

AUDIT  
REPORT

DECONTAMINATION AND  
DECOMMISSIONING AT THE  
EAST TENNESSEE TECHNOLOGY  
PARK



U.S. DEPARTMENT OF ENERGY  
OFFICE OF INSPECTOR GENERAL  
OFFICE OF AUDIT SERVICES

DECEMBER 1998



## DEPARTMENT OF ENERGY

Washington, DC 20585

December 21, 1998

### MEMORANDUM FOR THE MANAGER, OAK RIDGE OPERATIONS OFFICE

FROM: Terry L. Brendlinger, Manager  
Eastern Regional Audit Office  
Office of Inspector General

SUBJECT: INFORMATION: Audit Report on "Decontamination and Decommissioning at the East Tennessee Technology Park"

#### BACKGROUND

The East Tennessee Technology Park (ETTP) contains about 400 buildings with approximately 14.4 million square feet of space. Almost 90 percent of the space is comprised of buildings that are currently undergoing or are planned for decontamination and decommissioning (D&D). Departmental policy requires that D&D projects be prioritized based on employee and public health and safety, protection of the environment, compliance with environmental laws and regulations, cost-effectiveness, and future site plans. The objective of this audit was to determine whether the Oak Ridge Operations Office (Operations Office) reduced health, safety, and environmental risks through D&D projects at the ETTP.

#### RESULTS OF AUDIT

The Operations Office reduced health, safety, and environmental risks through D&D projects at the ETTP. However, the major ongoing D&D project at the ETTP did not involve the facility which posed the greatest risks from exposure to radioactive waste, hazardous or toxic materials, and structural collapse. This condition occurred because the Operations Office did not fully emphasize reductions of health, safety and environmental risks when it selected and performed D&D projects at the ETTP. As a result, a high-risk facility continues to deteriorate, and hazards to workers and the environment are increased. Also, the Department could incur \$34.5 million in unnecessary surveillance and maintenance costs between FYs 1998 and 2002 for a building which poses significant risks to workers and the environment. We recommended that the Operations Office require that D&D projects be selected and performed with greater emphasis on reducing health, safety, and environmental risks for workers and the public.

#### MANAGEMENT REACTION

Management did not concur with the finding, recommendation, or estimated monetary impact in the report. Management stated that the decision to decontaminate and decommission Buildings K-29, K-31, and K-33 before Building K-25 was an appropriate approach to risk reduction due to the complexity and hazardous nature of process equipment dismantlement and the associated risks posed to demolition workers.

We determined that the overall health and safety risks to ETPP workers would be reduced if Building K-25 was decontaminated and decommissioned before Buildings K-29, K-31, and K-33. Management's response centers on the possible risk to demolition workers; however, it does not give adequate consideration to the daily health and safety risks experienced by workers who enter the K-25 vaults to perform surveillance and maintenance activities.

# Decontamination and Decommissioning at the East Tennessee Technology Park

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## Overview

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### INTRODUCTION AND OBJECTIVE

The ETTP, formerly known as the K-25 Site, occupies about 4,700 acres, or 14 percent of the Oak Ridge Reservation. ETTP was established in 1942 to produce enriched uranium. Since the production mission ended in 1987, ETTP has focused on environmental management activities. These activities include maintaining facilities pending decisions about their disposition, characterizing and managing hazardous materials and conditions, and preparing for and performing D&D. The ETTP contains about 400 buildings totaling approximately 14.4 million square feet of space. Almost 90 percent (12.5 million square feet) consists of buildings that are currently undergoing or are planned for D&D.

The Operations Office is responsible for identifying contaminated facilities at the ETTP, documenting the potential for reuse and recovery of materials and equipment, and developing schedules for decommissioning facilities. Departmental policy requires that D&D projects be prioritized based on worker and public health and safety, protection of the environment, compliance with environmental laws and regulations, cost-effectiveness, and future site plans.

