

DOE/IG-0454

# AUDIT REPORT

## WASTE INCINERATION AT THE IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY



DECEMBER 1999

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

December 15, 1999

MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman (Signed)  
Inspector General

SUBJECT: INFORMATION: Audit Report on "Waste Incineration at the Idaho  
National Engineering and Environmental Laboratory"

BACKGROUND

The Waste Experimental Reduction Facility (WERF) Incinerator is located at the Idaho National Engineering and Environmental Laboratory (INEEL) in Idaho Falls, Idaho. The primary mission of the incinerator is to provide mixed waste treatment until a demonstrated, more cost-effective commercial facility is available. The objective of this audit was to determine whether the Department operated the WERF Incinerator at the capacity permitted by the State of Idaho.

RESULTS OF AUDIT

The Department did not operate the incinerator at the capacity permitted by the State of Idaho or at the "attainable" capacity. The attainable capacity represented the more realistic burn rate as determined by Lockheed Martin Idaho Technologies Company (LMITCO), the contractor operating the incinerator.

Two factors contributed to the shortfall in actual operations relative to the capacity of the incinerator: (1) the downtime between incineration campaigns was excessive, and (2) the majority of on-site waste was not sorted, segregated, and characterized for incineration.

Between April 1996 and September 1998 the Department spent \$13.5 million to incinerate 786,000 pounds of waste. This equates to about 300,000 pounds per year. Had the Department been more aggressive in incinerating the waste at INEEL, the 786,000 pounds could have been incinerated in less than 1 year, at a savings of about \$8.4 million. The 786,000 pounds of incinerated waste was well within the 900,000 pound "attainable" annual burn rate established by the contractor. Furthermore, the audit showed that the waste could be treated more economically at commercial facilities, once these treatment options become available in June 2000. Consequently, we concluded that the Department could close the WERF Incinerator in June 2000 and use commercial treatment for the incinerable waste in inventory at that time. This would be 39 months earlier than planned, and would reduce operating costs by \$18.1 million.

MANAGEMENT REACTION

Management agreed with the audit finding and two of the three recommendations. Management directed the contractor to take action to reduce the amount of downtime between incineration campaigns and begin sorting, segregating, and characterizing the inventory of mixed low-level waste as soon as possible. These actions are expected to be completed by May 31, 2000.

Management did not concur with the recommendation to close the WERF Incinerator. Management stated that the decision to close the WERF Incinerator had Departmentwide impact and warranted further evaluation. Management will study the merits of the recommendation and announce future plans for the incinerator in June 2000.

We consider management's comments to be responsive. The WERF Incinerator is an expensive treatment option compared to the commercial options expected to be available in June 2000. Even if the WERF Incinerator achieves the attainable rate of 900,000 pounds per year, use of the commercial treatment could save at least \$7.8 million for the waste in inventory at INEEL as of September 1999. Because the remaining waste at INEEL could be treated more economically at commercial facilities rather than at the WERF Incinerator, the Department should close the incinerator as soon as other treatment options are available.

Attachment

cc: Deputy Secretary  
Under Secretary

# WASTE INCINERATION AT THE IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY

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# OVERVIEW

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## INTRODUCTION AND OBJECTIVE

The WERF Incinerator was designed in 1982 to incinerate low-level waste. The facility cost approximately \$6 million to build and started operating in 1985. Operations were expanded to include mixed waste in 1986. As of 1999, the mission of the WERF Incinerator was to incinerate mixed waste until a demonstrated, more cost-effective commercial facility was available. LMITCO currently operates the facility for the Department with a staff of 64 employees. The FY 1999 operating budget for the incinerator was \$8.5 million.

The WERF Incinerator operates in a batch mode. Waste is packaged in cardboard boxes and fed into the incinerator in batches. After each generator's waste has been processed, the incinerator is cooled down and the ash is removed. Waste residuals are usually sent to a commercial facility for disposal. However, if the residuals do not meet the waste acceptance criteria of the commercial disposal facility, they are returned to the generator.

