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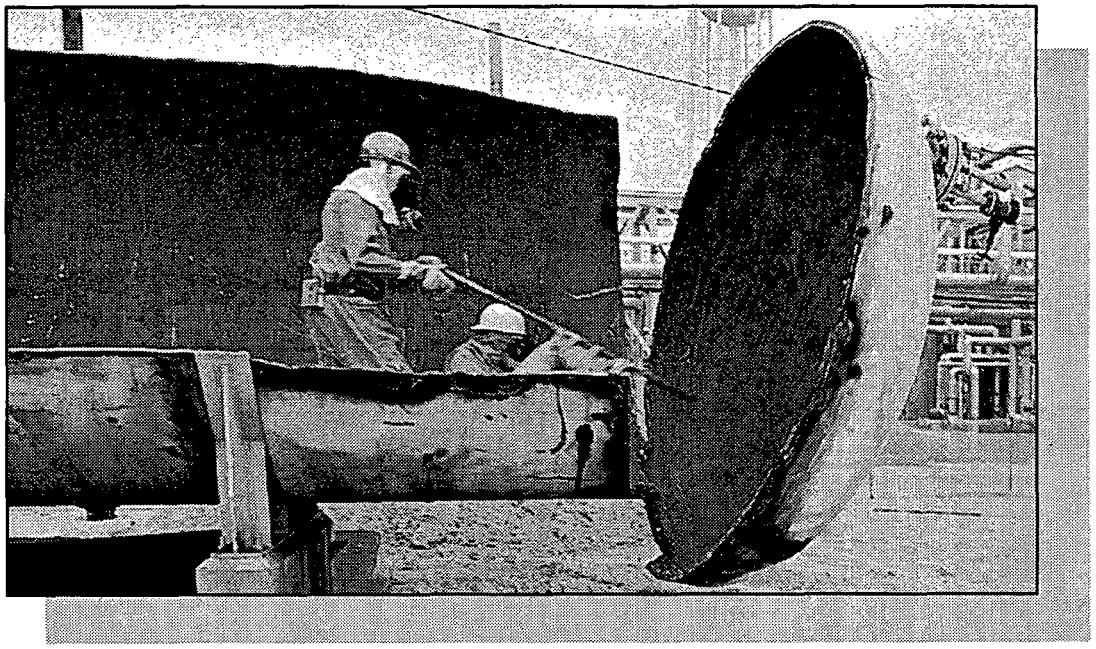
Fact Sheet

Fernald Technology Programs



An oxy-gasoline torch was used to segment a large, 1.5-inch thick steel tank which was part of the Fernald Plant 4 complex. The subcontractor purchased the oxy-gasoline torch after attempts to segment this tank were unsuccessful with an oxy-acetylene torch (6429-143).

Description

Fluor Daniel Fernald Technology Programs supports the cleanup mission at the U.S. Department of Energy's (DOE) Fernald Environmental Management Project by seeking out, identifying, demonstrating, and implementing innovative technologies. The goal is to find or demonstrate new proven technologies for safer, cheaper, and faster remediation of Fernald and other DOE sites. Technology Programs is partially funded by the DOE site budget with the majority of the technology projects being funded by the Office of Science and Technology (OST, EM-50). Technology Programs has established itself as a leader and center of excellence in the use of improved and innovative, cost-effective remediation technologies applied to real field problems. Providing engineering and technological leadership and support to projects at Fernald is accomplished through the efforts of the following programs: Technology Development, Technology Integration, the Site Technology Coordination Group, and Technical University Programs.

