

May 2003

# RADIOACTIVE WASTE

## DOE Has Acted to Address Delay in New Facility at Livermore Laboratory, but Challenges Remain



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**Highlights**

Highlights of [GAO-03-558](#), a report to the Honorable Ellen Tauscher, House of Representatives

### Why GAO Did This Study

The Department of Energy's (DOE) Lawrence Livermore National Laboratory in Livermore, California, generates radioactive and hazardous wastes in the course of its research dealing with nuclear weapons. The laboratory's new Decontamination and Waste Treatment Facility is a \$62 million complex that includes buildings designed for both temporarily storing waste and treating it for off-site disposal. Although construction was completed in 2001, the storage building did not begin operating until September 2002, and the treatment buildings remain unused to this day. GAO was asked to identify the cause of the delay in initiating storage and treatment operations at the facility, the effects of the delay in initiating treatment operations, and the steps taken to ensure that the latest estimated date for initiating treatment operations at the facility can be met.

[www.gao.gov/cgi-bin/getrpt?GAO-03-558](http://www.gao.gov/cgi-bin/getrpt?GAO-03-558).

To view the full report, including the scope and methodology, click on the link above. For more information, contact Robin Nazzaro at (202) 512-3841 or [nazzaror@gao.gov](mailto:nazzaror@gao.gov).

## RADIOACTIVE WASTE

# DOE Has Acted to Address Delay in New Facility at Livermore Laboratory, but Challenges Remain

### What GAO Found

The delay in initiating storage and treatment operations at the new facility occurred because DOE managers did not ensure timely resolution of disagreements with the laboratory over technical issues affecting safety at the facility's waste storage building. Safety documents must be approved by DOE to ensure the safe operation of nuclear facilities before operations can begin. The review of the storage building safety document lasted a year and resulted in postponement of the review of the safety document for the treatment buildings, which in turn delayed operation of the treatment buildings.

The delay in initiating treatment operations has had two main effects. First, the laboratory has had to continue its waste treatment activities at an older facility, which has fewer environmental and worker protections. Second, the delay in initiating treatment operations has postponed off-site disposal of some of the waste.

DOE and the laboratory have taken or are planning to take steps to address the delay in an effort to begin treatment operations at the new facility by the current deadline of August 2003, but officials believe that meeting the deadline will be challenging. One step that DOE is taking to prevent further delay is to improve its oversight so that any future disagreements are resolved in a timely manner. However, to meet the deadline, the laboratory has compressed the time allowed for other tasks. In this regard, the laboratory has altered the time to prepare for an operational readiness review—a process needed to ensure that the facility will be operated safely—from the normal 6 weeks to 2 weeks. Officials describe the scheduled start date as challenging but achievable.

DOE generally agreed with the accuracy of the report. GAO incorporated DOE's comments as appropriate.

#### Livermore Laboratory Decontamination and Waste Treatment Facility



Source: Lawrence Livermore National Laboratory.

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## **Abbreviations**

DOE Department of Energy  
NNSA National Nuclear Security Administration  
RCRA Resource Conservation and Recovery Act

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United States General Accounting Office  
Washington, DC 20548

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May 15, 2003

The Honorable Ellen Tauscher  
House of Representatives

Dear Ms. Tauscher:

The Department of Energy (DOE) has a complex of sites and facilities for designing nuclear weapons and producing the nuclear components for these weapons. One part of that complex is DOE's weapons laboratories, including the Lawrence Livermore National Laboratory. Located in Livermore, California, the laboratory conducts research on nuclear weapons and other areas in the interest of national security. In carrying out these activities, the laboratory creates radioactive waste (such as rags and tools contaminated with uranium or plutonium), hazardous waste (such as acids and solvents), and mixed waste (waste with both radioactive and hazardous material). Before this waste can be permanently disposed of, its contents must be analyzed to determine the specific physical, chemical, and radiological components, and some of the waste must be treated so that it meets the acceptance criteria of off-site disposal facilities. While the Livermore laboratory has been able to analyze and treat some of its wastes for off-site disposal, it has not been able to analyze and treat all of the various kinds of wastes it generates. As a result, some of the waste has remained on-site since the mid-1980s. The California Environmental Protection Agency, which regulates the storage and treatment of hazardous and mixed waste in the state, has given the laboratory permission to store hazardous and mixed waste in containers outdoors on pads or in tent structures. In addition, DOE has authorized the laboratory to store radioactive waste in a similar manner. However, for a number of years DOE has planned to improve the laboratory's ability to process its wastes for off-site shipment and thereby reduce the need for on-site storage.

