PhD, fresh out of MIT, beginning to learn her craft as a weapons designer. We became friends of sorts. I think of her not as a Strange-love, but as a person who had a large and boisterous golden retriever, a woman who gave her free time to help local schoolgirls go into science careers, a Japanese-American struggling to live amid the historical fallout from World War II.

Weapons designers learn their craft through apprenticeship, and they often have very close relationships with their mentors. I sometimes hear weapons scientists refer to Livermore’s RRW design as having a good “pedigree.” By this they mean it stays close to a well-tested and understood design. But I think “pedigree” also refers to a line of exceptional weapons designers whose expertise stands...