Technology Development

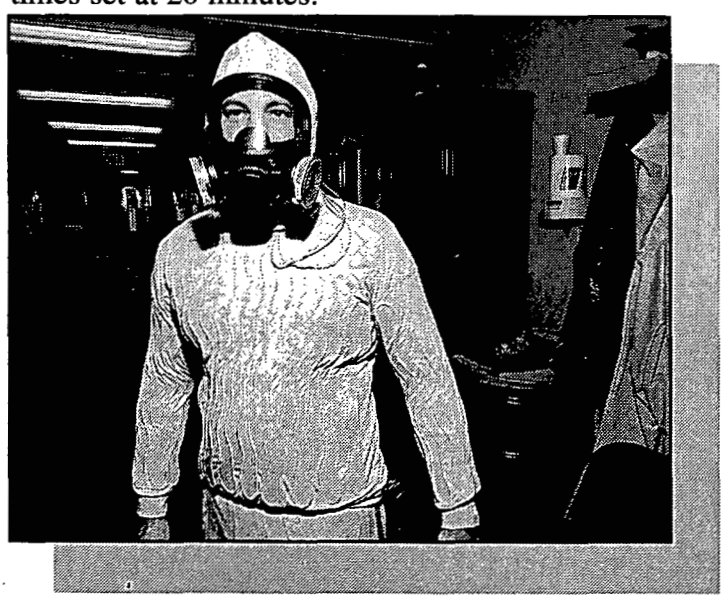
The goal of technology development is to develop and implement investigative studies and demonstrations of technologies that benefit Fernald's remediation efforts and "prove" that a proposed new technology can do the job better. The largest demonstration effort is focused on Decontamination and Decommissioning (D&D) through a very successful, OST-funded program called the Fernald Large Scale Technology Demonstration Project (LSTDP). Several of the projects that Technology Development is conducting are described as follows.

Oxy-Gasoline Cutting Torch

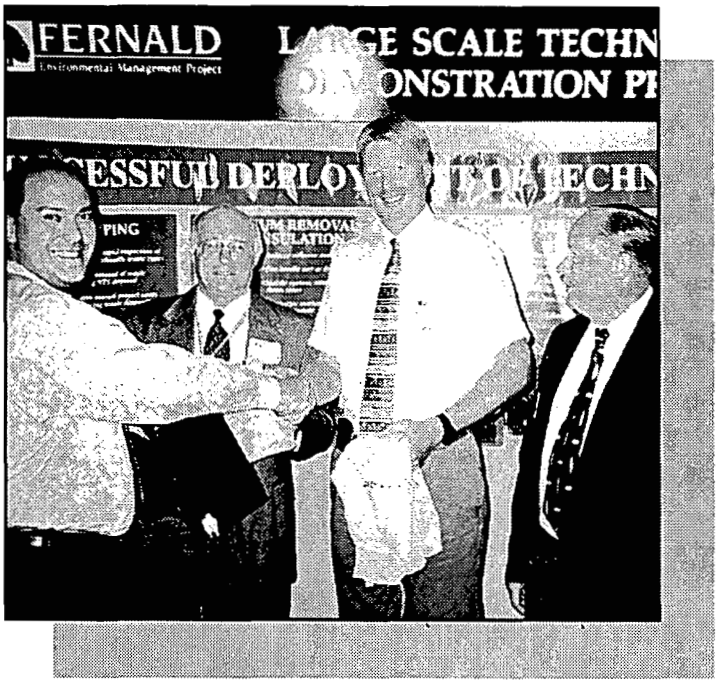
The oxy-gasoline torch system consists of a gasoline fuel tank equipped with special control valves, durable supply hose and a new type cutting head which remains cool and eliminates backflash during use. In Fernald LSTDP tests, the oxy-gasoline torch cuts thick metal significantly faster and cleaner than an acetylene torch. The oxy-gas torch took 13 minutes to cut a two-inch thick steel plate compared with 27 minutes to make the same length of cut using an acetylene torch.

Cool Suit - Personal Ice Cooling System

The Personal Ice Cooling System (PICS), or "Cool Suit," was selected for demonstration at Fernald D&D projects. The cool suit is a 12-pound, self-contained core body temperature control system which uses ordinary ice as a coolant, circulating cool water through tubing within a full body garment (pants, shirt and hood). The capability of the PICS to control heat stress, increase productivity, and improve worker comfort was proven with Wise Construction employees who wore PICSs during the rehabilitation of Fernald's Building 68, former thorium warehouse. Temperatures inside the structure reached as high as 105 degrees Fahrenheit with stay times set at 20 minutes.



The cool suit, pictured here, reduces heat stress and is worn as an undergarment beneath protective coveralls (6429-161).

