



Bombs Away?

W. Jack Howard

Last December 2 marked fifty years since the nuclear age began at the University of Chicago squash court where Enrico Fermi and his colleagues (including a youthful Harold Agnew) cautiously brought the first nuclear pile to criticality. That experiment and what followed at the national weapons laboratories played a major role in ending a war and preserving a shaky peace. Now freedom seems ascendant behind the former Iron Curtain, but even as the world celebrates the end of decades of cold war, those anxious years must be acknowledged as being vastly preferable to a third world war.

As we reflect on the ways in which technology has influenced the nation's yesterdays, our thoughts also turn to the future—to what is in store for our society and to the ways in which science might help shape our tomorrows. It is also a time to consider the destiny of the weapons laboratories and how they can help provide that science.

The laboratories' obligation to provide for the stewardship of nuclear weapons probably won't go away soon and entails more than a quality guarantee for the current stockpile. "Surety," one element of stewardship, requires a continuing sense of responsibility for safety, security, and use control as well as performance.

Since the future of nuclear weapons is a virtual unknown, the design technology must be kept modern, not just pickled-in-place with some magic preservative juice. The watch on proliferation itself will require an understanding of new weaponization options as the underlying science moves forward around the world.

Some of the weapons pledged for retirement by the former Soviet Union are no longer controlled by Moscow. Even the ones accounted for must be transported and dismantled without mishap. The United States has a vested interest in the entire dismantlement operation, and

our congress has designated funds for this activity. Our concerns can best be addressed by making U.S. nuclear expertise available as well, and the Yeltsin government seems receptive to scientific help.

I've argued that nuclear weapons have solved problems in the past, but some people say that they will *be* the problem of the future. Either way, the weapons laboratories' abandonment of the technology now would be a repudiation of their legacy and would leave the nation at risk.

The national laboratories, then, must find ways not only to maintain a capability in nuclear weapons (for purposes as yet unspecified) but also to prepare for an important role in fulfilling other technical needs of the nation. It's not a matter of choice *between* swords and plowshares; it's keeping the proper blend, which will surely involve a jagged decline of the weapons portion.

The fifty years of Los Alamos, which this issue celebrates, have been a useful preparation for the challenge of purveying science and technology to a post-Cold-War world. I think the heritage of weapons work will prove to have advantageous carry-overs such as the following:

We've been named "national laboratories." How reasonable it is, then, that the laboratories be engaged in the nation's work—civilian work in addition to, not instead of, the stewardship of U.S. nuclear weapons.

The unusual breadth of disciplines at the weapons laboratories gives them a powerful capability to solve new and difficult problems. Their ownership by the government guards against self-serving solutions—they can seek an an-

swer without concern about their sponsor's spin on the question.

Weapons R&D taught all of us that (contrary to the timeworn aphorism) invention is the mother of necessity; something becomes desirable once it is shown to be attainable. We used to be handed "Military Characteristics" for new weapons that described things we already knew how to do. The "Civilian Characteristics" can follow the same route. (Isn't "tech transfer" usually done with just such an approach?)

Others may judge the worth of a nascent technology by its potential dollar-return to the offeror. People in the national laboratories are more likely to feel fulfillment if science promises to provide for some national good or to overcome some threat to the well-being of society. Lab folks won't even be startled if they don't amass huge personal fortunes in the process of applying science.

Although Los Alamos has not set the most vigorous example of marketing prowess, the national laboratories are not without such skills; and those skills are applicable in the civilian sector. We should understand by now, however, that not *every* effort, even those with overwhelming merit, will bring instant public recognition and approbation. Take WIPP—*PLEASE*.

The laboratories know how to build reliability into products whether they be destined for civilian or military use. They also understand "user-friendly," and if someone were ever to ask, they could even incorporate cost as a design criterion.

The world *might* come to "the Hill" seeking solutions, but it seems more likely to me that, with many inventions already in hand, Los Alamos will have to ferret out civilian or military customers who don't yet recognize their own "necessities."

As we reflect on the last half century, its achievements and even its disappointments, we can wish for an equally memorable next fifty years for Los Alamos National Laboratory. With some imagination, and if the needs and jargon of new customers can be accommodated, the future can be very bright indeed. ■

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