The Office of Inspector General (OIG) recently issued two reports on waste incineration. Report DOE/IG-0451, *Waste Incineration at the Oak Ridge Reservation* (August 1999), concluded that the Department did not operate the Toxic Substances Control Act Incinerator at the capacity permitted by the State of Tennessee. The audit determined that the Department could treat all of the Oak Ridge Reservation's incinerable waste by June 2000 and save \$39 million by closing the incinerator 39 months earlier than planned. Also, Report DOE/IG-0453, *Waste Incineration at the Savannah River Site* (October 1999), concluded that the Department did not operate the Consolidated Incinerator Facility at the capacity permitted by the State of South Carolina. The audit determined that the Department could improve the facility's operating processes to save \$595 million and reduce the time required to incinerate the site's waste from 55 years to 23 years.

In addition, the OIG issued a report on the Advanced Mixed Waste Treatment Facility at INEEL, which is to be operational by March 2003. Report DOE/IG-0440, *Waste Treatment Plans at the Idaho National Engineering and Environmental Laboratory* (February 1999) concluded that waiting until the Advanced Mixed Waste Treatment Facility could process the 3,100 cubic meters of transuranic waste<sup>1</sup>

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<sup>1</sup> Transuranic waste generally consists of protective clothing, tools, glassware, equipment, soils, and sludge contaminated with manmade radioisotopes heavier than uranium.

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would be more economical than recharacterizing and disposing of the waste at the Waste Isolation Pilot Plant, and would reduce the environmental risks to INEEL employees. The audit determined that the Department could save \$66 million by deferring processing of the transuranic waste until the Advanced Mixed Waste Treatment Facility is operational.

The objective of this audit was to determine whether the Department operated the WERF Incinerator at the capacity permitted by the State of Idaho.

## **CONCLUSIONS AND OBSERVATIONS**

The Department did not operate the WERF Incinerator at the capacity permitted by the State of Idaho or at the attainable capacity. The attainable capacity represented the more realistic burn rate as estimated by LMITCO. Two factors contributed to the shortfall in actual operations relative to the capacity of the incinerator. Specifically, operations were limited because the downtime between incineration campaigns was excessive and the majority of on-site waste was not sorted, segregated, and characterized for incineration.

Between April 1996 and September 1998, the Department spent about \$13.5 million to incinerate 786,000 pounds of waste. Had the Department been more aggressive in incinerating the waste at INEEL, the 786,000 pounds could have been incinerated in less than 1 year, at a savings of about \$8.4 million. The remaining waste could be treated more economically at commercial facilities, once these treatment options become available in June 2000. We concluded that the Department could close the WERF Incinerator in June 2000 and use commercial treatment for the incinerable waste in inventory at that time. This would be 39 months earlier than planned, and would reduce operating costs by \$18.1 million.

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

(Signed)

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Office of Inspector General

## OPERATING CAPACITY

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### **WERF Incinerator is Permitted to Burn 1.4 Million Pounds of Waste Annually**

The Department is permitted to operate the WERF Incinerator at an annual capacity of 1.4 million pounds. The annual capacity is determined by multiplying the State of Idaho's hourly permitted rate of 400 pounds by the number of hours the facility is available to operate each year. After adjusting for required maintenance and calibrations and the removal of residual waste between burn campaigns, the incinerator is available to operate about 3,600 hours per year.

Although the permitted capacity is 1.4 million pounds, LMITCO management believed that a more realistic attainable capacity was 250 pounds per hour, or 900,000 pounds per year. The attainable capacity reflects the typical mix of waste available for incineration. The amount of waste that can be fed through the incinerator is based on the characteristics of the waste, such as the type of hazardous component, level of radioactivity, and flammability. The attainable capacity was estimated by management without formal analysis.

### **WERF Incinerator Was Not Operating at Capacity**

The WERF Incinerator was not operating at either the capacity permitted by the State of Idaho or the attainable capacity as estimated by LMITCO management. The following table shows the amount of waste incinerated and the resulting percentages of permitted and attainable capacity used by the facility from April 1996 through September 1998.

