

**HANFORD RESERVATION**

*Location: Richland, Washington. Size: 570 square miles. Mission: Plutonium processing; uranium recycling. Placed on EPA's National Priorities List of America's worst contaminated waste sites in 1989.*

DOE has called the cleanup of Hanford one of the "largest environmental restoration projects in history." Estimates of the cost range from \$50 to \$100 billion.

The production of 53 metric tons of plutonium for nuclear weapons from 1945 to 1987 created an estimated 68 million gallons of high-level radioactive waste, 65% by volume of all high-level waste stored within the nuclear weapons complex. About 61 million gallons of high-level waste are stored in 177 underground steel tanks, some of which have capacities of over a million gallons. According to DOE, 68 of these tanks are either known or assumed to have leaked as much as a million gallons of waste -- with enough plutonium to build 50 bombs the size of the Nagasaki bomb\* -- into the surrounding soil. At least 53 tanks may be at risk of fire or explosion due to a buildup of flammable hydrogen gas. Several workers have been injured or become ill when toxic vapors have escaped from the tanks. The waste tanks themselves consist of 451,000 tons of metal that some day must be emptied out, decontaminated and disposed of, as must nine shutdown plutonium-producing reactors.

Furthermore, enough liquid waste has been dumped into unlined pits and trenches at Hanford to form an 80-foot-deep lake the size of Manhattan. According to the General Accounting Office, the investigative arm of Congress, about 440 billion gallons of liquid waste has contaminated as much as 200 square miles of groundwater beneath the facility. Some wastes have been detected in the nearby Columbia River.

Documents made public in 1986 revealed that between 1944 and 1947 Hanford officials knowingly and without informing the public released to the atmosphere some 444,000 curies of radioactive iodine -- several thousand times what was released by the 1979 accident at Three Mile Island nuclear power plant. In 1990 DOE admitted that these emissions may be responsible for the high incidence of thyroid cancer and other illnesses in the region. An independent panel concluded that as many as 13,500 people living in the Hanford area at the time may have absorbed "significant" doses of radiation to their thyroid glands. Some infants may have received cumulative doses of radiation from contaminated milk higher than those absorbed by victims of the 1986 accident at Chernobyl nuclear power plant.

~CFDI

\*Plutonium for the Nagasaki bomb was produced at Hanford.

Since 1989 DOE has spent roughly \$20 billion on environmental cleanup and waste management. For fiscal 1994 Congress approved an additional \$5.2 billion. At most facilities, however, permanent cleanup activities have not yet begun because DOE is still defining the nature and extent of the contamination. Much of the technology and data needed to assess contamination problems and propose solutions simply do not yet exist. In a 1993 report on its cleanup program, DOE cautioned that "the full significance" of "the magnitude, scope and eventual cost" of cleaning up its weapons plants "has yet to be grasped."

A number of nuclear weapons facility sites are contaminated so extensively that they may have to be sealed off forever from public access, becoming what some have referred to as "national sacrifice zones." According to a 1990 study by the Congressional Budget Office, in such cases "complete cleanup may be technically and economically unfeasible." Efforts instead may have to be limited to containing, rather than eliminating, problems. Decontaminating groundwater, in particular, poses an enormous challenge. Groundwater beneath some nuclear weapons plants is believed to be contaminated at levels hundreds to thousands of times above drinking water standards.

In addition, DOE is faced with the necessity of decommissioning, decommissioning and dismantling as many as 7,000 buildings, reactors, and other structures within the nuclear weapons complex that ultimately may be shut down during the next 30 years. Completing these tasks, DOE estimates, will take at least through the year 2050. Many of the structures are huge. The K-25 building at the Oak Ridge Reservation in Tennessee is about a mile long and covers 137 acres. The poor condition of many facilities poses ongoing dangers to individuals working in and around them.

Cleanup of U.S. nuclear weapons facilities needs to take place in a manner that is timely, effective, efficient, safe and complete as possible. Additional federal money and resources for DOE cleanup are available in the billions of dollars the Pentagon wastes each year buying unneeded Cold War weapons. Plans by DOE to continue nuclear weapons activities into the next century should be reevaluated. The scientists and engineers who perfected "the bomb" should now be working on perfect effective cleanup technologies.

America's citizens are entitled to the full truth about the nation's nuclear dangers and to have a role in DOE cleanup program decisions. Justice demands that people harmed by "the nuclear threat at home" be compensated for their suffering. For this, the private contractors who profited immensely from the nuclear arms race should be made to bear some responsibility.