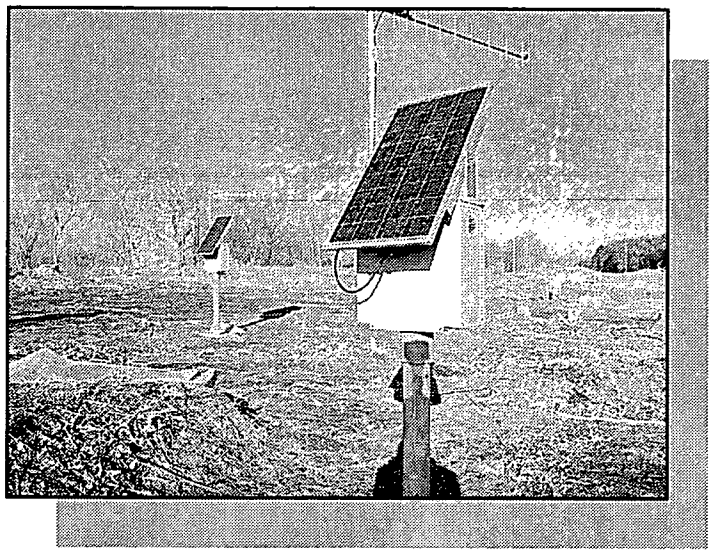


Fernald team members participate in a DOE sponsored technology transfer of the Personal Ice Cooling System (PICS) to Hanford officials. PICS has proven effective in mitigating heat stress, a serious health and safety problem across the DOE complex (6429-431).

Employees wearing the PICS were able to extend the stay time to 80 minutes, a four-fold increase in productivity. Pulse rate and core-body temperature were measured frequently to assess the PICS ability to maintain temperature and pulse rate below health and safety threshold limits and to ensure the safety of the employees. All measurements during the demonstration were below the set limits. Feedback from employees wearing the suits was positive, including a desire to have the PICS available for future situations where heat stress could present a problem.

Long-Term Post Closure Radiation Monitoring

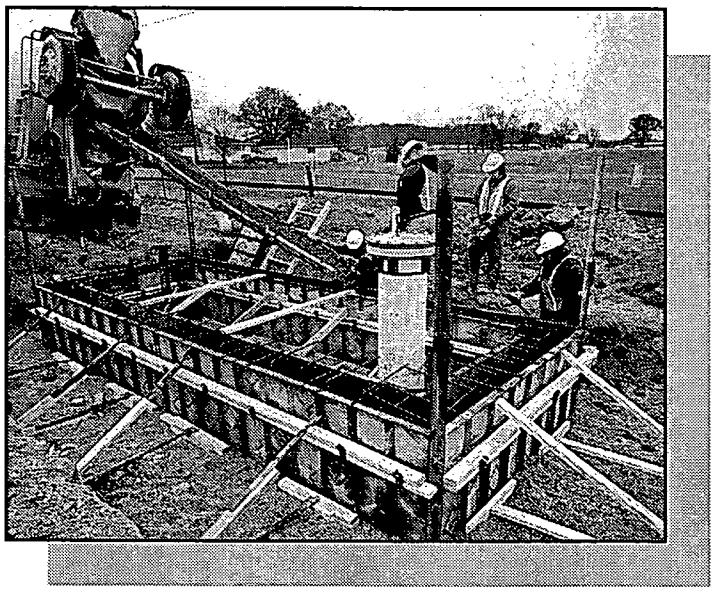
This demonstration evaluates a system for continuous, unattended monitoring of radiation levels in hazardous waste sites. The detectors transmit data automatically to a host computer and aid sites in meeting post-closure monitoring requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) at a lower cost and with significantly less worker exposure than conventional manual sampling.



Overview of radiation monitoring system depicting well casing, environmental enclosure, solar panel, and cell phone modem antenna (6734-241).