The Department's Office of Environment, Safety and Health performed an oversight review of the safety management of disposition efforts at the ETTP and issued a report in September 1997 entitled *Special Review: Safety Management Evaluation of Facility Disposition Programs at the East Tennessee Technology Park*. The review team concluded that the Operations Office had made limited progress in decommissioning contaminated buildings scheduled for demolition. One of the contaminated buildings was the subject of the Operations Office's *For-Cause Review of Worker Respiratory Illnesses Associated with Working in the K-25 Vaults at the East Tennessee Technology Park*, issued in June 1998. The review concluded that mold, fungi, and bacteria growing in the vaults resulted in some workers' respiratory illnesses.

In October 1997, the Office of Inspector General reported adverse conditions in the D&D program at the Department's Savannah River Site. Report ER-B-98-01, *Audit of the Deactivation, Decontamination, and Disposal of Surplus Facilities at the Savannah River Site*, concluded that Westinghouse Savannah River Company did not completely deactivate or decontaminate any of the 162 facilities identified as surplus in FY 1996.

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**CONCLUSIONS AND  
OBSERVATIONS**

The objective of this audit was to determine whether the Operations Office reduced health, safety, and environmental risks through D&D projects at the ETTP.

The Operations Office reduced health, safety, and environmental risks through D&D projects at the ETTP. However, the major ongoing D&D project at the ETTP did not involve the facility which posed the greatest risks from exposure to radioactive waste, hazardous or toxic materials, and structural collapse. This condition occurred because the Operations Office did not fully emphasize reductions of health, safety, and environmental risks when it selected and performed D&D projects at the ETTP. As a result, a high-risk facility continues to deteriorate, and hazards to workers and the environment are increased. Also, the Department could incur \$34.5 million in unnecessary surveillance and maintenance costs between FYs 1998 and 2002 for a building which poses significant risks to workers and the environment.

The audit identified issues that management should consider when preparing its yearend assurance memorandum on internal controls.

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Office of Inspector General

## DECONTAMINATION AND DECOMMISSIONING

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### **Decontamination and Decommissioning Had Not Begun for Building K-25**

The major ongoing D&D project at the ETTP did not involve the facility which posed the greatest risks from exposure to radioactive waste, hazardous or toxic materials, and structural collapse. The Operations Office awarded a \$238 million contract for the D&D of three enriched uranium process buildings (K-29, K-31, and K-33) in August 1997. However, the health, safety, and environmental risks associated with Buildings K-29, K-31, and K-33 were not as significant as the risks associated with Building K-25.

Building K-25 is the oldest process building and has been shutdown 23 years longer than the other process buildings. The roof of Building K-25 has leaked, and the water has accumulated on the operating floor, causing floor panels to collapse. Additionally, water has leaked into vaults used to store packaged Resource Conservation and Recovery Act waste, low-level waste, and waste awaiting disposal in the Toxic Substances Control Act incinerator. ETTP personnel were required to enter the vaults on a daily basis to perform surveillance and maintenance activities. As of August 1998, the roof leaks were not repaired and the wastes were not removed from the building. According to a for-cause review performed by the Operations Office, the accumulation of moisture and the lack of ventilation were ideal conditions for the growth of mold, fungi, and bacteria. Further, a series of employee concerns and issues related to working in or near the vaults were raised as far back as 1992.

### **The Operations Office Is Required to Manage Contaminated Facilities in a Safe and Cost-Effective Manner**

Departmental Order 5820.2A establishes policies and guidelines for the management, decontamination, and decommissioning of radioactively contaminated facilities under Departmental ownership or control. The order requires that Departmental organizations manage radioactively contaminated facilities in a safe, cost-effective manner to assure that the release of, and exposure to, radioactivity and other hazardous materials comply with Federal and state standards. Program offices are required to identify contaminated facilities under their jurisdiction, document the potential for reuse and recovery of materials and equipment, and develop schedules for decommissioning the facilities. Departmental policy requires that D&D projects be prioritized based on worker and public health and safety, protection of the environment, compliance with environmental laws and regulations, cost-effectiveness, and future site plans.