<b>Use of WERF Incinerator Capacity</b>			
	<b><u>1996*</u></b>	<b><u>1997</u></b>	<b><u>1998</u></b>
Pounds Incinerated (Thousands)	176	394	216
Percent of Permitted Capacity Used	24	27	15
Percent of Attainable Capacity Used	39	44	24

\* 1996 data is from April through September because the 24-hours-a-day operation began in April. The permitted capacity for the 6-month period was 700,000 pounds; the attainable capacity was 450,000 pounds.

The table shows that the incinerator operated at between 15 and 27 percent of its permitted capacity from April 1996 through September 1998. Using LMITCO's attainable capacity as the benchmark, the facility operated at between 24 and 44 percent of capacity. Thus, regardless of the benchmark used, the incinerator did not operate near capacity.

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**Incinerator Downtime Was Excessive and Most Waste Was Not Prepared for Incineration**

The contractor generally met the Department's performance expectations even though the incinerator was operated at less than capacity. The Department established performance goals for FYs 1996 through 1999 requiring that specific amounts of material be treated at WERF in support of the Department's Strategic Plan and in accordance with the requirements of the Government Performance and Results Act of 1993.

The WERF Incinerator operated at less than capacity because the downtime between campaigns was excessive and the majority of on-site waste was not sorted, segregated, and characterized for incineration.

Downtime Between Campaigns Was Excessive

Incineration activities were limited by the excessive downtime that occurred between incineration campaigns. LMITCO management determined that incinerator workers needed between 7 and 10 days after each incineration campaign for the incinerator to cool down and personnel to remove the residual waste. However, the average amount of time between incineration campaigns from April 1996 through September 1998 was 30 days, or 3 times the requirement established by management.

According to FY 1997 and FY 1998 timekeeping records, only 49 percent of the operators' time was spent on incineration activities. These activities included incineration, maintenance, and residual ash clean up after each campaign. The incinerator appeared to be idle the remaining 51 percent of the time. Management stated that while the incinerator was not operating, operators spent 28 percent of their time performing other treatment activities such as sizing and compacting low-level waste. According to management, the remaining 23 percent of the operators' time was spent performing training as well as preparation and revision of documentation.

Most Waste Was Not Sorted, Segregated, and Characterized

Incinerator activities were also limited because most of INEEL's incinerable waste was not sorted, segregated, and characterized for incineration. Incinerable waste must be sorted, segregated, and characterized before a burn plan can be developed for efficient use of the incinerator. INEEL had 465,000 pounds of incinerable mixed

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waste in inventory as of September 30, 1999. Approximately 98 percent of the waste in inventory had not been sorted, segregated, and characterized for treatment.

Management stated that the waste was not sorted and segregated because incinerable and nonincinerable wastes were commingled and the treatment outlet for nonincinerable wastes will not be available until FY 2000. Also, INEEL had to prioritize their funding to meet Site Treatment Plan milestones. Finally, management stated that a significant amount of the incinerable mixed waste that needed to be characterized was only recently classified as mixed waste.

### **Incineration Costs Were Excessive**

The Department incinerated 786,000 pounds of waste between April 1996 and September 1998 at a cost of \$13.5 million. Had the Department been more aggressive in incinerating the waste at INEEL, the 786,000 pounds could have been incinerated in less than 1 year, at a savings of about \$8.4 million.

Further, the current waste inventory could be treated under commercial contracts at rates significantly below the cost of WERF incineration. The Department has awarded six contracts for the treatment of mixed waste using various technologies. The technologies are to be available for treatment of the Department's waste by June 2000. As of September 30, 1999, INEEL had 465,000 pounds of incinerable mixed waste in inventory planned for treatment at the WERF Incinerator. Management stated that it would take approximately 1 year to treat 71,000 pounds of the waste since the waste needed to be repackaged and prepared for incineration.

