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**FERNALD ENVIRONMENTAL REMEDIATION PROGRESS STATUS
REPORT**

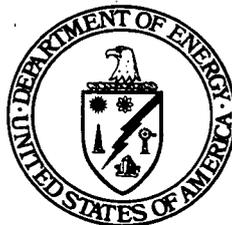
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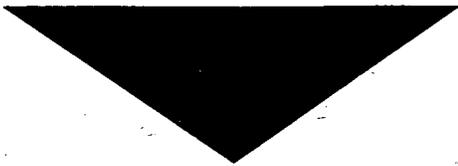


**FERNALD ENVIRONMENTAL
REMEDICATION PROGRESS
STATUS REPORT**

May 10, 1995



Executive Summary



Fernald site poses health and environmental risks

The U.S. Department of Energy's Fernald Environmental Management Project, located on 1,050 acres about 18 miles northwest of Cincinnati, produced uranium metal products for use in the nation's nuclear weapons program between 1952 and 1989. During past production processes, significant levels of radiological and chemical contaminants were released into the air, water, and soil. There is a large residential population immediately adjacent to this relatively small site and the groundwater aquifer beneath the facility is the sole source of drinking water in the region. These factors exacerbate the potential for adverse impacts to human health and the environment.

DOE is poised to begin cleanup for entire site

Accordingly, the site was placed on the National Priorities List in 1989 and is now being remediated under a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Consent Agreement between the DOE and the U.S. Environmental Protection Agency (EPA). As discussed below, the DOE is now poised to begin and, in some cases, continue cleanup (actual work in the field) for the entire Fernald site.

Study phase of project essentially complete

In very broad terms, the process of remediating sites under CERCLA consists of three general phases. First is site characterization. This phase determines what contaminants are present and at what levels, where they are located and to where they are migrating. Site characterization also evaluates the potential impacts of those contaminants on human health and the environment. The second phase is remedy selection. This phase develops and evaluates different cleanup alternatives and, with appropriate public involvement, selects a remedy. These two phases are commonly referred to as the "study" portions of the process. The final phase is actual site cleanup.

The study phases of the process at Fernald are essentially complete for the entire site and actual site cleanup has started. The selected cleanup options primarily use technologies and process options that have been successfully implemented at CERCLA sites throughout the country. For the one innovative technology selected, extensive testing at Fernald has proven its applicability to the site. Accordingly, there do not appear to be any significant technical issues that

would prevent timely implementation of the selected and proposed remedies at the site. The most significant constraint is related to the extent to which the cleanup efforts are funded.

Final or proposed cleanup strategies identified for entire site

Initial characterization of the entire Fernald site began in 1986 under a Federal Facilities Compliance Agreement. In 1991, under CERCLA, a segmented Remedial Investigation and Feasibility Study began, which completes site characterization and supports remedy selection for all five study areas targeted for remediation; this process is substantially complete. There are signed or approved Records of Decision, which document remedy selection, for four of the five operable units, with the fifth Record of Decision expected to be approved before the end of fiscal year 1995. For this operable unit (Operable Unit 5), a proposed remedy has been identified by the DOE and approved by the U.S. and Ohio Environmental Protection Agencies. Fernald has begun implementation of its cleanup remedies; indeed, construction has begun on a vitrification pilot plant, which will turn radioactive sludges into a glass-like form. CERCLA requires that remedial action begin within 15 months of the date the Records of Decision are signed, so actual cleanup activities will be underway for the entire site in a matter of months. In addition, 30 short-term removal actions have been completed or are now in progress at Fernald. These actions are designed to eliminate or control contamination sources prior to final cleanup.

Stakeholders actively involved in decision-making process

Stakeholders at the Fernald site have been engaged and are actively participating in discussions and decisions about remediation. Two groups in particular — Fernald Residents for Environmental Safety and Health (FRESH) and the Fernald Citizens Task Force — have been active participants in Fernald cleanup. FRESH has been instrumental in focusing Congressional attention on Fernald. The Task Force, which was formed by the DOE in 1993 to develop public consensus on cleanup and future courses of action at the site, has delivered a series of recommendations on future use of the site, cleanup objectives, waste disposal, and cleanup priorities. All of the selected and proposed remedies are consistent with the existing recommendations of the Task Force. The Task Force membership includes local residents,

Work progressing in cooperation with regulators

local elected officials, local labor representatives, representatives of FRESH, the DOE, the EPA, and the Ohio Environmental Protection Agency (OEPA).