In the mid-1990s, DOE and the Livermore laboratory began building a new facility to treat the laboratory's wastes. Called the Decontamination and Waste Treatment Facility, this \$62 million project includes a building of more than 11,000 square feet for temporarily storing waste and two larger buildings totaling more than 37,000 square feet for treating waste for off-site disposal. The new facility is intended not only to enhance the laboratory's capability to treat waste, but also to better protect workers and the environment while doing so. Although construction of the project

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was completed in June 2001, the storage building did not begin operating until September 2002, and the treatment buildings remain unused to this day. In response to your request, this report (1) identifies the cause of the delay in initiating storage and treatment operations at the new facility, (2) identifies the effects of the delay in initiating treatment operations, and (3) discusses the steps taken to ensure that the latest estimated date for initiating treatment operations at the facility can be met.

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## Results in Brief

The delay in initiating storage and treatment operations at the new facility occurred because DOE managers did not resolve in a timely way two technical issues concerning the plan to ensure the safe operation of the new building for temporarily storing wastes. The first issue concerned how to categorize the potential severity of hazards faced by workers, the public, and the environment if wastes stored in the new storage building were released. This categorization provides the basis for determining what safety controls are needed to ensure adequate protection of workers, the public, and the environment from such a release. The second issue involved whether to include an analysis of the effect of a potential aircraft crash into the building. Nearly a year after the safety document was submitted for review and approval, DOE directed the Livermore laboratory to base its document on a higher-level category that assumed that if a release of wastes occurred, the consequences for workers, the public, and the environment could extend beyond the building to other laboratory areas. Laboratory officials had preferred a lower-level designation that assumed that the consequences of an accident would not extend beyond the building. Laboratory officials had contended that this lower-level designation would cost less to implement and reduce the amount of nuclear safety oversight the laboratory would receive. In addition, officials from DOE and the laboratory agreed that the laboratory would analyze the potential effect an aircraft crash would have on the building. The laboratory's position on conducting such an analysis had been that it was unnecessary because a potential aircraft crash was not a credible event. The lengthy time frame for approving the laboratory's storage building safety planning document delayed the start of treatment operations.

The delay in initiating treatment operations at the new facility has had two main effects. First, it postponed the use of the new facility's safety improvements. Because of the delay, the laboratory has had to continue treatment operations for longer than planned in the older facility, which lacks some of the new facility's protections for worker safety and the environment. For example, some waste is treated at the older facility in

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uncovered outdoor tanks, while at the new facility the treatment operations will be conducted indoors using a ventilation system that will prevent waste particles from being released into the environment. Second, the delay in initiating treatment operations has postponed off-site disposal of some of the waste. Within 6 months of the facility's becoming operational, laboratory officials had planned to start treating some of the waste that could not be treated in the older facility and shipping this waste off-site for disposal. With a later start-up date, these shipments will be delayed.

DOE and the laboratory have taken or are planning to take three steps to address the cause of the delay and begin treatment operations at the new facility by the current deadline of August 2003, but officials believe that meeting the deadline will be challenging. First, DOE and the laboratory implemented a formal process to resolve issues during the development of the treatment buildings' safety document. Second, the two issues that led to the delay in approving the storage building safety document have been resolved in the treatment buildings' safety document. Third, DOE management said it will improve oversight so that any future disagreements are resolved in a timely manner. Even with these steps, DOE and laboratory officials are unsure if the August 2003 date for initiating operations at the treatment buildings can be met. To achieve this deadline, the laboratory has compressed the time allowed for other interim steps. In this regard, the laboratory has allowed less time than it typically allows to prepare for an operational readiness review—2 weeks, rather than the normal 6 weeks. This process is important because it tests the facility's procedures, equipment, and personnel to ensure that the laboratory will operate the facility in accordance with parameters set out in the safety document. DOE and laboratory officials describe the scheduled start date as challenging but achievable.

In commenting on a draft of this report DOE generally agreed with GAO's findings.

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## Background

DOE has several research laboratories, including the Livermore laboratory, devoted primarily to DOE's nuclear weapons program. Organizations or universities under contract to DOE manage and operate these laboratories. For example, the University of California has operated the Livermore laboratory for DOE and its predecessor agencies since

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laboratory operations began in 1952.<sup>1</sup> The Livermore laboratory has an infrastructure of research, testing, engineering, and waste management facilities located on the laboratory site in Livermore, California, a city of about 75,000 people located about 50 miles east of San Francisco. An additional area located about 15 miles east of the laboratory is used for experimental testing. The laboratory site's groundwater is contaminated with hazardous substances from past operations,<sup>2</sup> and in 1987, the Environmental Protection Agency added the site to the National Priorities List of the nation's most serious hazardous waste sites.

