E
M Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

The EM Story

Making of the Atomic Bomb

Albert Einstein and FDR

The road to development of the atomic bomb began in 1939 when Albert Einstein wrote a letter to President Franklin Roosevelt advising him that Nazi Germany might be conducting research to develop atomic bombs and suggesting that the U.S. should do the same.

Manhattan Project

In 1942, the U.S. government launched an effort to develop the first atomic bombs, which came to be known as the Manhattan Project. Conducted in secret, the Manhattan Project eventually employed more than 130,000 people at research and production sites located across the U.S. These sites included the Los Alamos research site in New Mexico and production facilities at Hanford, Washington and Oak Ridge, Tennessee.

First Atomic Bombs

On July 16, 1945, at the Trinity Site in New Mexico, the U.S. government conducted the first test of an atomic bomb. Shortly thereafter, U.S military aircraft dropped atomic bombs on the Japanese cities of Hiroshima and Nagasaki. Japan surrendered on August 14, 1945, bringing an end to World War II, a conflict in which more than 70 million people died.

The Cold War

Arms Race

Following World War II, tension and competition grew between the U.S. and the Soviet Union. This came to be known as the Cold War. The Cold War involved a nuclear arms race in which both the U.S. and the Soviet Union developed large numbers of nuclear weapons. The U.S. expanded nuclear weapons research and production, building such sites as the Savannah River Plant in South Carolina, the Idaho National Laboratory, and the Rocky Flats Plant in Colorado.

End of the Cold War

The prospect of mutual mass destruction from these nuclear weapons deterred direct conflict between the adversaries. In the late 1980s and early 1990s, the Soviet Union and its influence over its allies collapsed, effectively ending the Cold War.

America's Cold War Legacy

Nuclear Waste and Materials

During the Cold War, the U.S. nuclear stockpile reached more than 30,000 nuclear weapons. Research and production of these weapons resulted in large volumes of nuclear waste and materials. They consist of some of the most dangerous materials known to mankind, including liquids, sludge, solids, and equipment contaminated with plutonium and other radioactive elements. Some of these substances have low levels of radioactivity while others have high levels that require shielding, such as lead, concrete, and steel.

There are more than 1.5 million cubic meters of solid radioactive waste and 88 million gallons of radioactive liquid waste. The total amount of nuclear waste to be safely dispositioned would fill the Louisiana Superdome.

In addition to waste, nuclear weapons research and production left a legacy of nuclear materials, which include plutonium, uranium, and nuclear fuel.

Soil and Groundwater

During the Cold War, the U.S. did not have the environmental protection know how, processes, and regulations which exist today. Therefore, large amounts of nuclear waste were generated, stored, and disposed of in ways that we now consider to be unacceptable, such as in single-shell underground tanks.

These Cold War methods also led to the contamination of soil and groundwater at locations across the country. The sheer volume of affected soil and groundwater, the range of geologic settings, and the diversity of contaminant types makes this one of the world's most complex environmental challenges.

Facilities

In addition to nuclear waste and materials, nuclear weapons research and production have left behind nearly 5,000 contaminated nuclear and industrial facilities and 10,000 areas needing remediation.

Cold War cleanup sites are located in 35 states.

Office of Environmental Management

Creation

In 1989, the U.S. Department of Energy created the Office of Environmental Restoration and Waste Management, which later was renamed the Office of Environmental Management or EM. The EM mission is to complete the safe cleanup of nuclear waste, materials, and facilities left over from five decades of nuclear weapons development and government-sponsored nuclear energy research.

World's Largest Nuclear Cleanup Effort

EM operates the world's largest nuclear cleanup program. This effort involves two million acres of land located in 35 states and employs more than 30,000 federal and contractor employees, including scientists, engineers, and hazardous waste technicians. EM's annual budget, appropriated by Congress, is more than $5 billion.

Headquartered in Washington, D.C., EM focuses on cleanup of nuclear waste, nuclear materials, buildings, and facilities.

The amount of land involved in the EM cleanup is the size of Rhode Island and Delaware combined.

Cleanup Activities

Nuclear Waste Cleanup

Involves the storage, retrieval, characterization, treatment, packaging, transport, and disposal of nuclear waste.

Nuclear Materials Cleanup

Involves safely packaging nuclear materials for disposition.

Facility and Site Cleanup

Involves the decontamination, demolition, and removal of facilities and buildings; soil and groundwater remediation; and other highly technical cleanup activities.

Many cleanup activities require innovative technologies and processes.

Safety and Risk Reduction

Worker Safety

Workers at EM sites perform complex, “first-of-their-kind” tasks every day, under the most technically and physically challenging conditions. The waste and materials they deal with contain some of the most dangerous substances known to man and will remain radioactive for thousands of years.