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*The Policy on Decommissioning of Department of Energy Facilities Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) issued May 1995, establishes the approach agreed upon by the Department and the Environmental Protection Agency for the conduct of decommissioning projects consistent with CERCLA requirements. The policy's objective is to reduce risk without unnecessary delay and is based on the goal of earlier guidance "to develop decisions that appropriately address the reduction of risk to human health and the environment as expeditiously as the law allows."*<sup>1</sup>

**Operations Office Did Not Fully Emphasize Health and Safety Risk Reduction**

The Operations Office did not fully emphasize reductions of health, safety, and environmental risks when it selected and performed D&D projects at the ETTP. Despite Building K-25's deteriorating condition, it was not scheduled to begin D&D until FY 2003. The Operations Office stated that it started the D&D of Buildings K-29, K-31, and K-33 because it received a proposal to complete the buildings for \$550 million less than previously estimated. Management stated that since other factors, such as long-term surveillance and maintenance cost, risk to workers and the environment, and the critical path for ETTP closure, were relatively equal between the two projects, it decided to undertake Buildings K-29, K-31, and K-33 first to take advantage of the large cost savings.

We determined that the large cost savings cited by the Operations Office was primarily related to the contracting method used rather than the specific project selected. In December 1995, the management and operating contractor (M&O) at the ETTP estimated it would cost \$817 million to decontaminate Buildings K-29, K-31, and K-33 using M&O labor and overhead. Then, in November 1996, the Operations Office solicited proposals for the decontamination of the buildings from contractors other than the M&O. The Operations Office received proposals and awarded a contract in August 1997 for a fixed price of \$238 million. The price was substantially less than previously proposed by the M&O because (1) the Operations Office awarded a fixed-price contract to a private contractor using

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<sup>1</sup> *Guidance on Accelerating CERCLA Environmental Restoration at Federal Facilities*, established by the Environmental Protection Agency, Department of Energy, and Department of Defense; August 22, 1994.



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competitive procedures rather than negotiating a cost-reimbursable task order with the M&O; (2) the Department agreed to transfer ownership of the decontaminated metals removed from the buildings to the new contractor rather than require the M&O to dispose of the metals after they were decontaminated; and (3) the contractor's overhead and fees were lower than those proposed by the M&O. If the same contracting method was used to decontaminate Building K-25, we estimate that a similar cost savings could be realized.

**Unnecessary Costs Are Incurred for Surveillance and Maintenance**

In addition to the health and safety risks, the Department could incur \$34.5 million in unnecessary surveillance and maintenance costs for Building K-25 before it is demolished in FY 2003. As a result of its size and rapidly deteriorating condition, Building K-25 accounted for more than one-third of the surveillance and maintenance costs incurred at the ETTP in FY 1997. It will cost the Department about \$51.3 million to maintain Building K-25 in its current condition until it can be demolished in FY 2003. However, it would have cost the Department only \$16.8 million to maintain Buildings K-29, K-31, and K-33 in their current condition until FY 2003. Therefore, the Department could avoid \$34.5 million in surveillance and maintenance costs by demolishing Buildings K-25 before decontaminating and decommissioning Buildings K-29, K-31, and K-33.

**RECOMMENDATION**

We recommend that the Manager, Oak Ridge Operations Office require that D&D projects be selected and performed with greater emphasis on reducing health, safety, and environmental risks for workers and the public.

**MANAGEMENT REACTION**

Management did not concur with the finding, recommendation, or estimated monetary impact. Management stated that the decision to decontaminate and decommission Buildings K-29, K-31, and K-33 before Building K-25 was an appropriate approach to risk reduction due to the complexity and hazardous nature of process equipment dismantlement and the associated risks posed to demolition workers. Management stated that Buildings K-29, K-31, and K-33 were configured in such a way that supports dismantlement. Problems associated with uranium deposits are more easily handled considering both the low assay of the deposits and the maintenance support infrastructure designed into these buildings. Management stated that the conditions are considerably different in Building K-25, which was configured with multiple confined spaces that present a considerable

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hazard to dismantlement workers. Also, management stated that Building K-25 contains multiple bulky deposits of uranium in assays over 20 percent.