The work at Fernald is proceeding under an Amended Consent Agreement between the DOE and EPA with the OEPA as an active participant in the process. In addition, OEPA has other certain regulatory authorities at the site.

Regulators and stakeholders calling for accelerated cleanup

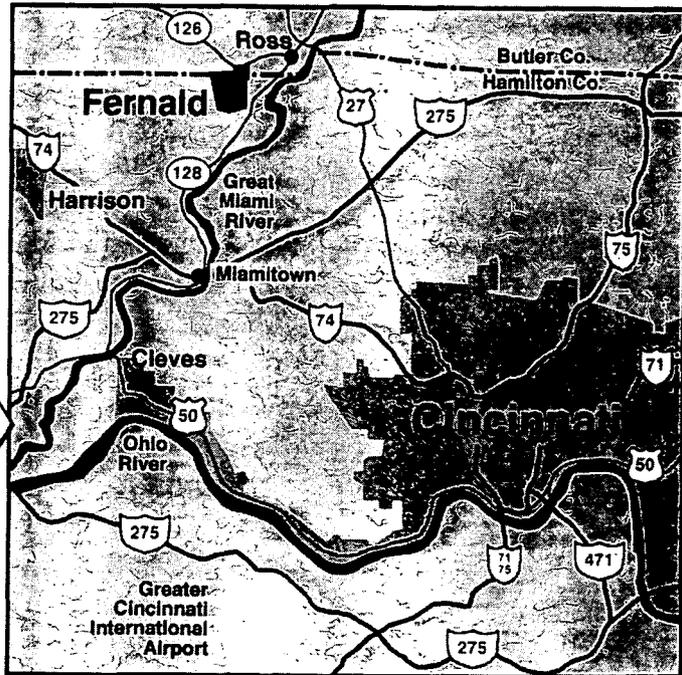
All selected remedies have been approved by the EPA with the concurrence of the OEPA. The DOE is working actively and cooperatively with both regulatory agencies to facilitate cleanup work at Fernald.

Under current target budget constraints, remediation is estimated to take 25 years at a total escalated cost of \$5.7 billion. Without constraints, the same remediation could be conducted in 10 years at a total escalated cost of \$2.7 billion. This 10-year time frame is generally consistent with that envisioned in the Records of Decision. The Task Force recently forwarded a recommendation to the DOE calling for accelerated remediation, citing the associated cost savings and more timely reduction of risk at Fernald. In addition, both EPA and OEPA are maintaining the position that the DOE is legally obligated to complete remediation consistent with the time frames set forth in the Records of Decision.

Background

Construction of the Fernald facility began in 1951, with full production starting in 1952. The Fernald facility was originally built by the Atomic Energy Commission, which became the Energy Research and Development Administration, and the DOE. The facility produced uranium products including derbies, ingots, billets, fuel cores, and targets for DOE sites in Rocky Flats, Col.; Savannah River, S.C.; Oak Ridge, Tenn., and Hanford, Wash. Much of the Fernald product provided "feed materials" used in DOE production reactors to make plutonium and tritium. Uranium metal production was suspended in July 1989, and the DOE focused its resources on environmental restoration of the Fernald site.

Since 1952, various radionuclides and chemicals have been discharged to the air, soil, and water, both on and off the Fernald facility. The radionuclides include those in the uranium and thorium chains, as well as trace quantities of some long-lived fission products and transuranics. As a result of these releases — and the threat of future releases, including radioactive materials — EPA determined the Fernald site presented an imminent danger to public health and environment.



