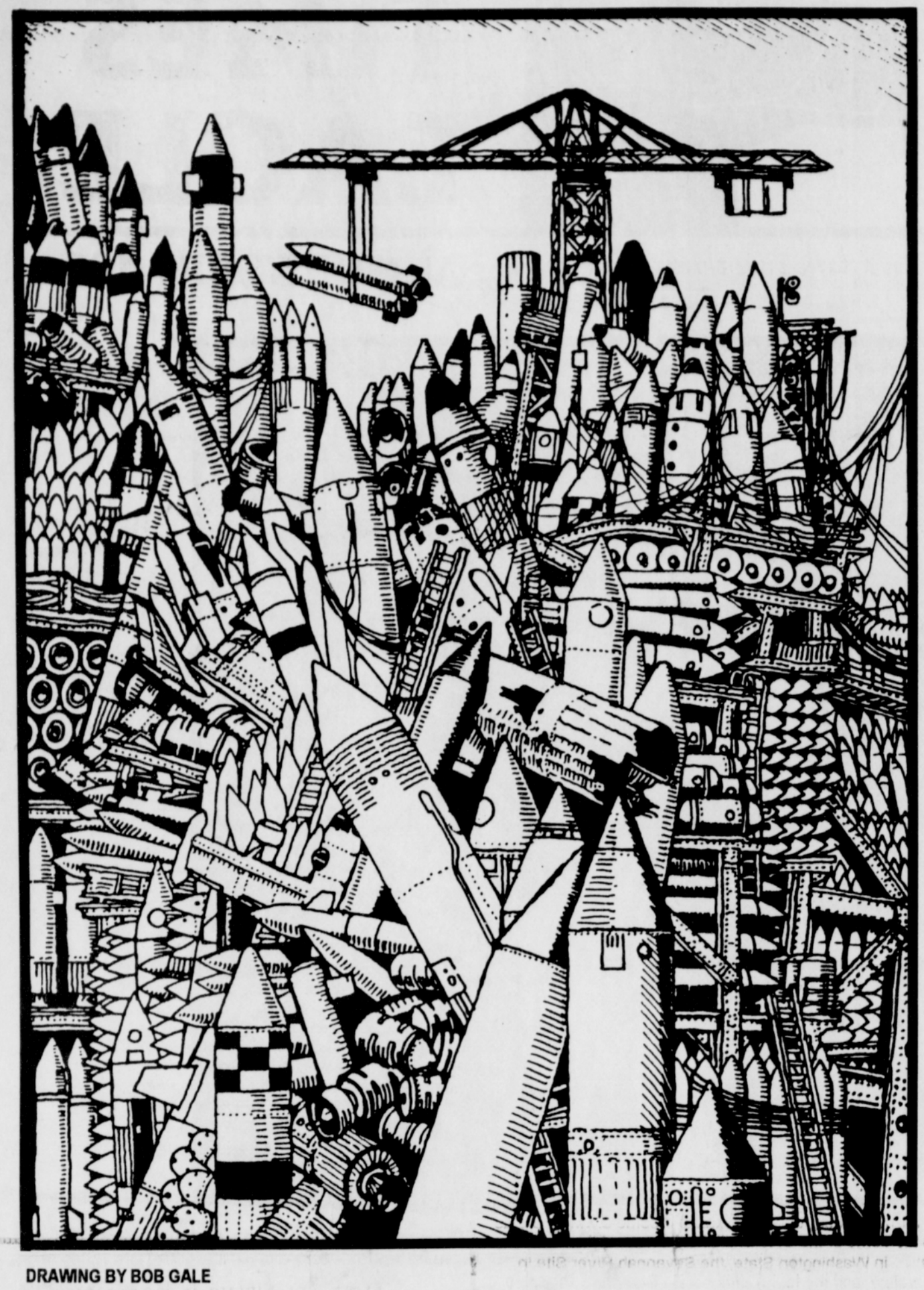

DRAWING BY BOB GALE

49 YEARS LATER

BY THE CENTER FOR DEFENSE INFORMATION

The Cold War may be over, but thanks to the huge mess that remains behind, it will not soon be forgotten. Lethal leftovers from the Cold War nuclear arms buildup have transformed vast tracts of land and water in the United States into radioactive and toxic wastelands. The names of nuclear weapons facilities such as Fernald, Hanford and Rocky Flats are to some as synonymous with environmental disaster as Chernobyl, Love Canal and Three Mile Island.

