



20 Years of Progress in Processing Nuclear Waste

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Our Mission – Every Project as Successful as This

1960s: Plutonium Manufacturing
Rocky Flats, Colorado



Cleanup →

Rocky Flats today:
National Wildlife Refuge



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20 Years of Progress – Summary

- The Department’s Responsibility
 - **Cleanup** of radioactive waste and contamination generated by nuclear energy research and weapons production
 - **Protection** of groundwater and soil
 - **Reduction of risk** to the nation’s citizens
- 2009 Marks **20 Years** of Our Cleanup Effort
 - Demonstrated **progress** in cleanup
 - **Technological** breakthroughs
- Our Future
 - Continuing nuclear waste **challenges** to solve
 - Implications for the **world’s energy future**



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Five Decades of Nuclear Research and Weapons Production – The Legacy



Sites covering 8,100 sq. km., nearly the size of London, Paris, Washington, and Moscow combined



More than 10,000 groundwater and soil sites to protect and clean up



4,500 facilities to decontaminate and demolish

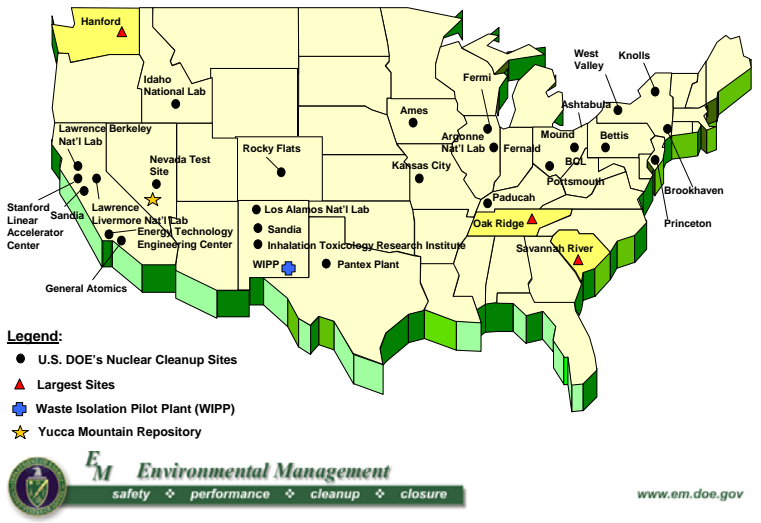


Enough nuclear waste to fill the Beijing National Olympic Stadium



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The U.S. Department of Energy's Cleanup Sites

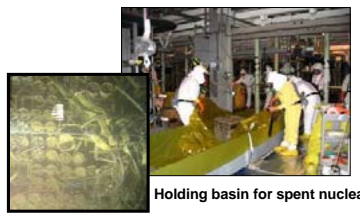


The Inherently High-Risk Work of Nuclear Cleanup

We work with some of the most **dangerous substances** known to humanity...



Workers using glovebox to handle plutonium



Holding basin for spent nuclear fuel

Performing **first-of-a-kind tasks** in highly hazardous work environments



Working with high-level waste

We are Making Progress Every Day



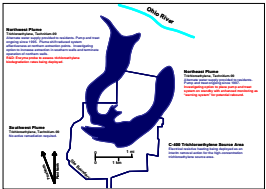
Completed cleanup at **86 of 108** total sites across the U.S.



Brought down more than **1,700** facilities



Annually dispose of **one million cubic meters** of low-level waste (a football field over 200 meters high)



Stabilized more than **100** groundwater plumes

We Solve Problems That Once Seemed Unsolvable

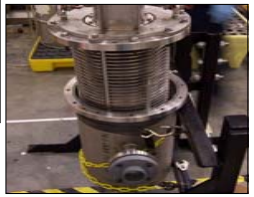
The Department's work has led to the design, construction and operation of **first-of-a-kind facilities and technologies.**



Hanford, Washington
 Liquid Waste Treatment Plant =
 US\$12 Billion



Device for removing sludge from bottom of liquid waste storage tank



Microfilter for separating solids and liquids developed at Savannah River, South Carolina

But Significant Cleanup Challenges Lie Ahead

Retrieving 3000+ million liters of liquid radioactive waste . . .

. . . Safely storing it in 200+ underground tanks . . . and

. . . Solidifying it for safe disposal

Cleaning up 240 sq. km. of contaminated groundwater

Maintaining a stable and skilled workforce

Developing technologies – vitrified waste from Savannah River, South Carolina

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Energy Benefits of Investments in Nuclear Cleanup

1. Building nuclear industry **infrastructure**
2. Invigorating **education** in science and engineering
3. Developing **technology**

4. Enhancing global **security**
5. Promoting energy **diversity**
6. Supporting efforts to address **global climate change**

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Success Story #1: Disposal of Transuranic Waste

- Transuranic waste is disposed of at the **Waste Isolation Pilot Plant (WIPP)** in Carlsbad, New Mexico
- WIPP is the **world's first** deep geological repository
- WIPP has provided a **safe, stable** solution for waste disposition

Depository rooms are located 650 meters below ground

Waste being safely shipped from states across the U.S.

Drums being prepared for disposal at WIPP

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Success Story #2 – Spent Nuclear Fuel

The Department's manages more than **2,100 metric tons of spent nuclear fuel**, including foreign research reactor fuel of U.S. origin.

Receipt and Storage of spent nuclear fuel at U.S. DOE facilities

Spent Nuclear Fuel

DOE has developed:

- Best-in-class **wet storage** practices for spent reactor fuel
- **Dry storage** methodologies for damaged spent fuel
- **Water cleanup systems** that support spent fuel recovery and basin decommissioning

Global Energy Benefit: Supports global non-proliferation

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Success Story #3 – Special Nuclear Materials

- The Department manages more than **30 metric tons of excess special nuclear materials** such as plutonium, enriched uranium, and U-233.
- Surplus plutonium will be fabricated into **mixed oxide (MOX) fuel** for commercial nuclear power, or dissolved and vitrified
- Highly enriched uranium is being downblended to low enrichment for use as **commercial reactor fuel**



Global Energy Benefits: *Non-proliferation, and former weapons material becomes feedstock for commercial nuclear power*

Success Story #4 – High-Level Waste



Tank Construction, Savannah River, South Carolina, 1963



Waste Treatment Plant Construction, Hanford, Washington, 2008

- **Waste Disposition:** Waste is non-homogenous, requiring different processing:
 - Waste Treatment Plant (Washington State)
 - Defense Waste Processing/Salt Waste Processing Facilities (South Carolina)
 - Sodium Bearing Waste Plant (Idaho)
 - West Valley Vitrification Plant (New York)
- **Tank Closure:** Empty tanks filled with grout to stabilize contents and structure

Global Energy Benefit: *Demonstrating the management of waste generated by the nuclear fuel cycle*

In Conclusion

U.S. Department of Energy nuclear waste management provides pollution cleanup today and energy solutions for tomorrow



Our record proves that safe, effective nuclear waste management is possible:

- We have effectively reduced risk to the environment and the community
- Each year, our knowledge and skill base grows

Our work provides global benefits beyond nuclear cleanup:

- Advancing nuclear power during a stagnant time for the nuclear industry
- Enhancing global security and nuclear non-proliferation

Enormous challenges lie ahead:

- The ability to continue to make technological leaps forward
- The willpower of societies to continue to pursue difficult, expensive work