Map of Fernald and vicinity

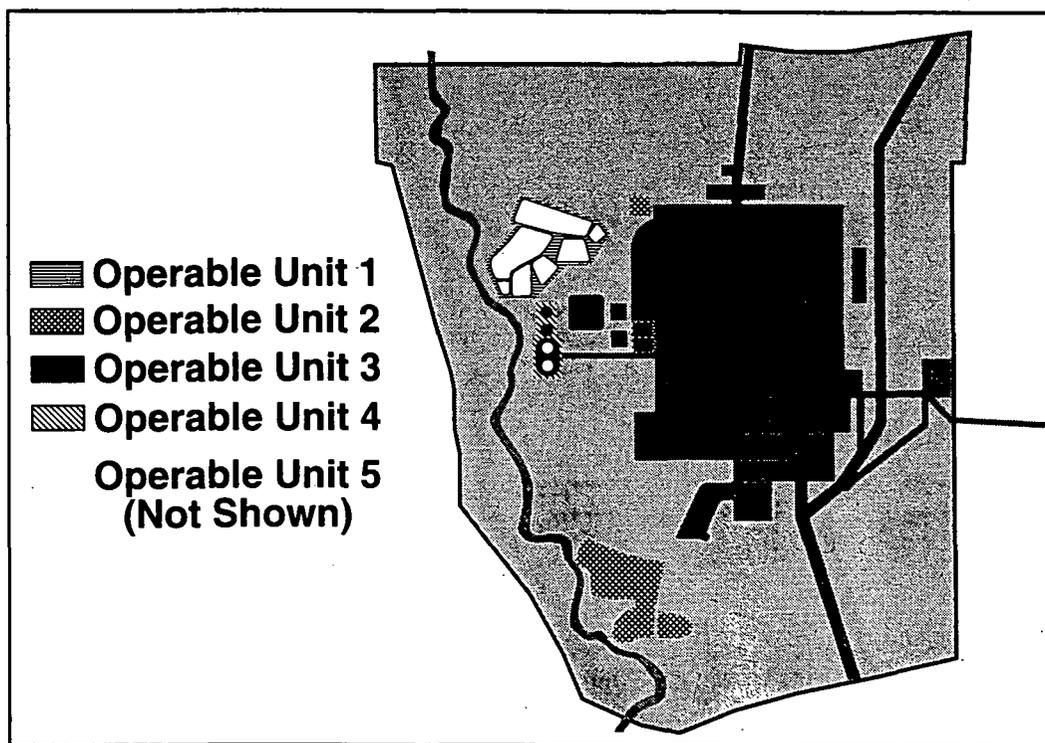
In December 1989, the Fernald site was added to the National Priorities List, which is the list of Superfund sites most in need of cleanup. Production ceased in 1989, and in February 1991, the DOE announced its intention to formally end the production mission at Fernald. Closure of the facility became effective in June 1991.

To address the releases and threats of releases of hazardous substances from containers and facilities at Fernald, the DOE and the EPA entered into a CERCLA Consent Agreement in 1990; that agreement was amended in 1991. In addition to initiating a Remedial Investigation and Feasibility Study (RI/FS), the Amended Consent Agreement sets forth specific, legally-binding milestones by which progress is measured. The Remedial Investigation and Feasibility Study stages, whose purpose is to determine the extent and nature of the contamination and to identify appropriate cleanup remedies, are essentially complete. Of the five discrete study

areas, or operable units, created in the Consent Agreement, four have approved or signed Records of Decision, which are the legal agreements specifying how cleanup will proceed at Fernald. The EPA has approved the Records of Decision with the written concurrence of OEPA.

A brief description of the operable units at Fernald follows:

- **Operable Unit 1** includes six waste pits, a Burn Pit, and Clearwell
- **Operable Unit 2** includes a solid waste landfill, lime sludge ponds, inactive-flyash pile, active flyash pile, and the South Field area
- **Operable Unit 3** includes all processing facilities located in the 136-acre former production area
- **Operable Unit 4** includes "K-65" Silos 1 and 2, which contain radium-bearing wastes; Silo 3, which contains dried uranium-bearing wastes, and Silo 4, which is empty
- **Operable Unit 5** encompasses the environmental media on the Fernald property and surrounding areas impacted by the facility. Environmental media include groundwater, surface water, soils, sediments, vegetation, and wildlife



