



memorandum

DATE: September 22, 2004

Audit Report Number: OAS-L-04-22

REPLY TO
ATTN OF: IG-35 (A04LL016)

SUBJECT: Audit on "Completion of the Terascale Simulation Facility Project"

TO: Director, NNSA Policy and Internal Controls Management (NA-66)

INTRODUCTION AND OBJECTIVE

The National Nuclear Security Administration (NNSA) is constructing the Terascale Simulation Facility (TSF) project at Lawrence Livermore National Laboratory (Livermore). The TSF project will provide space to operate two teraops computers, consolidate office space for Livermore's computation directorate, and provide a visualization theater. The theater will allow weapon scientists and engineers to access, analyze, and evaluate the massive quantities of data generated from the stockpile tools, such as the National Ignition Facility and the Dual Axis Hydrodynamic Radiographic Test facility. The information will be processed through the teraops computers.

The Department approved the mission need for the TSF project in November 1997. The TSF was included as a line item construction project in the Department's Fiscal Year 2000 appropriation with a \$86.2 million total project cost and a completion date of December 2005. However, at the start of the project, NNSA stopped the work on the project, eventually causing a 13 month delay. The TSF was approved to restart in October 2000 with a revised total project cost of \$92.2 million and a revised milestone completion date of September 2006. The scope of the project will involve the construction of a 253,000 square foot building, which will house two computer bays of unobstructed computer floor space and the visualization theater. The building will contain adequate electrical and cooling power to operate two teraops computers, computer room floor space for ancillary classified and unclassified computers, classified computing network, work laboratories, and offices with technical spaces to house 288 scientists and engineers in secure and open work areas. Construction of the TSF building will cost approximately \$70 million of the \$92.2 million total project cost. The remaining funds will be used to build out the classified computing network, install equipment in the visualization theater, activate the security and fire alarm systems, and put in landscaping next to the building.

In addition, the first set of teraops computers to be installed in the TSF will be the "Purple" and "Blue Gene/L" computers. The cost of acquisition, installation, and cabling infrastructure for these two computers will be \$207.8 million with an operational date in the fall of 2005. Both the TSF and these two computers are funded under the Advanced Simulation and Computing (ASC) Campaign. The purpose of the ASC campaign is to

develop the computational resources needed to analyze experimental data in evaluating the performance, safety, and reliability of nuclear weapons.

The purpose of the audit was to determine whether NNSA will be able to complete the construction of the TSF project within scope, schedule, and cost parameters.

CONCLUSION AND OBSERVATIONS

NNSA and Livermore should complete the TSF project within scope, schedule, and cost parameters. Specifically, Livermore has built the TSF building with the required two computer bays which contain unobstructed computer floor space that will house the two teraops computers, space for the visualization theater, and offices and work spaces as specified in the project baseline. Further, review of the planned electrical requirements for the computer bays, visualization theater, and office tower showed that the electrical capacity of 24 mega watts was installed as planned in the project baseline.

Our analysis also showed that Livermore completed scheduled tasks at or prior to their due dates, which should result in the TSF project being completed ahead of the September 2006 baseline completion date. For example, we sampled and verified the actual completion of the installation of the computer room air handling units and the auto transfer system against the scheduled completion dates. The air handling units, used to cool the teraops computers, were completed on time. The auto transfer system, which automatically transfers electrical power routing from the normal operating system to a back-up power system when electrical power is interrupted, was also completed on time. Further, except for some minor construction defects such as touch up painting that remain to be dealt with under the construction contract, the contractor completed the construction of the TSF building. Since the construction of the building was completed ahead of schedule, Livermore is using the building to start the installation of equipment in the visualization theater, build out of the classified computing network, activation of the security and fire alarm systems, and placement of the landscaping next to the building.

Our review showed that Livermore should complete the TSF project within the \$92.2 million approved total project cost. As of July 31, 2004, Livermore's actual expenditures for the TSF project were \$79.9 million, which is \$1.2 million below the planned budgeted cost. With actual cost less than the planned budgeted cost each month and the project significantly ahead of schedule, Livermore is reporting to NNSA that the TSF project will be completed below the approved total project cost. Livermore forecasted that they will expend another \$11.1 million to complete the project by August 2005, bringing the total project cost to \$91 million, which is \$1.2 million below the \$92.2 million approved total project cost.

SCOPE AND METHODOLOGY

The audit was performed from March to September 2004 at Lawrence Livermore National Laboratory in Livermore, California. The scope of the audit covered the construction of the

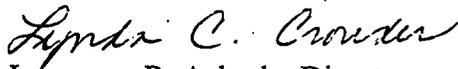
TSF. To accomplish the audit objective, we:

- Interviewed NNSA and Livermore officials;
- Reviewed and assessed the Congressional Project Data Sheets, Project Execution Plan, construction contract, and milestone and cost schedules;
- Toured and observed the construction of the facility;
- Sampled and analyzed planned and actual electrical installation; and,
- Examined related internal and external management reports.

