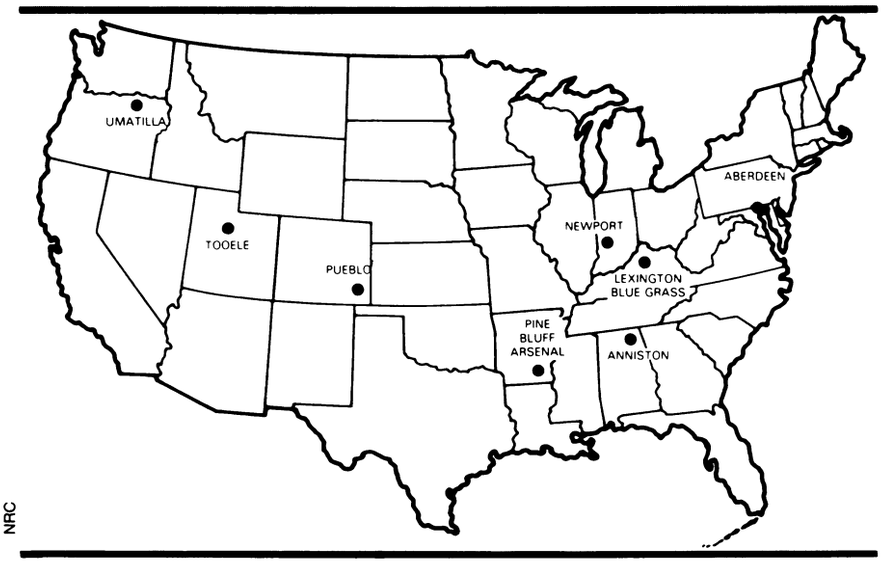
Chemical Weapon Stockpiles: A Burning Question

Rows and rows of "igloos" — dirt-covered, reinforced concrete bunkers — line long stretches of the road between Salt Lake City and Tooele, Utah. Each structure holds a stockpile of largely obsolete weapons: rockets, land mines, artillery and mortar shells, bombs and bulk containers loaded with chemicals such as mustard, nerve and hallucinogenic agents.

Tooele is one of eight storage depots within the continental United States where the U.S. Army carefully guards its massive supply of chemical munitions and agents. The Army now faces the formidable task of disposing of these unusable weapons, a few of which are starting to leak and all of which are more than 16 years old.

Although the total amount of munitions and agents now stored is classified, there is so much material that disposing of the stockpile could take up to 10 years and cost as much as $4 billion, according to Army estimates. "This is dangerous material," insists Robert W. Buchheim, formerly with the U.S. Arms Control and Disarmament Agency and member of a National Academy of Sciences (NAS) panel that, at the request of the Army in 1982, studied the problem. "We're much better off to get rid of the stuff," he says.

Last week, the panel released its report, "Disposal of Chemical Munitions and Weapons." The report recommends that the stockpiles "should be destroyed as soon as possible," preferably by incineration at each of the eight sites to avoid the problems of transporting the material to a central location. But because of numerous technical difficulties, the report also notes, "For the present time, however, storage is the only option."



NRC

Army depots where chemical agents and munitions are stored.

Among the chemical munitions, the panel says, the Army should give priority to the disposal of half a million M55 rockets. Each rocket is loaded with nerve gas and has a fuse, burster charge and propellant in place. These rockets are the source of the greatest number of leaks and the leading concern because of the possible harm that an accidental release or explosion could inflict on workers at the site and on nearby civilian populations.

According to the report, during the past two years, no accidents and only three minor incidents related to handling chemical agents and munitions have occurred. "The Army is handling the stockpiles well," says Norton D. Zinder, panel chairman and genetics professor at Rockefeller University in New York. Nevertheless, the Army should begin monitoring igloo exhaust vents continuously instead of making only periodic measurements to detect leaks, the panel says.

The Army has three options, says spokesman Maj. Donald Maple. One is to do nothing and leave the weapons in storage. Another is to build special incinerators at each site, as recommended by the NAS panel. The Tooele depot already has a small experimental facility where several tons of nerve agents have been burned successfully. Finally, the materials could be transported to a few regional centers or one central disposal plant. The Army will probably make its decision in about a year after a series of public meetings throughout the country and the preparation of environmental impact statements, says Maple.

Complicating the problem are the technical difficulties involved in disposing of the chemical agents and munitions. Until 1972, obsolete materials were dumped into the deep ocean, but Congress banned this practice. Chemical processes to neutralize or inactivate the agents are too specific, difficult and slow, the report says, and produce large quantities of hazardous wastes. The panel also rejected the possibility of placing the chemical weapons in underground cavities and destroying them in a nuclear explosion, although this method would ensure the complete destruction of anything placed in a cavity regardless of its composition or type.

The report concludes that incineration —burning the materials in air in a special furnace — is the most suitable disposal method. The Army has already demonstrated that all four major types of chemical agents can be destroyed effectively in this way. "They all burn well at a nice high temperature," says Zinder. However, one problem still to be faced, says Buchheim, is that of sensing the toxic agents during disposal, when shells and other containers must be broken apart to allow removal of the agents. These gases are hard to detect "once you leave the comfortable world of controlled storage," he says.

Despite the technical difficulties that a disposal program faces, says Zinder, "we're happy to celebrate the destruction of chemical weapons rather than the production of new ones." But, adds Buchheim, "all we can do right now is storage."

—I. Peterson

Clotting factor cloned

One year after the first bit of the gene that codes for an important blood clotting factor was located in human DNA (SN: 12/10/83, p. 372), two teams of researchers report that they have isolated and reproduced the entire genetic sequence, and successfully slipped it into the genetic machinery of hamster and monkey kidney cells in tissue culture.

With this technique, the cells were coaxed to secrete small quantities of Factor VIII, the substance missing or defective in the 20 of every 100,000 males who are afflicted with the most common type of hemophilia, say the researchers. Scientists at Genentech, Inc., in South San Francisco worked with the Royal Free Hospital in London on the project, while researchers at Genetics Institute, Inc., in Boston collaborated with the Mayo Clinic in Rochester, Minn. An editorial accompanying the reports of both groups in the Nov. 22 NATURE praises the feat, but notes that it may be three to five years before a safe, effective and clinically tested product reaches the market. □