Treatment, storage, and disposal of hazardous and mixed wastes are governed by the Resource Conservation and Recovery Act of 1976, as amended (RCRA). Under RCRA, owners and operators of new hazardous waste treatment, storage, and disposal facilities, including federal facilities, are required to obtain a permit before beginning construction of the facility. The state of California is authorized to administer the RCRA program for facilities in California and is responsible for issuing the permit.

DOE is responsible for ensuring that the nuclear activities at its facilities are carried out safely and in accordance with law and regulation. The National Nuclear Security Administration (NNSA), a separately organized agency within DOE, carries out oversight of nuclear research, nuclear safety, and related activities. DOE's Office of Environmental Management provides oversight of environmental restoration and waste management activities, such as the construction of the new waste treatment facility at the Livermore site. NNSA and Office of Environmental Management staff from NNSA's Livermore Site Office are responsible for carrying out these oversight responsibilities. NNSA staff also administer the contract between DOE and the University of California, which sets out the parameters and performance requirements for operating the laboratory.

Radioactive and hazardous wastes at the Livermore laboratory amounted to about 2,700 cubic meters as of January 16, 2003. The wastes include

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<sup>1</sup> DOE has continued to extend its contract with the University since that time under a provision in federal statute that allows contracts with federally funded research and development centers to be extended without competition in order to maintain essential research and development capability. See 41 U.S.C. § 253 (c)(3)(B). The University of California also operates another DOE weapons laboratory, the Los Alamos National Laboratory in New Mexico.

<sup>2</sup> The site is a former U.S. Navy flight training base and aircraft rework facility.

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low-level radioactive waste,<sup>3</sup> transuranic waste,<sup>4</sup> hazardous waste, and mixed waste. About one-fourth of the radioactive waste also contains hazardous substances. The waste is packaged in containers and is stored outdoors or under tents on asphalt pads, or inside enclosed or partially enclosed buildings (see figs. 1 and 2). The waste is stored within fenced areas of the laboratory site where access is controlled. The California Environmental Protection Agency and DOE have approved storage of the waste in this manner. Before the waste can be disposed of off-site, much of it must be treated and repackaged so that it will meet the requirements of disposal facilities. Because the waste inventory is expected to eventually decline, the new facility's storage building is designed to provide less waste storage capacity than the older storage facilities provide. Most of the older storage facilities will be closed in future years after the backlog of waste has been disposed of off-site.

**Figure 1: Current Outdoor Waste Storage**



Source: Lawrence Livermore National Laboratory.

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<sup>3</sup> The Livermore laboratory's low-level waste has a wide range of characteristics; it often contains small amounts of radioactivity in large volumes of material.

<sup>4</sup> Transuranic waste is radioactive waste contaminated with transuranic elements (i.e., elements heavier than uranium, such as plutonium) with half-lives greater than 20 years, in concentrations above 100 nanocuries per gram of waste.