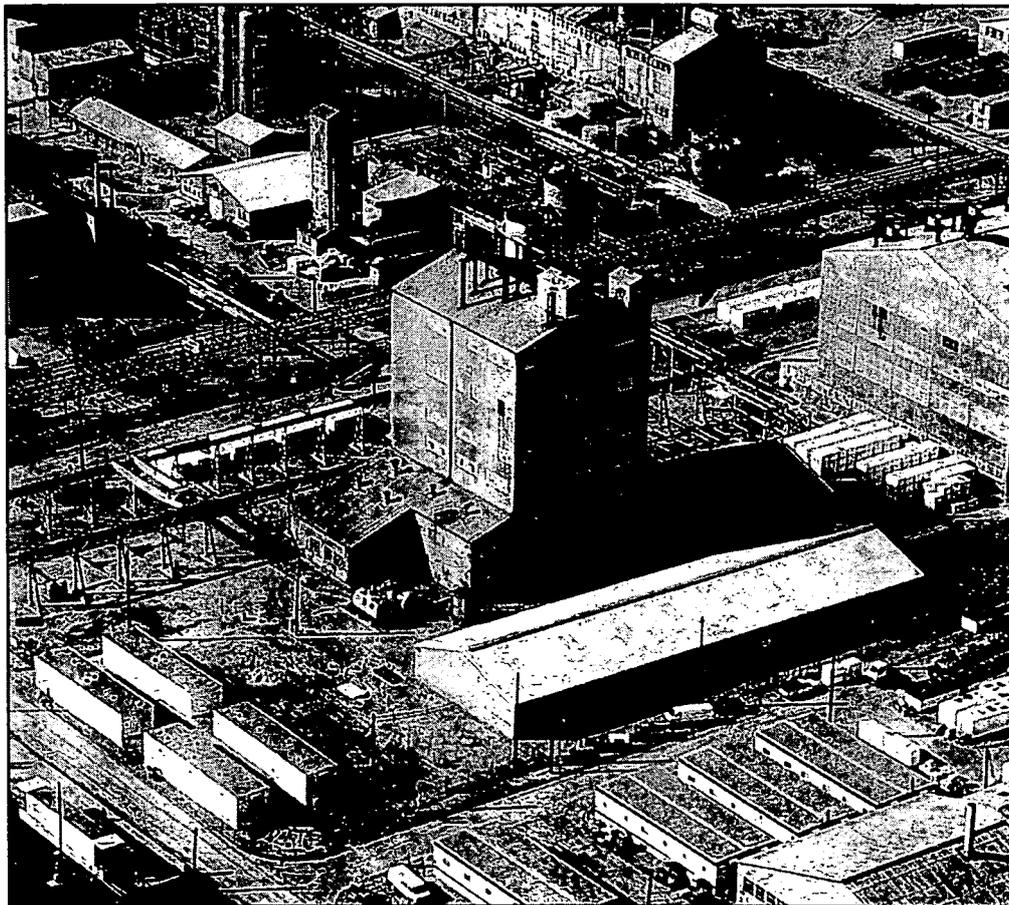
Aerial graphic showing Fernald study areas known as "operable units" which are targeted for remediation

Progress in Cleanup Efforts

As stated earlier, characterization and the remedy selection process for the entire site are essentially complete.