It will cost the Department about \$16 million to treat the remaining 394,000 pounds of waste at the WERF Incinerator at the rate achieved from April 1996 through September 1998. If the Department were to improve WERF operations and achieve the attainable rate estimated by LMITCO, it would still cost \$10.4 million to treat the 394,000 pounds of waste at the WERF Incinerator. By comparison, the cost to treat the 394,000 pounds under the commercial contracts would be \$2.6 million. Therefore, using the commercial contracts to treat the waste would cost at least \$7.8 million less than using the WERF Incinerator.

Because the waste can be treated more economically at the commercial facilities rather than the WERF Incinerator, the

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Department should close the incinerator as soon as other treatment options are available. The Department plans to operate the WERF Incinerator through FY 2003. However, by closing the WERF Incinerator in June 2000, rather than September 2003, the Department could avoid operating costs of \$18.1 million.

The WERF Incinerator must remain open until other treatment options are available. Waste treatment is regulated by the Site Treatment Plan, and the milestones for WERF incineration must be met or the Department will be in violation of the Federal Facilities Compliance Act.

## **RECOMMENDATIONS**

We recommend that the Manager, Idaho Operations Office:

1. Require LMITCO to reduce the amount of downtime between incineration campaigns;
2. Require LMITCO to sort, segregate, and characterize the inventory of mixed waste as soon as possible to allow the WERF Incinerator to operate more efficiently; and
3. Close the WERF Incinerator as soon as other treatment options are in place.

## **MANAGEMENT REACTION**

Management agreed with the audit finding and two of the three recommendations. Management directed the contractor to take action to reduce the amount of downtime between incineration campaigns and begin sorting, segregating, and characterizing the inventory of mixed low-level waste as soon as possible. These actions are expected to be completed by May 31, 2000.

Management did not concur with the recommendation to close the WERF Incinerator. Management stated that the decision to close the WERF Incinerator had Departmentwide impact and warranted further evaluation. Management will study the merits of the recommendation and announce future plans for the incinerator in June 2000.

In addition, the contractor began actions to increase the efficiency of the operation of the incinerator. The contractor increased the amount of waste in each box and increased the number of waste boxes fed per hour. Management expects these improvements to result in an

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increase of approximately 30 percent in the amount of waste placed in each box and an expected increase of 20 percent in the waste feed rate.

## **AUDITOR COMMENTS**

We consider management's comments to be responsive. However, the WERF Incinerator should be closed as soon as other treatment options are in place. The WERF Incinerator is an expensive treatment option compared to the commercial options expected to be available in June 2000. Even if the WERF Incinerator achieves the attainable rate of 900,000 pounds per year, use of the commercial treatment could save at least \$7.8 million for the waste in inventory at INEEL as of September 1999. Because the remaining waste at INEEL could be treated more economically at commercial facilities rather than at the WERF Incinerator, the Department should close the incinerator as soon as other treatment options are available.

# Appendix

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## SCOPE

The audit was performed from February 2, 1999 to October 14, 1999, at the INEEL in Idaho Falls, Idaho. The scope of the audit included waste incinerated at WERF from April 1996 through September 1998 and plans for future waste incineration.

## METHODOLOGY

To accomplish the audit objective, we:

- Reviewed the operating capacity and waste feed limitations for the WERF Incinerator;
- Determined the amount of time the incinerator was down for maintenance and calibrations from April 1996 through September 1998;
- Determined the amount of waste incinerated from April 1996 through September 1998 and in inventory at the INEEL as of September 1999;
- Compared April 1996 through September 1998 operating levels to (1) the capacity permitted by the State of Idaho and (2) the attainable capacity as estimated by LMITCO management; and
- Evaluated the Department's performance expectations and measures for the WERF Incinerator between FYs 1996 and 1999.

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, the assessment included reviews of Departmental and contractor policies, procedures, and performance measures related to management and control of WERF incineration activities. 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 assessed the reliability of computer generated data and found that it was reliable.

We held an exit conference with the Waste Management Program Director for INEEL Operations Office and LMITCO's Project Manager for the WERF Incinerator on November 18, 1999.

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