**Figure 2: Current Waste Storage under Tent**



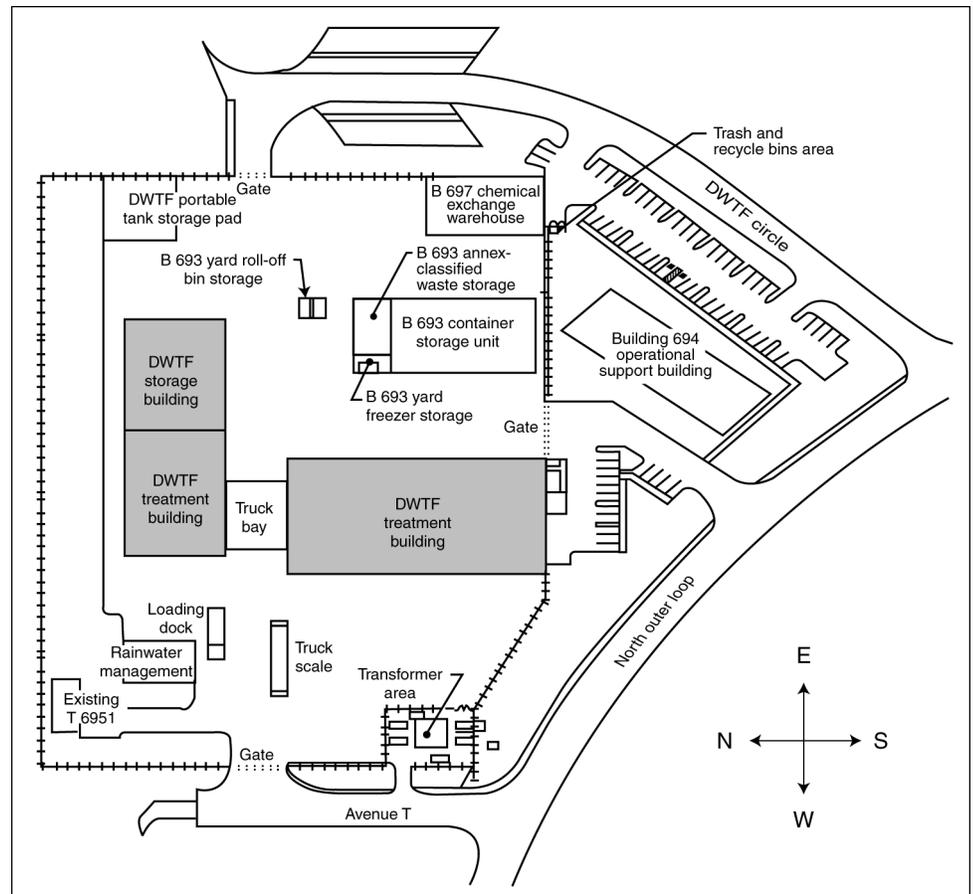
Source: Lawrence Livermore National Laboratory.

Construction of the Decontamination and Waste Treatment Facility project was placed on hold for a time after its authorization. The Congress had provided authorization and funding for the project for fiscal year 1986, but complaints from the public about an incinerator included in the facility design contributed to DOE's decision to place the project on hold. Ultimately, the laboratory redesigned the facility without the incinerator and planned to complete construction of the facility by the end of 1999.

Construction of the Decontamination and Waste Treatment Facility was completed in June 2001, approximately 1½ years behind schedule. Construction was delayed because California regulators took longer than expected to issue a RCRA permit for the facility. Although laboratory officials had planned to receive the permit in 1997, an accident occurred at one of the laboratory's existing waste management facilities, which exposed workers to higher-than-allowable levels of radioactivity. According to a California regulator, that accident is likely to have led the California Environmental Protection Agency to postpone issuing the permit until an investigation of the accident was completed. Issuance of the permit was also delayed by a large number of public comments, which

took longer than expected to address. To mitigate the impact of the delay in receiving the permit, the laboratory built the facility in two stages. In the first stage, the laboratory built portions of the facility that did not require the permit, such as the lobby and offices, which would not handle hazardous and mixed waste. The laboratory built the rest of the facility in the second stage after receiving the permit in 1999. The delay in obtaining the RCRA permit increased project costs by \$2.1 million. The increase was covered by available contingency funds, allowing the project to remain within budget. Figure 3 shows the site plan of the facility; figure 4 shows a portion of the interior.

**Figure 3: Decontamination and Waste Treatment Facility (DWTF) Site Plan**



Source: Lawrence Livermore National Laboratory.

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**Figure 4: New Facility's Treatment Area for Liquid Waste**



Source: Lawrence Livermore National Laboratory.

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## **Delay Occurred because DOE Managers Did Not Resolve Disagreements in a Timely Manner**

The delay in initiating storage and treatment operations at the new facility occurred because DOE managers did not resolve in a timely manner lingering disagreements about two technical issues. First, DOE and the laboratory disagreed about how to categorize the potential severity of hazards faced by workers, the public, and the environment if wastes stored in the new storage building were released. Proper categorization is important because it provides the basis for determining what kinds of safety controls must be in place to protect workers, the public, and the environment if such an event were to occur. Second, DOE and the laboratory also disagreed about whether to include an aircraft crash analysis in the safety document, with the laboratory maintaining that such an analysis was unnecessary, and DOE officials taking the opposite

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viewpoint. DOE managers did not fully resolve these disagreements for nearly a year. The lengthy time frame for approving the laboratory's storage building safety document delayed the start of treatment operations.

