

Render Safe

Defusing a Nuclear Emergency

by Eileen Patterson

The extra duty is inconvenient and could turn dangerous, but Los Alamos staff volunteer because it serves national security and because their expertise is rare: they know the ins and outs of nuclear weapons like few others in the world.

weapon, and the Joint Technical Operations Team (JTOT), which would respond to the threat of a terrorist device. In this work, Los Alamos joins other DOE facilities, including Lawrence Livermore and Sandia National Laboratories.

Beyond their full-time jobs, Los Alamos NEST volunteers serve their on-call duty in rotating one-week shifts. During that week, they keep their equipment packed and stay no more than a few hours' travel time from Kirtland Air Force Base in Albuquerque, a short leash that restricts family activities. Their pagers could sound at any time, but for now, the calls summon them to training exercises, where they practice their skills under conditions like those of a real crisis. For this, they receive about \$40 a day on-call pay. The real compensation is in the work itself. It could save lives.



Jose (Mitzie) Ulibarri

At a simulated crash site, Accident Response Group members plan how to secure a nuclear weapon (the cylindrical object in the wreckage). A plane crash involving a U.S. nuclear weapon is unlikely since the cessation of frequent airborne alerts, but ARG volunteers train for all possibilities.

A Shield against Disaster

A number of scientists, engineers, and technicians at Los Alamos are volunteers on the Nuclear Emergency Support Team (NEST), a Department of Energy (DOE) team that is always on call as the nation's shield against a nuclear weapon emergency. Two of the NEST branches staffed by Lab volunteers are the Accident Response Group (ARG), which would deal with an accidentally damaged U.S. nuclear

Vital Skills for a Vital Mission

For both ARG and JTOT, the mission is "render safe"—disable the weapon or device before it does any damage—and then move it to a safe spot for disassembly. If a U.S. weapon were involved in an accident, during transport, for example, ARG volunteers would decide how to handle it safely. Los Alamos volunteers are well suited to making that decision because five out

of the seven U.S. nuclear weapon systems were developed at Los Alamos. An expert on any one of them would be rapidly available. (For weapons developed by Lawrence Livermore, Livermore designers would serve in the same capacity.)

For ARG, Los Alamos also deploys on-site health and safety personnel, special pneumatic tools for moving a weapon, radiation monitors, and radiographic support in the form of Portac, a portable accelerator. Portac is an x-ray source that can quickly provide high-quality images of a weapon's interior.

Deciphering the mysterious internal workings of a terrorist device would fall to JTOT. Faced with an unknown design, JTOT volunteers would need to evaluate the device, without disturbing or destroying it, and determine how it was put together and what its capabilities might be.

Los Alamos is the lead laboratory for providing the team with nuclear diagnostics—the sensors that detect the types of radiation associated with nuclear weapons and that identify the radiation “signatures” of particular weapon configurations. The “day jobs” of Los Alamos JTOT experts are in programs devoted to developing, testing, and evaluating such tools. So Los Alamos provides JTOT not only with weapon-design experts to deal with a suspected terrorist device but also with the nondestructive evaluation technology they need in the field.

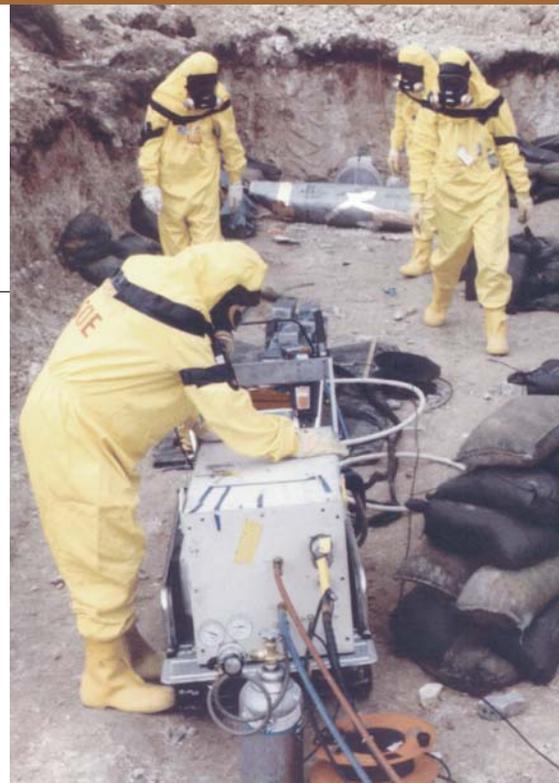
Home Team Backups

Los Alamos JTOT volunteers would not work in isolation at an incident site. They would draw on support from the Home Team, an additional network of Los Alamos and DOE volunteers. The Home Team provides JTOT with rapid access to expanded expertise and programmatic capabilities held ready to meet the needs of those in the field.

The Home Team also provides a vital computing link. At a JTOT incident site, Los Alamos scientists would be able to weigh what their diagnostic tools told them against data from more than a thousand U.S. nuclear tests. Those data are available to them on laptop computers, which would also allow them to run simulations of a device's destructive potential. For more-extensive simulations, they would feed information back to the Home Team, which could tap the Laboratory's computing capability.

All of this work is aimed at providing the military's explosive-ordinance disposal personnel with a workable strategy for disabling a terrorist device and moving it safely away from any population center. “It's a stimulating mental challenge,” says one Los Alamos scientist, “although not always fun when you're in a freezing hangar on a NEST exercise. But we volunteer because it's important. Someone has to do it.”

NEST volunteers are the ones qualified to do it. ■



Diagnostic tools such as Portac, shown here being used in a training exercise, provide information about a weapon's condition. Portac's x-rays reveal the status of a weapon's high explosives, which, if cracked, must be stabilized with injections of a vulcanizing rubber before the weapon is moved.