

The Office of Environmental Management Celebrates 20 years (1989-2009)

With the advent of the Manhattan Project in World War II and extended by the Cold War, which lasted until the end of the 1980s, the United States created a massive, nation-wide complex to research, develop and mass-produce nuclear weapons and related materials. This complex handled highly-radioactive and extremely hazardous materials that were necessary to create the sophisticated nuclear weapons that stocked the U.S. arsenal during the Cold War. This urgent undertaking, which was usually cloaked in the secrecy demanded of the Cold War era, eventually allowed the United States to “win” the Cold War. Unfortunately, it also created large areas of contaminated land and water, and huge stockpiles of highly-radioactive and/or hazardous waste.



Work progresses rapidly on the Integrated Waste Treatment Unit (IWTU).

[Click on image to enlarge](#)

The urgency of the Cold War did not allow the weapons complex to adequately plan ahead for how to manage the hazardous waste products it was producing, and the result was high levels of environmental contamination throughout what would become the Department of Energy complex. As the Cold War began to end and new environmental laws were put on the books by Congress, however, the urgency shifted from producing nuclear weapons to cleaning up the waste and contamination left behind.

To coordinate this huge undertaking, the U.S. Department of Energy created in 1989 the Office of Environmental Management. Its mission is to complete the safe cleanup of the environmental legacy brought about from five decades of nuclear weapons development and government-sponsored nuclear energy research. Before 1989, separate offices within DOE had responsibility for nuclear and non-nuclear related cleanup at sites and facilities across the nation, and it was difficult to coordinate and prioritize these activities. In establishing the Environmental Management program, DOE centralized these responsibilities and demonstrated its commitment to environmental cleanup.

The EM program has made significant progress in its 20 years, reducing risk and environmental liability at government sites across the nation, including at DOE’s Site here in Idaho. As an established operating cleanup and risk reduction program, EM continues to demonstrate the importance of environmental cleanup in the United States.

The Cleanup program at the Idaho Site



Remnants of the Materials Test Reactor building are pictured behind the D&D excavator, where crews

The Idaho Site’s Office of Environmental Management is responsible for managing a variety of radioactive and hazardous wastes and materials that originated from World War II-era conventional weapons testing, Cold War-era government-owned research and defense reactors, spent nuclear fuel reprocessing, laboratory research, and defense missions at other DOE sites. The Idaho Cleanup Project is treating, storing and disposing of a variety of waste streams, cleaning up the environment, and removing or deactivating unneeded facilities.

inside are hard at work dismantling shielding around the reactor.

[Click on image to enlarge](#)

Since its establishment in 1949, the Idaho Site has fulfilled numerous Department of Energy missions, including designing, testing and operating 52 nuclear reactors to support both defense and commercial nuclear power research and development, and reprocessing spent nuclear fuel to recover fissile materials. These activities resulted in an inventory of high-level, transuranic, mixed low-level and low-level wastes, which were disposed of in accordance with the applicable laws and regulations of the time.

In 1991, the Environmental Protection Agency designated the Snake River Plain Aquifer, which underlies much of southern Idaho, including DOE's Idaho Site, a sole-source aquifer. In the same timeframe the Site was also put on the U.S. Environmental Protection Agency's National Priorities (Superfund) List, requiring environmental remediation activities at 10 Waste Area Groups encompassing 100 operable units within the Idaho Site boundaries. In the early 1990s, negotiations among the U.S. Department of Energy, the U.S. Environmental Protection Agency, and the state Department of Environmental Quality resulted in a disciplined process and schedule for cleanup activities at the Idaho Site. This process involved characterizing areas where there were, or may have been releases of hazardous materials; assessing the risks of those releases; developing alternative approaches to ensure the risks were within acceptable regulatory limits; getting public input into the decision on how to best remediate the area; agreeing to a final Record of Decision on the cleanup approach; and finally, implementing that cleanup approach. After years of following this process and approach, DOE and its regulators – the EPA and the State of Idaho – signed the last Record of Decision for a large cleanup site earlier this month.

Actual cleanup and waste management activities are undertaken by the Idaho Cleanup Project, and its two principal contractors: CH2M-WG Idaho, LLC and Bechtel BWXT Idaho, LLC.

Waste Disposition

Since the 1950s the Department of Energy has used the Idaho Site to manage, store, and dispose of radioactive waste generated by national defense and research programs such as the Department's former Rocky Flats Plant located near Denver, Colorado. The Rocky Flats Plant was established in 1951 with a mission to manufacture nuclear weapons components from materials such as plutonium, beryllium, and uranium. The Idaho Site played its role in the national defense and research programs by accepting the waste by-product that resulted from these types of operations. From 1954 to 1970, Rocky Flats waste was buried in unlined pits and trenches at the Idaho Site. From 1970 to 1984, it was temporarily stored on asphalt pads covered with earthen berms. From 1984 until the Rocky Flats Plant closed in the late 1980s, waste was stored on asphalt pads in temporary air-support structures. Eventually, permitted hazardous waste storage modules were constructed to store the Rocky Flats waste until the Waste Isolation Pilot Plant, a permanent waste repository located near Carlsbad, N.M., opened to begin receiving the waste. Today the Idaho Site is actively retrieving, treating, and repackaging these wastes and shipping them off site for permanent disposal.

The Advanced Mixed Waste Treatment Project (AMWTP): The AMWTP facilities were constructed between 1996 and 2002 in order to retrieve, treat, and ship the contact-handled transuranic waste, most of which was generated at the Rocky Flats Plant and then stored at the Idaho Site. Waste that qualifies for disposal is sent to the Waste Isolation Pilot Plant (WIPP). Over half (approximately 35,900 cubic meters) of CH-TRU waste has already been shipped out

of Idaho. Currently, AMWTP is the largest provider of transuranic waste to WIPP. Future activities include shipment of the remaining 30,000 or so cubic meters of stored transuranic waste out of Idaho by a target date of December 31, 2015 as well as the characterization and treatment, if necessary, of transuranic wastes from other sites in the DOE complex.