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## DOE and Laboratory Officials Disagreed about Hazard Categorization

Federal regulations require contractors operating a DOE nuclear facility to establish controls upon which they will rely to adequately protect workers, the public, and the environment against the dangerous materials on-site.<sup>5</sup> Before a nuclear facility can operate, contractors must prepare and DOE must approve a safety document that identifies and assesses the hazards, risks, and controls needed to safely operate the facility. Contractors must determine the potential risk to workers, the public, and the environment of hazards associated with the facility. They must categorize the level of the facility's hazards in accordance with DOE requirements. There are three hazard categories: potential for significant off-site consequences (category 1), potential for significant on-site consequences (category 2), and potential for only significant localized consequences in the facility (category 3).

Using the same methodology that the laboratory had used to determine categorization for existing storage facilities, the laboratory determined that the new storage building should be given a category 3 classification. The laboratory believed the methodology was adequate because it had received DOE approval when it had been used before. Laboratory officials were also concerned that a higher category 2 classification would require them to conduct a rigorous quantitative accident analysis, which is more costly and might result in more safety controls and external oversight of storage building operations that could increase operating costs.

Although the methodology had been approved when used for the laboratory's existing facilities, some officials within DOE had questioned its appropriateness, and these concerns surfaced again as the document was being reviewed for the new storage building. Some DOE officials believed that the new storage building warranted a category 2 hazard classification, because they saw potential for significant on-site consequences in the event of a release of the stored materials. In addition, a May 2001 report by the laboratory's safety document review group indicated that the laboratory's methodology for determining the hazard

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<sup>5</sup> 10 CFR part 830, promulgated in 2001, establishes these safety requirements.

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category for some of its existing facilities was inappropriate. The report concluded that the hazard category for the facilities needed further evaluation.<sup>6</sup>

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### DOE and the Laboratory Also Disagreed about the Need for Aircraft Crash Analysis

DOE and the laboratory also disagreed over whether to include an aircraft crash analysis as part of the storage building safety document. DOE had issued a standard in October 1996 that provides facilities an approach for performing an analysis of the health and safety risks to workers on-site and the public in the event of a release of material resulting from an aircraft crash. This standard applies to facilities that contain significant quantities of radioactive and hazardous material.<sup>7</sup> The standard also applies if special circumstances exist, such as a facility's being located near significant numbers of people. The laboratory is located next to residential areas in the city of Livermore.

Both DOE and laboratory officials believed they had a logical basis for their positions on the aircraft crash analysis. DOE officials believed that an aircraft crash analysis should be included in the storage building safety document because of the laboratory's proximity to residential areas and the Livermore airport; an increase in airplane traffic in the area; and the potential for a release of radioactive material in the event of an aircraft crash into the storage building, which would pose potential health and safety risks to workers and the public. Laboratory officials, on the other hand, said their previous calculations for an existing storage facility determined that such a crash was not a credible event, and therefore an analysis was not required. They contended that the same finding was valid for the new storage building, as well.

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### Review of the Safety Document Lasted a Year

In June 2001 the laboratory submitted the storage building safety document to DOE for review and approval. Review of the safety document was scheduled to last approximately 4 months. However, the safety document was not approved until June 2002, a year later. During the 1-year period, the laboratory submitted the safety document to DOE three times,

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<sup>6</sup> Lawrence Livermore National Laboratory, *Baseline Review of LLNL Nuclear Facilities Authorization Basis Documents, Final Summary Report on Issues and Recommendations on LLNL-Authorization Basis Documents*, May 2001.

<sup>7</sup> *Accident Analysis For Aircraft Crash Into Hazardous Facilities*, DOE-STD-3014-96, October 1996.

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and each time DOE rejected it. Although the project was falling behind schedule, DOE field managers responsible for the timely approval of the safety document did not take steps early on to resolve the situation. This occurred in part because some DOE officials supported the laboratory's efforts to justify a lower category 3 hazard classification. They concurred with the laboratory that a category 2 hazard classification would require a more detailed quantitative accident analysis, which would be more costly and would result in more safety controls that could increase operating costs and oversight of its storage building operations. In addition, the laboratory believed that a category 3 hazard classification would provide an appropriate level of safety.<sup>8</sup>

In May 2002, the DOE manager responsible for overseeing laboratory operations took steps to resolve the disagreement over hazard classification. In a May 10, 2002, letter, the DOE manager directed laboratory officials to use a category 2 classification for the storage building. The same letter also stated that DOE and the laboratory agreed to expedite the review and approval process to accelerate the initiation of operations at the storage building. DOE and the laboratory implemented an intensive review process that consisted of a series of meetings in which the DOE review team and laboratory officials jointly conducted a line-by-line review and edit of the storage building safety document. In addition, DOE had determined that the storage building safety document did not have to include an aircraft crash analysis provided that the laboratory include the analysis in the June 2003 update of the document. In the interim, DOE required the laboratory to include compensatory measures in the document, such as procedures for public notification and fire department response time in the event of an airplane crash. DOE approved the safety document on June 28, 2002.