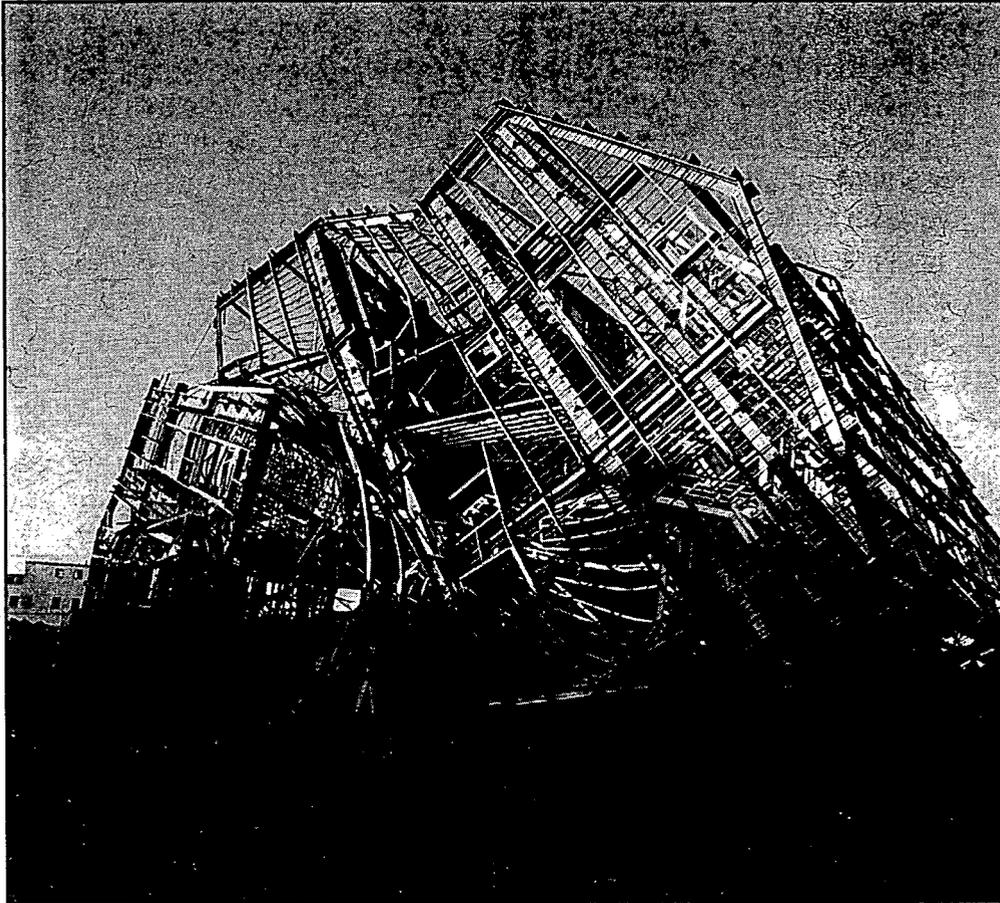
The site characterization process documented significant concentrations of radiological and chemical contaminants in the soil, groundwater and surface water on and around the Fernald facility. This process also concluded that in the absence of remedial action, these contaminants represented a potentially unacceptable risk to human health and the environment. Several factors exacerbate this risk. First is the proximity of residents, who live immediately adjacent to this relatively small facility. Second is the presence of a groundwater aquifer directly beneath the site, which is the principle source of drinking water in the region.

Also of note is the fact that the silos containing radioactive materials represent the highest single source concentration of radon, a known carcinogen, in the United States. The waste pits and other waste units channel contamination directly into the sole-source aquifer. Contamination from the Fernald facility has affected about 1.7 billion gallons of the region's drinking water; the DOE has had to provide bottled water for neighbors in the path of the contamination and has paid to extend public water supplies to the area.



Plant 7 as it appeared prior to dismantling activities

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Plant 7 superstructure following successful implosion in September 1994