For decades America's nationwide complex of facilities responsible for designing, building and testing nuclear weapons has dumped, injected, poured, spilled and vented some of the most toxic substances known into the air, ground and water. According to the U.S. Congress' Office of Technology Assessment (OTA), "There is evidence that air, groundwater, surface water, sediments and soil, as well as vegetation and wildlife, have been contaminated at most, if not all, of the Department of Energy nuclear weapons sites." Continued unsafe and impermanent storage of radioactive waste and other deadly by-products of nuclear weapons activities only promises to add to a long-term, tax-funded cleanup bill already estimated at more than $2 billion.

In preparing to fight a nuclear war with the former Soviet Union, America succeeded in "nuking" itself. With the Cold War now behind us, there is less reason to fear that we will die in a nuclear attack. However, communities in the shadows of nuclear weapons plants and the workers who made the bombs may have good cause to fear that they will be stricken with cancer or other ailments because of the nuclear threat *at home*. To the victor of the world, it is said, belong the spoils. In the case of the Cold War, this is all too true.

The U.S. nuclear weapons complex is a vast industrial enterprise that sprang from the secret Manhattan Project effort to develop the atomic bombs to drop on Japan in 1945. Its 15 major facilities collectively occupy some 3,350 square miles -- an area larger than Delaware, Rhode Island and the District of Columbia combined -- in 13 states and employ more than 100,000 people. Although these facilities are owned by the federal government through the U.S. Department of Energy (DOE), they are managed and operated by private contractors such as Martin Marietta, Rockwell International and Westinghouse.

In the half century that it has existed, the nuclear weapons industry has manufactured nearly 70,000 nuclear warheads[1]. It has produced about 89 metric tons of plutonium and more than 500 metric tons of highly enriched uranium, the primary radioactive materials in nuclear weapons[2]. And it has carried out 1,076 nuclear explosions[3]. In the process, it has created a legacy of environmental contamination that, in the view of the OTA, is "unprecedented in scope and complexity."

This happened because nuclear weapons facilities were permitted to operate behind a veil of secrecy, largely free from external oversight, public scrutiny and environmental, health and safety laws. The attitude was "bomb production, whatever the costs." Facilities treated, stored and disposed of the vast quantities of waste materials they generated often in a careless and environmentally harmful manner. Decades of environmental, health and safety abuses at U.S. DOE nuclear weapons facilities have left an estimated 4,500 contaminated sites covering tens of thousands of acres of land[4].

Nine nuclear weapons facilities have qualified for inclusion on the U.S. Environmental Protection Agency's (EPA) "Superfund" National Priorities List of the worst contaminated sites in America. Much of this contamination was the result of accidents, spills and leaks. In other cases, however, it resulted from planned and deliberate acts. In the past, disposal of liquid wastes at nuclear weapons facilities often meant pouring them directly into the ground. Wastes also have been injected or pumped into wells or holes deep underground, buried in landfills, stored in giant underground tanks and vented into the atmosphere.

Contamination from nuclear weapons activities has posed a potential health and safety threat to some 600,000 past and present workers at nuclear bomb plants and millions of residents of surrounding communities. Radiation exposure has been linked to higher rates of cancer, leukemia, brain tumors, thyroid disorders, birth defects, sterility and miscarriages.

Plutonium is readily absorbed by the body and can remain there for decades. As little as .000001 ounce of plutonium-239, the radioisotope of plutonium used to fuel nuclear weapons, may be sufficient to cause lung cancer if inhaled in fine particles. With an estimated *half-life* of 24,000 years, half of the plutonium-239 that exists in 1994 will still be around in the year 25994. It will continue to emit radiation and remain a potential threat to life for about 10 half-lives -- in other words, 240,000 years, or about 10,000 human generations!