Because of the longer-than-expected time frame for approving the storage building safety document, the cost for completing the facility's safety documents exceeded laboratory estimates by \$400,000, according to a project budget document. However, the laboratory's project manager stated that the additional cost was covered by the project's contingency fund reserved for unforeseen circumstances, allowing the project to remain within budget. The delay in approving the storage building safety

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<sup>8</sup> Concerns over safety issues surfaced in 1996 and 1997 when the laboratory prepared the preliminary safety documents for the new facility. DOE required the laboratory to resolve these issues prior to DOE authorizing facility operations.

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document postponed the review of the safety document for the other portion of the facility—the treatment buildings. This delay, in turn, prevented the start of operations at the treatment buildings.

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### Delay in Initiating Treatment Operations Postponed Use of Safety Improvements and Off-Site Disposal of Some Waste

The delay in initiating treatment operations has had two related consequences. First, because the treatment buildings are not yet operational, the laboratory has had to continue conducting its waste treatment activities at the older facility, which lacks some of the new facility's environmental and worker protections. In addition, the older facility has fewer capabilities to treat waste and prepare it for off-site disposal, requiring the laboratory to postpone disposing of some waste off-site.

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### Safety Improvements Not Realized with Continued Use of Older Treatment Facility

Until DOE approves the treatment buildings' safety document and DOE and the laboratory conduct an operational readiness review, the treatment buildings cannot begin operations. These tasks were postponed until DOE resolved disagreements about the storage buildings' safety document. As a result, the laboratory has had to continue its waste treatment operations at the older facility and has not been able to utilize the safety features of the new facility. Examples of the differences in safety features between the two facilities follow.

- The new facility has a ventilation system that filters waste particles from the air in the buildings to prevent the release of contaminants into the environment; the older facility does not.
- The buildings of the new facility were designed so that all waste treatment operations are conducted indoors. At the older facility, some operations are conducted in treatment tanks that do not have covers and are located outdoors, enabling vapors and waste particles to escape into the environment.
- Compared with the older facility, the new facility has more areas in which ventilation systems take in air at a high rate near treatment equipment to protect workers from exposure to fumes and waste particles.

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### Delay Postponed Off-Site Disposal of Some Waste

Because the treatment buildings are not yet operational, the laboratory has not been able to use the new treatment facility's enhanced capabilities to prepare waste for off-site disposal. For example, the new facility has a debris washer that washes mixed waste to remove the hazardous portion of the waste from the radioactive portion, allowing each portion to be sent

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to disposal sites at a lower total cost than disposing of the mixed waste as a whole. In addition, the new facility is equipped with a glovebox that enables special handling of the waste in an enclosed, controlled, and highly ventilated area to treat “reactive” waste<sup>9</sup> that is not acceptable at disposal sites. Treatment of such waste enables it to meet the acceptance criteria of disposal sites. The older facility does not have these features.

Since the laboratory cannot yet utilize the new buildings’ treatment capabilities, some wastes have remained at the laboratory rather than being disposed of off-site. For example, a laboratory official responsible for waste management activities stated that the laboratory had planned to begin treating reactive waste within 6 months of the start of operations at the treatment buildings to prepare it for disposal. Because of the delay in initiating operations, the laboratory has postponed treating and disposing of this waste.

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## DOE Has Improved Review and Oversight of Laboratory Safety Documents, but Time Remaining Will Make It Challenging to Meet the August 2003 Deadline for Starting Treatment Operations

DOE and the laboratory have taken or are planning to take the following three steps to address the cause of the delay in approving the storage building safety document in an effort to meet the August 2003 deadline for starting treatment operations:

- DOE and the laboratory agreed to hold a series of joint working meetings to identify and resolve issues during the development of the treatment buildings’ safety document. This action was taken to identify and address issues or concerns during the development stages of the document rather than during the document review process. By enhancing communication, DOE and the laboratory hoped to minimize the possibility that disagreements would delay the approval of the document and further postpone the initiation of treatment operations.
- In the treatment buildings’ safety document, DOE and the laboratory resolved the two main issues that led to the delay in approving the storage building safety document. The laboratory has agreed to limit the amount of radioactive material it processes during treatment operations to meet the requirements for a lower category 3 hazard classification for the treatment buildings. The laboratory also agreed to include an aircraft crash analysis in the treatment buildings’ safety document.