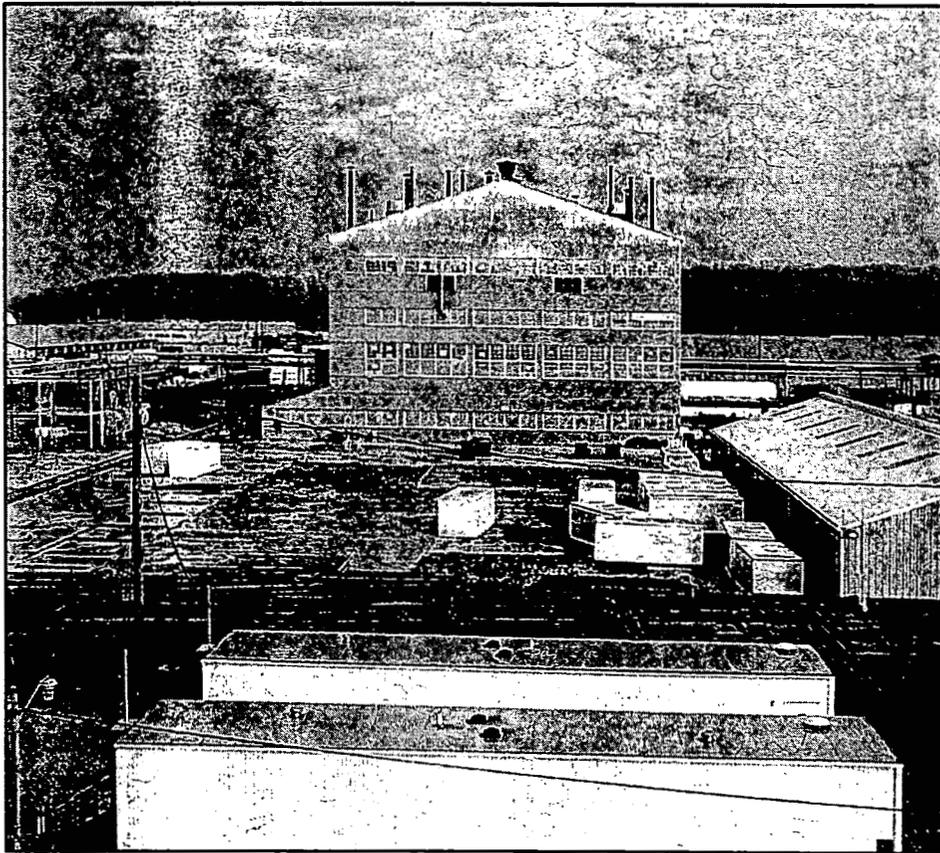
The status of the DOE's remedy selection to address these threats, by operable unit, is:

- **Operable Unit 1** — Record of Decision signed March 1995. The remedy is excavation of the waste pit contents, processing and treatment of the waste by thermal drying, and off-site disposal at a permitted commercial disposal facility.
- **Operable Unit 2** — Record of Decision conditionally approved May 1995. The remedy is excavation and on-site disposal of the waste materials in an engineered facility.
- **Operable Unit 3** — Record of Decision for Interim Remedial Action signed July 1994. The remedy is decontaminating and dismantling buildings and support facilities in advance of the final Record of Decision; ultimate disposition of the wastes will be determined in the final Record of Decision.

- **Operable Unit 4** — Record of Decision signed December 1994. The remedy is to remove and vitrify the contents of the three silos and the decant sump tank, then ship the vitrified waste for disposal at the Nevada Test Site.
- **Operable Unit 5** — Proposed remedy is excavation of contaminated soil and sediment and on-site disposal in an engineered facility; extraction and treatment of the Great Miami Aquifer and perched groundwater containing concentrations of contaminants above established or proposed maximum concentration levels. This proposed remedy has been approved by the EPA with the concurrence of OEPA. Formal public comment on the proposed remedy is now being accepted.

All the approved and proposed remedies utilize proven technologies that have been successfully applied at other CERCLA sites.

In addition, 30 short-term removal actions have been completed or are now in progress at Fernald. These actions are designed to eliminate or control contamination sources prior to final cleanup.



Area in foreground is where Plant 7 once stood; building in background is Plant 4, which has been cleaned out and is now ready for dismantling

Stakeholder Involvement

The DOE has pursued aggressive public involvement with stakeholders at the Fernald site. The chronology of community involvement, detailed in the site's Community Relations Plan, demonstrates how increased stakeholder awareness prompted the DOE to move from the non-participatory "Decide, Announce, Defend" strategy to the two-way approach of shared decision making. In this approach, DOE and its stakeholders work together toward the common goal of cleaning up the site. In the beginning, the DOE held public meetings that simply provided forums for protest and accusations. Since then, the DOE has made an effort to move from one-way to two-way communication.

Stakeholder input is solicited through such mechanisms as regular briefings for FRESH and local township trustees, person-to-person communication through the Envoy Program, workshops designed solely to ask stakeholders their concerns, informational sessions, and dissemination of fact sheets and other literature. In May 1994, a comprehensive community assessment, in which a total of 415 stakeholders were interviewed in person or by telephone, revealed four key concerns:

- Providing truthful information about the site and site activities
- Involving stakeholders in the decision-making process
- Site impacts to public health, safety, and the environment
- Desire for site cleanup without wasting taxpayers' money

Recognizing the importance of public involvement in the decision making during Fernald remediation, the DOE established in August 1993 the Fernald Citizens Task Force, a site-specific advisory convened to provide recommendations on four specific questions:

- What should be the future use of the Fernald site?
- Where should waste materials be disposed?
- What should be the cleanup levels?
- What should be the cleanup priorities?