While much information about past contamination releases is not yet publicly available, in the last year there have been some startling revelations. In 1993 the General Accounting Office, the investigative arm of Congress, reported that the U.S. military and DOE's predecessor agency, The Atomic Energy Commission, purposely released large amounts of radiation to the atmosphere in the late 1940s and early 1950s as part of secret experiments to design a weapon that would kill enemy soldiers with radioactive fallout. Two such experiments took place at the Oak Ridge National Laboratory in Tennessee. Another six tests occurred at the U.S. Army's Dugway Proving Ground in Utah.

In a 1949 experiment referred to as "Green Run," scientists at the Hanford Reservation, a plutonium processing plant in Washington State, deliberately released a cloud of radioactive gases to test new equipment for detecting radiation far from its source. The cloud, which contained radioactive iodine, spread radiation for some 200 miles. Residents of the Pacific Northwest did not learn of the tests until 1989, and some details still remain secret. Additional tests took place in 1950 at Los Alamos National Laboratory in New Mexico. In one case, scientists, after exploding a nonnuclear bomb that contained radioactive materials, tracked radioactive fallout to a town 70 miles away.

A 1993 DOE report on the status of nuclear safety at weapons plants concluded that "the likelihood of a disaster is high." Foremost among DOE's concerns is the possibility of a chemical explosion or fire involving underground tanks that store high-level radioactive waste. The buildup in waste tanks of flammable hydrogen gas and potentially explosive ferrocyanide and organic nitrate compounds poses the risk of an accident similar to those that caused casualties and widespread radioactive contamination surrounding nuclear weapons facilities in Russia in 1957 and 1993.

According the Senator John Glenn (D-Ohio), a long-time observer of the nuclear weapons complex, "The potential for explosions is widespread throughout the entire DOE weapons complex." Of most concern are waste tanks at the Hanford Reservation, many of which are also either known or assumed to be leaking.

According to Assistant Secretary of Energy for Environmental Restoration & Waste Management Thomas P. Grumbly, DOE's second-highest priority after waste tanks is its unsafe storage of "spent," or irradiated, nuclear fuel. Until 1988 the United States routinely *reprocessed* spent fuel in order to separate and recover plutonium for use in weapons. Since then millions of pounds of the highly radioactive fuel have been left to sit in aging and corroding storage facilities.

A 1993 DOE report identified more than 100 "vulnerabilities" associated with spent fuel storage, defined as "conditions or weaknesses that may lead to radiation exposure to the public, unnecessary or increased exposure to the workers, or release of radioactive materials to the environment." Some fuel has already leaked from rusting canisters. Other fuel "was buried without protective barriers or containers."

Efforts to clean up contaminated sites and bring DOE nuclear weapons facilities into compliance with the nation's environmental laws are expected to take at least 30 years and cost more than $200 billion. This cleanup and compliance bill amounts to more than $2.8 million for each nuclear warhead the nuclear weapons industry manufactured and almost $800 for every man, woman and child living in the United States. It is more than twice what the country spent on the Apollo space program to put a man on the moon!

NOTES:

1. According to DOE, more than 53,000 of these 70,000 warheads have been retired and disassembled. The U.S. has produced no new nuclear warheads since 1990.

2. The U.S. has produced no new plutonium for nuclear weapons since 1988. It has produced no new highly enriched uranium for nuclear weapons since 1964.

3. This number includes 23 British tests on U.S. soil and the nuclear explosions at Hiroshima and Nagasaki on August 6 and August 9, 1945. The U.S. last tested a nuclear weapon in September 1992.

4. DOE defines a contaminated site as "any location, ranging from very small to as large as a thousand acres, where radioactive, hazardous or mixed waste has been released, or is suspected to have been released, to the environment." *Radioactive* waste contains atomic elements that emit radiation. *Hazardous* waste contains materials that are toxic, corrosive, flammable or reactive. *Mixed* waste is both radioactive *and* hazardous.