America may have won the Cold War, but it did so at a heavy price. We have not yet paid the full cost of victory in terms of cleaning up its lethal leftovers.

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**Nuclear Threat at Home  
DOE Nuclear Weapons Facilities**



**WASTE IS A TERRIBLE THING TO MIND**

From the mining of uranium ore to the final assembly of warheads, nuclear weapons production has generated vast quantities of wastes. Through the end of 1991, DOE was storing almost 395,000 cubic meters (100 million gallons) of high-level radioactive waste; 255,000 cubic meters of transuranic (plutonium contaminated) waste; 2.8 million cubic meters of low-level radioactive waste; and 101,000 cubic meters of mixed low-level waste. The combined radioactivity of these wastes -- about a billion curies\* -- is 20 times the radiation released by the 1986 Chernobyl nuclear power plant accident and 40 times the radioactivity of all high-level waste generated by America's nuclear power industry.

High-level radioactive waste results from the processing of "spent" or irradiated, nuclear fuel to produce plutonium. Nuclear weapons facilities have generated more than 99% by volume of all high-level radioactive waste in America. Production of just one pound of plutonium can generate as much as 150 gallons of high-level waste. In what was originally regarded as an "interim emergency method" but has since become *de facto* standard practice, most high-level waste is unsafely stored in liquid form in underground steel tanks -- some of which are as large as the dome of the U.S. Capitol building -- at the Hanford Reservation in Washington State, the Savannah River Site in South Carolina, and the Idaho National Engineering Laboratory.

No suitable method yet exists for safely and permanently disposing of high-level waste. DOE hopes by the year 2010 to open a proposed deep geologic repository at Yucca Mountain, Nevada, but numerous technical and political obstacles stand in the way. To convert it to a more stable form suitable for long-term disposal, DOE plans to immobilize high-level waste by embedding it in borosilicate "glass logs," a process known as *vitrification* or *glassification*. A vitrification facility has already been constructed at the Savannah River Site. A second is planned for Hanford.

Transuranic waste includes cloth, metal, paper, plastic and other materials that are contaminated with plutonium. Currently stored or buried at five principle locations, DOE plans to move its transuranic waste by truck to what would be the

nation's first permanent nuclear waste repository, the Waste Isolation Pilot Plant (WIPP) in New Mexico. But technical and legal obstacles have kept it from opening.

Low-level radioactive waste contains radioactivity that is less intense, but can still be dangerous. Nuclear weapons facilities have generated about 66% of all low-level radioactive waste in America. Most of it lies buried at DOE facilities in shallow trenches. In addition, DOE estimates that 89,472 steel drums (each with 55- or 80-gallon capacities) containing wastes totaling more than 94,000 curies of radioactivity were dumped at sea to 1970, when the United States halted this practice.

Mixed low-level waste is radioactive waste which also contains nonradioactive hazardous materials such as acids, cleaning fluids, engine oil, medical waste, paint residue, polychlorinated biphenyls (PCBs), heavy metals such as lead and mercury, and solvents such as benzene and trichloroethylene (TCE). Effective methods for treating mixed waste do not yet exist.

~CENTER FOR DEFENSE INFORMATION

**NOT ALL NEWS IS BAD NEWS**

Recent developments have reduced the likelihood that DOE will add to its contamination problems in the future.

In 1992 Congress passed the "Federal Facility Compliance Act" waiving the principle of federal *sovereign immunity* which nuclear weapons facilities have invoked to exempt themselves from environmental laws. Now facilities committing environmental crimes or failing to meet agreed-upon cleanup and compliance goals can, like private industry, be subjected to fines and penalties.

Meanwhile, under the Clinton Administration, DOE is showing signs of much-needed new vision and direction. In December 1993 Energy Secretary Hazel O'Leary announced a new "openness initiative" and disclosed previously classified information about the U.S. stockpile of plutonium, unannounced nuclear test explosions, and secret radiation experiments on human "guinea pigs." DOE's new Office of Declassification, formerly the Office of Classification, is reviewing 32 million pages of documents for possible public release.

DOE is also working to improve its oversight of weapons facility contractors to make them more accountable for environmental performance.

~CFDI

\*A curie is a measure of radioactivity equal to the amount of radiation produced by a gram of radium. Nuclear scientists equipped with protective clothing normally handle radioactive materials in quantities on the order of thousandths or millionths of a curie. An estimated 50 million curies were released by the 1986 accident at the Chernobyl nuclear power plant.



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