Management stated that there is no release of radioactive contamination or hazardous or toxic materials, and there is no threat of external structural collapse in Building K-25. It is management's opinion that Building K-25 can be maintained to contain the contamination and is safe for limited use by personnel with administrative controls, engineered constraints, and personnel protective equipment until major funding is available to begin dismantlement.

Management concluded that the decision to proceed with the D&D of Buildings K-29, K-31, and K-33 provides a proving ground for these efforts while maintaining worker safety. The knowledge obtained from that effort will be transferred to support safe dismantlement of Building K-25.

Finally, management disagreed with the estimated cost savings of \$34.5 million. Management stated that the D&D of Buildings K-29, K-31, and K-33 before Buildings K-25 and K-27 will result in a cost savings of up to \$147 million. Management stated that the surveillance and maintenance costs for Buildings K-25 and K-27 are high and will continue to increase; however, the costs to maintain Buildings K-29, K-31, and K-33 would also increase if D&D were deferred. For example, Building K-33 would need a new roof. Further, the delay in decommissioning Buildings K-29, K-31, and K-33 might cause the buildings to be torn down rather than reused, resulting in a substantial cost increase over the current project for reuse.

## **AUDITORS COMMENTS**

We disagree with management's statement that the decision to decontaminate Buildings K-29, K-31, and K-33 before Building K-25 was an appropriate approach to risk reduction. Management's conclusion centers on the possible risk to demolition workers. However, it does not give adequate consideration to the daily health and safety risks experienced by ETTP workers who are required to enter the K-25 vaults to perform surveillance and maintenance activities.

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Management's estimate of cost savings was not supported. In its calculation of the \$147 million cost savings, management included \$33 million for surveillance and maintenance costs for a 7 to 10 year period, \$30 million for a new roof and other major repairs for Building K-33, and \$84 million for the demolition of the buildings. However, this calculation is flawed for three reasons. First, the cost of surveillance and maintenance is much greater for Building K-25 than for Buildings K-29, K-31, and K-33. Management stated that, for a 7 to 10 year period, surveillance and maintenance costs for the three buildings would be about \$33 million. By comparison, the surveillance and maintenance costs for Building K-25 would be \$101.6 million for a 10 year period. Second, we question management's assertion that Building K-33 needs \$30 million in repairs since the contractor performing D&D activities on K-33 has not been asked to perform repair work. Finally, we disagree with management's methodology whereby both the cost of repairs and the cost of demolition are used as a basis for determining cost savings. Management estimated that the cost to repair Building K-33 was \$30 million. Management also estimated the cost of demolishing the buildings at \$84 million. We do not believe management would spend \$30 million repairing a building it planned to demolish in the near future.

# Appendix

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## SCOPE

The audit was performed from August 4, 1997, to June 12, 1998, at the Operations Office and the ETTP. The scope of the audit included 123 facilities in the D&D program at the ETTP. FY 1997 surveillance and maintenance costs for the D&D program at the ETTP were about \$22 million. The Operations Office developed an integrated prioritization process which included D&D, waste management, and remedial action projects. As of February 1998, there were 260 projects ranked in the prioritization.

## METHODOLOGY

To accomplish the audit objective we:

- Reviewed Federal and Departmental regulations for the D&D process;
- Analyzed the costs and risks associated with D&D projects at the ETTP;
- Reviewed estimated repair and annual surveillance and maintenance costs for the five uranium process buildings at the ETTP;
- Evaluated the effectiveness of the Operations Office's prioritization system; and
- Held discussions with Departmental and contractor personnel regarding D&D activities.

The audit was performed in accordance with generally accepted Government auditing standards for performance audits and included tests of internal controls and compliance with laws and regulations to the extent necessary to satisfy the audit objective. Accordingly, we assessed significant internal controls related to the D&D of facilities at the ETTP. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of our audit. We did not conduct a reliability assessment of computer-processed data because only a very limited amount of computer-processed data was used during this audit.

We held an exit conference with the Assistant Manager for Environmental Restoration on December 9, 1998.

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