The dangers our workers face make safety EM’s top priority. EM ensures that its workers have the experience, expertise, and training necessary to perform each of their tasks safely. EM believes that its workers deserve to go home each day as healthy as they were when they arrived at work.

Public and Environmental Protection

EM’s ultimate goal is to reduce risks to the public and the environment that are posed by nuclear waste and materials, soil and groundwater contamination, and aging nuclear weapons research and production facilities.

To achieve this goal, EM invests in and deploys robust, first-of-its-kind, state-of-the-art technology, equipment, and systems to accomplish its cleanup mission.

In performing its tasks, EM focuses on complying with federal and state laws, regulations, and agreements for environmental protection, occupational and nuclear safety, transportation, and disposal.

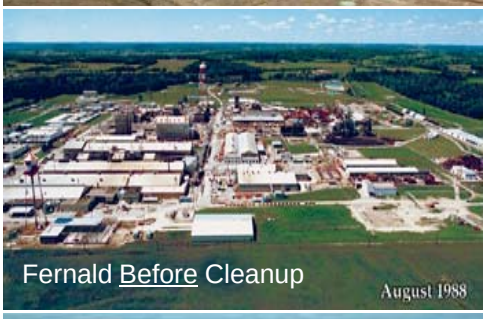
Partnerships with regulators, stakeholders, tribal nations, industry, and universities are essential to successful cleanup of EM sites.

Safety is our first priority.

Cleanup Progress


Rocky Flats
Before Cleanup


Rocky Flats
After Cleanup


Fernald Before Cleanup
August 1988


Fernald After Cleanup

Major Sites Cleaned Up

EM has made substantial progress in completing cleanup of large sites such as Rocky Flats, located near Denver, Colorado and Fernald, located near Cincinnati, Ohio. These sites were completed decades ahead of schedule, saving taxpayers billions of dollars.

Low-Level Waste Cleanup

More than three quarters of the Cold War's low-level waste has been safely disposed of in engineered landfills such as at the Nevada Test Site.

Transuranic Waste Cleanup

More than 100,000 containers of transuranic waste have been safely disposed of in a stable geologic formation 2,150 feet below the surface at the Waste Isolation Pilot Plant in New Mexico. This waste was transported safely from other nuclear weapons sites.

Plutonium, Uranium, and Spent Fuel Packaged

Nearly all plutonium, uranium residues, and spent nuclear fuel have been packaged for long-term safe storage and disposition.

Facilities Completed

Nearly 2,000 nuclear, radioactive, and industrial facilities have been decontaminated and demolished or converted to industrial use.

Soil and Groundwater Completed

More than 6,000 contaminated areas have been cleaned up.

Reduction of risk to the environment, our workers and our communities is paramount.

Challenges

While EM has made substantial progress in its cleanup, much work remains and many challenges lie ahead.

Chief among these is the elimination of more than 88 million gallons of liquid radioactive waste stored in more than 200 aging underground tanks. Most of this waste is planned for disposition in highly stable glass or concrete.

Continuing the EM Mission

EM will continue to focus on risk reduction ensuring cleanup activities that are safe, environmentally responsible, cost effective, efficient, and prioritized.

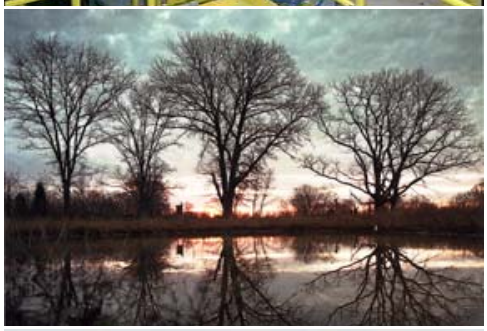
EM is implementing robust project management processes that promote performance and efficiency and is striving for an organization with industry partners that yields high performance.

EM will continue to engage the public, regulatory agencies, state and local governments, tribal nations, and other stakeholders in developing cleanup strategies that fulfill EM's mission to complete the safe cleanup of nuclear weapons sites that strengthened our nation.

To Learn More

To learn more about EM and its work, please visit the EM website:

www.em.doe.gov



The website contains information on the following:

- Sites/Locations
- Acquisition
- Budget and Performance
- Regulatory Compliance
- Engineering and Technology
- Projects
- Safety & Quality Assurance
- Transportation
- Waste and Materials Disposition
- Advisory Boards and Working Groups
- Tribal Programs
- Intergovernmental and International Involvement
- Resources
- Organization and Leadership
- Jobs/Human Capital

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