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<sup>9</sup> An example of reactive waste is material containing sodium metal, which reacts strongly with water, including water in the air. Such a reaction could create a large amount of heat, which could cause the material to ignite.

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- DOE's management resolved to strengthen oversight by not allowing any future disagreements to languish unresolved for long periods of time. For example, DOE's Livermore Laboratory Site Manager said that it took too long to resolve the disagreement over the storage building safety document and that in a similar situation she would take action to ensure that any disagreement was resolved within 60 to 90 days.

Even with these steps, DOE and laboratory officials are unsure if the August 2003 date for initiating operations at the treatment buildings can be met. The laboratory now has less time available to prepare for the remaining tasks than it typically allows. Once the laboratory has submitted and received approval of safety documents from DOE, it must prepare documents and train staff for the facility's operational readiness review. An operational readiness review examines the facility's procedures, equipment, and personnel to ensure that the contractor will operate the facility safely in accordance with parameters set out in the safety document. Laboratory officials said that, typically, the laboratory allows 6 weeks of preparation for the operational readiness review. However, for the treatment buildings, the laboratory has compressed the amount of time to prepare for the operational readiness review to 2 weeks in order to meet the August 2003 deadline. DOE and laboratory officials said that the August 2003 deadline is challenging but achievable.

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## Agency Comments and Our Response

We provided a draft of this report to DOE and Lawrence Livermore National Laboratory for their review and comment. The laboratory provided its comments through DOE. In written comments, DOE generally agreed with the accuracy of our report. However, we made changes in response to two points raised by DOE's Assistant Secretary for Environmental Management. First, concerning the delays in resolving safety issues, DOE said our draft report omits the fact that the laboratory had developed a safety document for the treatment and storage facility as early as 1996 and some of the safety issues had been unresolved since that time. We recognize that the laboratory had developed preliminary safety documents in 1996 and 1997 and some of the safety issues identified at that time remained unresolved until after they resurfaced in 2001. However, this information does not help explain why those issues remained unresolved, and it does not address the cause of the delay in initiating operations at the new facility. We did clarify in the report that some of the safety issues surfaced in 1996 and 1997.

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DOE's second point concerned a statement in the draft report that shipment of some waste to off-site disposal facilities had been delayed. The Assistant Secretary said that the treatment and off-site disposal of legacy waste—the backlog of stored waste from nuclear weapons research activities—have not been directly postponed by the delay in obtaining approval of the facility safety documents. However, we found that the delay in approving the storage building safety document contributed to the delay in approving the treatment buildings' safety document. Furthermore, the treatment building cannot operate until after approval of the safety documents and completion of an operational readiness review. Certain waste at the laboratory, such as reactive waste, cannot be treated in the laboratory's older facilities and has been stored at the site. The laboratory's plan was to begin treating this waste for off-site disposal within 6 months of initiating operations at the new treatment facility. Therefore, the delay in initiating operations at the treatment facility has postponed the off-site disposal of some waste.

DOE also provided technical comments, which we have incorporated as appropriate. DOE's written comments on our draft report are included in appendix II.

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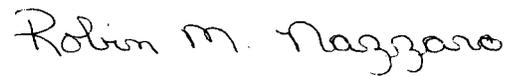
We conducted our review from September 2002 through April 2003 in accordance with generally accepted government auditing standards. Appendix I provides details on our scope and methodology.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 1 day after the report date. At that time, we will send copies of this report to the Secretary of Energy and the Director of Lawrence Livermore National Laboratory. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

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If you or your staff have any questions about this report, please contact me at (202) 512-3841. Key contributors to this report are listed in appendix III.

Sincerely yours,

A handwritten signature in cursive script that reads "Robin M. Nazzaro".

Robin M. Nazzaro  
Director, Natural Resources  
and Environment

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# Appendix I: Objectives, Scope, and Methodology

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To identify the cause of the delay in initiating storage and treatment operations at the new facility, we reviewed DOE orders and standards and federal regulations pertaining to safety documents. We also reviewed safety documents, DOE comments on safety documents, and internal DOE correspondence discussing disagreements over safety documents. In addition, we reviewed a DOE memorandum addressing delegations of authority and also analyzed project schedules to determine the extent of delays for the Decontamination and Waste Treatment Facility project. We also analyzed project cost documents to determine any increases in costs from the delay. Finally, we interviewed DOE and Livermore laboratory officials about the preparation and review of safety documents.