Remote-Handled Transuranic Waste (RH-TRU): RH-TRU waste sources are primarily from nuclear fuel examinations, experiments, and other industrial activities that occurred since the Idaho Site's establishment in 1949. About 80 cubic meters of RH-TRU have been removed from below-grade storage, repackaged, and shipped for permanent disposal at WIPP, the first being on January 23, 2007. Because of the higher radiation fields associated with this waste, activities involving disposal are performed remotely which significantly increases the complexity of the work. Although challenges exist with the remaining waste streams, final disposition will meet the Idaho Settlement Agreement target date of December 31, 2015.

Buried Waste: A specific record of decision addresses transuranic waste buried in the Subsurface Disposal Area in the 1950s and 1960s, by defining actions that must be taken to remediate the area. Activities will take place over approximately 17 years and include: targeted waste retrieval, removal and destruction of hazardous chemical vapors from below ground, in-place grouting of some highly-mobile radioactive contaminants and, eventually, a cap over the remaining wastes and on-going monitoring and control of the burial site. Exhumation activities in the Subsurface Disposal Area will remove at least 6,238 cubic meters of waste from a minimum retrieval area of 5.69 acres. The wastes to be exhumed, packaged, and shipped out of Idaho consist of defined targeted wastes (sludge, graphite, filters, and roaster oxides). Thus far, about 1,800 cubic meters of targeted waste from this area have been shipped out of Idaho.



Waste exhumations continue at the Accelerated Retrieval Project.

[Click on image to enlarge](#)

Facility and Material Disposition

Established in the 1950s the Idaho Site's Idaho Chemical Processing Plant, now the Idaho Nuclear Technology and Engineering Center, recovered useable uranium from spent fuel generated in government reactors. Over the years, the facility recovered over \$1 billion worth of highly enriched uranium, which was returned to the government fuel cycle. In 1992 the Department of Energy announced that the changing world political situation and the lack of demand for highly enriched uranium made reprocessing no longer necessary. The result of years of reprocessing left the Idaho Site with millions of gallons of high-level radioactive liquid waste, and numerous facilities that no longer have a mission. The Idaho Cleanup Project has made great strides in solidifying large quantities of liquid waste, closing waste tanks that are no longer needed, and cleaning up and stabilizing facilities that contained radioactive and/or hazardous materials that were used in the reprocessing work.

The High Level Waste Tank Farm

The uranium recovery effort produced 9 million gallons of liquid high-level waste which was stored in eleven 300,000-gallon stainless steel tanks at the INTEC high-level waste tank farm. The high-level waste was eventually turned in to 4,400 cubic meters of calcine, the product of an innovative high-level liquid waste treatment process developed at the plant. Calcination reduced the volume of liquid radioactive waste generated during reprocessing and placed it in a more

stable granular solid form. The high-level waste calcine is a waste form unique to the Idaho Site, and is currently stored in 43 stainless steel bins in six concrete bin sets.

Eleven of the 15 high level waste tanks, as well as the system of lines and risers that connected the tanks to the fuel processing facilities, have been emptied and grouted. Regulated closure of the entire INTEC tank farm will occur when the remaining 900,000 gallons of liquid waste being stored in three of the four remaining tanks is removed and treated at the Integrated Waste Treatment Unit, which is currently under construction. The IWTU is scheduled for completion in August 2010, with startup scheduled for April of 2011. Treatment of waste will take approximately 15 months to complete.

Decommissioning and Demolition The purpose of the D&D project is to safely disposition surplus facilities located at the Idaho Site. Since June 2005, the project has demolished 142 facilities for a total footprint reduction of over 1.4 million square feet. The project has disposed of two nuclear reactor vessels in a lined, permitted disposal facility, and is working on decommissioning a third reactor. The project has successfully demolished spent fuel storage pools, hot cells and hot shops, a fuel reprocessing plant, numerous above- and below-ground tanks, warehouses, and waste storage buildings. Upcoming work includes 90 American Recovery and Reinvestment Act--funded facilities, which include the Experimental Breeder Reactor-II at the Materials and Fuels Complex and hot cells at the Advanced Test Reactor Complex.

Spent Nuclear Fuel

The Idaho Site manages 220 types of spent nuclear fuel representing the history of Navy and commercial nuclear power development. The Idaho Site's Idaho Nuclear Technology and Engineering Complex has five storage configurations. The Idaho Site is also responsible for an NRC licensed storage facility in Fort St. Vrain, Colorado. Spent nuclear fuel is currently being transferred from wet to dry storage, a process that is expected to be complete by September 30, 2010.

It has been estimated that less than 10 percent of the total area of the Idaho Site has been disturbed by buildings, roads, utilities or releases of chemical or radioactive contamination. Much of the cleanup and remediation of the Idaho Site agreed to with our regulators is already complete. In addition, the recent receipt of American Recovery and Reinvestment Act funding allows the Environmental Management Program at the Idaho Site to accelerate completion of existing environmental protection and site cleanup goals, disposition excess nuclear facilities and radioactive waste much earlier than originally planned, and greatly reduce the EM footprint, and any environmental threats that resulted from decades of nuclear weapons development from other sites -- and government-sponsored nuclear energy research and development here in Idaho.

In its 20 years of existence, the Environmental Management program has made great strides in Idaho. There is still plenty of work to be done over the next several decades, but the EM track record in Idaho is a good one and gives the Department confidence it can continue to meet its commitments to the people of Idaho to restore and protect the vast high desert environment, and underlying aquifer of its Idaho Site.