Task Force membership includes local residents, local elected officials, representatives of FRESH, the DOE, the EPA, and the Ohio Environmental Protection Agency (OEPA).

The Task Force has delivered a series of recommendations on future use of the site, cleanup objectives, waste disposal, and cleanup priorities. All of the DOE's selected and proposed cleanup remedies are consistent with the existing recommendations of the Task Force. In particular, the Task Force has recommended:

- That past impacts of the Fernald site on the Great Miami Aquifer must be remediated and any future impacts controlled so that groundwater quality meets the standards of the Safe Drinking Water Act.

- That the excess risk of contacting cancer posed by exposure to Fernald contamination under any use of land on and off the Fernald property shall never exceed one in 10,000. This recommendation is intended to establish a maximum level of allowable risk, not a target; recommendations of the Task Force regarding aquifer protection and hazard index must also be considered and the most stringent cleanup levels applied. Additionally, the Task Force recommends limiting land use even in cases where the concentrations achieved in the soil would allow for less restrictive uses, to provide for an additional margin of safety.
- That all contaminated soils and other waste sources both on and off the Fernald property be reduced to levels that will provide safety from non-cancer toxicological effects at a level equivalent to a hazard index of one.
- That all contaminated soils and other waste sources both on and off the Fernald property must be reduced to levels that will prevent contaminants from reaching the aquifer at levels that would result in groundwater concentrations exceeding Safe Drinking Water Act levels.



Members of the Fernald Citizens Task Force playing FutureSite, a board game developed by Chair John Applegate that realistically depicts site cleanup issues including cost, potential risks and transportation concerns

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- That, for the purpose of evaluating risks, all off-property land is to be considered at the resident farmer scenario to provide for the most stringent cleanup levels.
 - Construction of an on-site disposal facility to accept, from the Fernald site only, materials solely with low levels of contamination meeting the site-specific waste acceptance criteria.

The Task Force also has recommended accelerating remediation at Fernald, citing Fernald's unique position among DOE's major remediation sites. "A relatively modest up-front investment will yield a nearly complete remediation in one-half to one-third of the time projected in current reduced-budget scenarios," according to the Task Force recommendation. The Task Force noted in its recommendation that, without funding constraints, remediation at Fernald could be conducted much more quickly and at a savings of about \$3 billion. "In addition to saving billions of dollars, the symbolic significance of getting a major facility 'off the books' is incalculable Dollar for dollar, there must be few opportunities in the DOE complex that offer a clearer choice or more attractive dividends."

In addition, the Task Force is currently evaluating potential recommendations concerning future uses and institutional controls on the Fernald site.

The public has been involved in decision making at Fernald and, as a result of the DOE's efforts, most stakeholders generally accept the cleanup plans for the site.

There is some disagreement among stakeholders about on-site disposal at Fernald. While the Fernald Citizens Task Force has recommended on-site disposal of less-contaminated materials as a balanced and reasonable course of action, some stakeholders have expressed worry about the appropriateness of on-site disposal. The DOE is committed to working with these stakeholders to discuss and address their concerns to the maximum degree possible.

Regulatory Issues

As discussed previously, all cleanup at Fernald is mandated by the Amended Consent Agreement, which specifies the schedule of activities the DOE must perform, and the dates by which they must be performed. The EPA has approved all documentation and decisions to date. OEPA, which has been actively participating, also has concurred with the documentation and decisions produced to date.

The time frame for remediation is set forth in the Records of Decision. Both EPA and OEPA are maintaining the position that the DOE is legally obligated to complete remediation consistent with the time frames set forth in the Records of Decision. Neither EPA nor OEPA have identified any significant technical issues that would prevent timely implementation of the selected and proposed remedies at the site. The regulators agree that the most significant constraint is related to the extent to which the cleanup efforts are funded.