Groundwater Re-injection

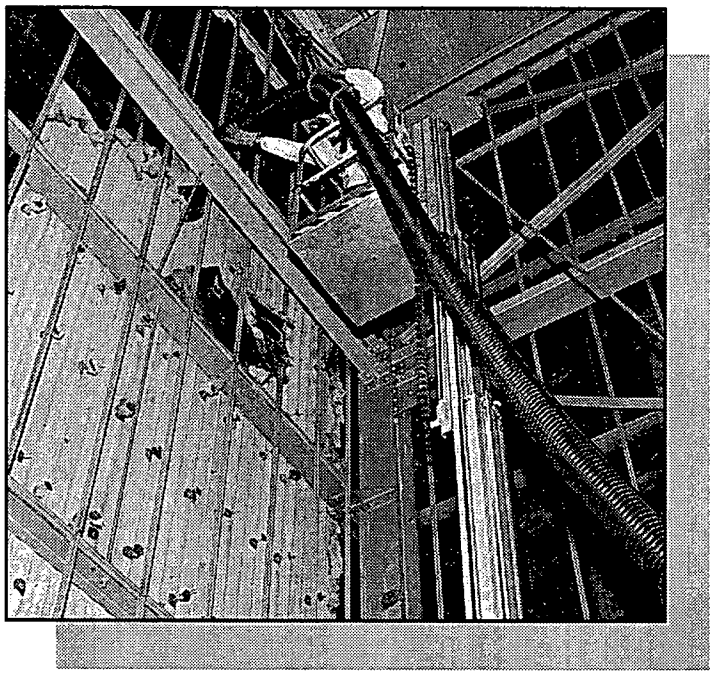
This demonstration evaluates an enhanced remediation strategy for a uranium contaminated groundwater plume at the Fernald site and involves the injection of treated water into the Great Miami Aquifer as a means of improving the flushing of uranium from the aquifer. A total of five injection wells will be used for this demonstration. Modeling simulations have predicted a reduction in remediation time by as much as 17 years through this technology. The expected cost savings associated with this technology is $3 to $5 million per year, for every year the restoration effort is shortened.



Workers pour foundation wall for a 16" re-injection well to be used in the field-scale demonstration. Part of the project investigation is to determine the optimal well size for re-injection (6261-275).

VecLoader HEPA Vac

The VecLoader HEPA Vac is a self-contained, trailer-mounted vacuum unit that is used commercially to evacuate asbestos insulation. Through a flexible suction hose the HEPA Vac can transport insulation up to 1,000 feet. Mineral wool batting and insulation fibers (nonasbestos) are "vacuumed" and captured in a fully-enclosed, negative pressure system and sent into a cyclone separator, where the material is bagged directly from the vacuum. The VecLoader HEPA Vac is an extremely useful D&D tool equipped with automatic shut-off safety valves and other safety features.



Worker uses the VecLoader suction hose to remove the insulation directly off the wall in a one-step process. The HEPA Vac technology significantly reduces airborne contamination and handling and greatly enhances worker safety (6482-55).

Technology Integration

Integration of technologies involves getting out in the field and talking to project managers, engineers and workers who need and use technologies. It focuses on new ideas and simple improvements to make jobs easier through technology. One of the primary functions of Technology Integration is to administer the Site Technology Coordination Group (STCG).

Site Technology Coordination Group (STCG)

Fernald's STCG acts as a vital link between various DOE offices, other DOE sites, technology providers, Fernald projects, and stakeholders. The STCG proactively represents Fernald interests to the many DOE research, development, demonstration, and deployment efforts throughout the country. In this way, technologies are acquired and implemented at Fernald to expedite schedule, enhance safety, and reduce remediation costs. The STCG's primary function is communication, which is accomplished in the following ways:

- identify and communicate technology needs from the various Fernald projects to technology providers;
- obtain information necessary to fill needs;
- convey information to Fernald projects;
- provide technology information from Fernald projects to other DOE sites.

The STCG performs a number of activities to meet its communication mission. STCG members include DOE-FEMP and Fluor Daniel Fernald personnel, and representatives from U.S. Environmental Protection Agency (EPA) Region V, Ohio EPA, Fernald Residents for Environmental Safety and Health, and the Fernald Citizens Advisory Board.

Technical University Programs

To enhance its technical effectiveness, Fluor Daniel Fernald has a special partnership with various Ohio Universities and Historically Black Colleges and Universities/Minority Institutions. These institutions provide advice and counsel in their areas of expertise to support the Fernald site in:

- training and retraining the workforce;
- basic and applied research;
- extension of Ohio businesses;
- formulating and implementing public information and consensus building activities;
- participating in readiness/technical reviews;
- evaluating cleanup technologies.

Several institutions of higher education are actively involved in the remediation of the Fernald site through Technical Universities Programs.

For More Information...

Additional information about Technology Programs is available in the Public Environmental Information Center, 10995 Hamilton Cleves Highway (Delta Building), or on Fernald's Web site (www.fernald.gov).

Stakeholders can learn about cleanup plans and progress at monthly Cleanup Progress Briefings. The briefings are held on the second Tuesday of every month at a location near the Fernald site. For specific questions about Technology Programs, call Rod Warner, DOE FEMP project manager, 513-648-3156, email address: rod_warner@fernald.gov, or Paul Pettit, Fluor Daniel Fernald project manager, 513-648-4960, email address: paul_pettit@fernald.gov.

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