To identify the effects of the delay in initiating treatment operations, we analyzed documents describing waste treatment operations obtained from the laboratory, and we interviewed Livermore laboratory officials.

To identify the steps taken to ensure that the latest estimated date for initiating treatment operations at the facility can be met, we interviewed DOE and laboratory officials and analyzed a DOE and laboratory written agreement addressing the development of safety documents. We also reviewed laboratory presentations on safety issues made to DOE. Finally, we analyzed the project schedule pertaining to the operational readiness review.

We also toured laboratory and waste storage and treatment facilities and obtained data on the types, amounts, and locations of waste at the laboratory. We conducted our review from September 2002 through April 2003 in accordance with generally accepted government auditing standards.

# Appendix II: Comments from the Department of Energy



## Department of Energy

Washington, DC 20585

APR 25 2003

Mr. Robin Nazzaro  
Director, Natural  
Resources and Environment  
United States General Accounting Office  
Washington, D.C. 20548

Dear Mr. Nazzaro:

Thank you for the opportunity to comment on the draft report GAO-03-558, *Radioactive Waste: DOE Has Acted to Address Delay in New Facility at Livermore Laboratory, but Challenges Remain*.

The Department of Energy (DOE) would like to emphasize that though the new facilities have features that provide additional environmental and worker protections, the existing facilities meet all Federal and State regulations and are both safe for the worker and protection of the environment. At no time has legacy waste been stored improperly or workers exposed to undue hazards. Likewise, the new Decontamination and Waste Treatment Facility (DWTF) will not operate until the DOE is assured that it can be operated safely and in compliance with applicable laws and regulations. It should also be recognized that some of the existing facilities would remain in operation, following startup of the new facility, as defined by the Legacy Waste Disposal Plan.

I agree that some of the safety issues (e.g., hazard categorization, aircraft crash accident) have taken longer to resolve, but the report omits the fact that the Lawrence Livermore National Laboratory developed a safety analysis report for this facility and the Radioactive Waste Storage Facility as early as 1996. Some of the safety issues laid dormant since that time, remaining unresolved until resurfaced in 2001. The report makes mention that the cost for completing facility safety documents exceeded estimates by \$400,000. It is unclear what estimates were used to draw this conclusion given the fact that safety document preparation has occurred over a multi-year time frame.

With the recent involvement from my staff, the DWTF Safety Analysis Report (SAR) review and approval process for the DOE site office has improved significantly. As a result, I was able to approve the DWTF Safety Analysis Report and Technical Safety Requirements on April 16, 2003.



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The DOE is still relying upon the Lawrence Livermore National Laboratory to achieve startup of operations at the DWTF as they have committed to in August 2003. We are approaching these commitments with the recognition that the first priority is ensuring the new facility is ready to function in a safe and environmentally sound manner, protecting the worker, the public, and the environment. It is my expectation, and certainly achievable, that both the Laboratory's internal and DOE's independent operational readiness reviews be conducted in the most disciplined and rigorous manner to support this priority.

One statement, often made in the report, that we take issue with is that delays in the safety documentation approval resulted in a postponement of off-site disposal of some waste. I am not aware of any instance in which the treatment and off-site disposal of legacy waste has been directly delayed by safety documentation approval. Existing treatment capabilities have been maintained at the existing facilities while the new facility was being made ready. Though the new facility construction has been completed, the equipment needed to provide expanded treatment capabilities has not yet been installed, tested, and operating procedures implemented. These activities do not rely upon safety documentation approval to be completed. Further, it is unclear what measures were used to determine that off-site disposal delays occurred given that the first Legacy Waste Disposal Plan was established in 2002.

I would like to acknowledge the abilities and professionalism of your staff. They have made every effort to understand a very complicated management and technical issue and produce a fair and balanced report. If you have any further questions, please call me at (202) 586-7709.

Sincerely,



Jessie Hill Roberson  
Assistant Secretary for  
Environmental Management

cc: Robert G. Card, Under Secretary  
Everet H. Beckner, NA-10  
Beverly A. Cook, EH-1

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# Appendix III: GAO Contacts and Staff Acknowledgments

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## GAO Contacts

Robin M. Nazzaro (202) 512-3841

William R. Swick (206) 287-4800

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## Acknowledgments

In addition to those named above, Leo G. Acosta, Gary R. Boss, Allen T. Chan, Nancy L. Crothers, Gary L. Jones, James L. Ohl, Stanley G. Stenersen, and Yunsian Tai made key contributions to this report.

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