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. 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. Also, since the audit did not disclose a finding with recommendations, we did not conduct a data reliability assessment.

The Government Performance and Results Act (GPRA) of 1993 was enacted to improve Federal program effectiveness and public accountability by promoting a new focus on results-oriented management. Accordingly, the Department developed performance measures to assess the effectiveness of the construction of the TSF. We did not identify any instances where the Department was in noncompliance with GPRA.

We coordinated the report with officials at NNSA and Livermore. Since no formal recommendations are being made in this letter report, a formal response is not required. We appreciate the cooperation of your staff throughout the audit.

for 
Lawrence R. Ackerly, Director
National Nuclear Security Administration
Audits Division
Office of Inspector General

cc: Team Leader, Audit Liaison Team, ME-100
Audit Liaison, NNSA Livermore Site Office

Memorandum

DATE: September 22, 2004

REPLY TO
ATTN OF: IG-35 (A04LL016)

SUBJECT: Final Report Package for " Completion of the Terascale Simulation Facility Project"

TO: Linda Snider, Director for Planning and Administration

Attached is the required final report package on the subject audit. The pertinent details are:

1. Actual Staff days: 94 staff days

Actual Elapsed days: 183 elapsed days

2. Names of OIG audit staff:

Assistant Division Director: Tara Elmore
Team Leader: Freeman Young
Auditor-in-Charge: Tom Henderson

3. Coordination with Investigations and Inspections:

Office of Investigations- Adrian Gallegos, Assistant Special Agent-in-Charge, August 30, 2004; and,

Office of Inspections – Fatima Pashaei, Program Analyst, August 30, 2004.

for 
Lawrence R. Ackerly, Division Director
National Nuclear Security Administration
Audits Division
Office of Inspector General

Attachments:

1. Audit Report (2)
2. Monetary Impact Report
3. Audit Project Summary Report
4. Audit Database Information Sheet

bcc: Livermore Audit Group
NNSA Audits Project File - A04LL016

MONETARY IMPACT OF REPORT NO.: DAS-L-04-22

1. Title of Audit: " Completion of the Terascale Simulation Facility Project"

2. Division: NNSA Audits Division/Livermore Audit Group

3. Project No.: A04LL016

4. Type of Audit:

Financial: _____ Performance: X
 Financial Statement _____ Economy and Efficiency _____
 Financial Related _____ Program Results X
 Other (specify type): _____

5.

FINDING		COST AVOIDANCE		QUESTIONED COSTS				MGT. POSITION	POTENTIAL BUDGET IMPACT
(A)	(B) Title	(C) One Time	(D) Recurring Amount Per Year	(E) Questioned	(F) Unsup-ported	(G) Unre-solved	(H) Total (E)+(F)+(G)	(I) C=Concur N=Noncon U=Undec	(J) Y=Yes N=No
	No Findings								
TOTALS--ALL FINDINGS		0	0	0	0	0	0	N/A	N/A

6. Remarks: The audit found that Livermore should complete the Terascale Simulation Facility project within scope, schedule, and cost. There are no recommendations and no questioned costs made in this report.

7. Contractor: N/A

8. Contract No.: N/A

9. Task Order No.: N/A

10. Approvals:

Division Director & Date: Lynda Crowder for Larry Acterly
 Technical Advisor & Date: [Signature]

AUDIT DATABASE INFORMATION SHEET

1. Project No.: A04LL016
2. Title of Audit: " Completion of the Terascale Simulation Facility Project"
3. Report No./Date OAS-L-04-²²XX / September ²²XX, 2004
4. Management Challenge Area: National Security & Stockpile Stewardship
5. Presidential Mgmt Initiative: Research & Development Investment (RDI)
6. Secretary Priority/Initiative: National Nuclear Security (NNS)
7. Program Code: NNSA (NA)
8. Location/Sites: Lawrence Livermore National Laboratory Livermore, CA
9. Finding Summary:

NNSA and Lawrence Livermore National Laboratory (Livermore) should complete the Terascale Simulation Facility (TSF) project within scope, schedule, and cost parameters. Specifically, Livermore built the TSF building with the planned number of computer bays, visualization theater, and offices and work spaces as specified in the project baseline. Livermore installed the 24 mega watts electrical capacity for the computer bays, visualization theater, and office tower as planned in the project baseline. Further, the audit showed that Livermore completed scheduled tasks at or prior to their due dates. With the completion of the TSF building, Livermore started to use the building to finish the remainder of the project. Livermore is starting the installation of equipment in the visualization theater, build out of the classified computing network, activation of the security and fire alarm systems, and placement of the landscaping next to the building. This should result in the TSF project being completed ahead of the September 2006 baseline completion date. Finally, our review showed that Livermore should complete the TSF project within the \$92.2 million approved total project cost. Livermore forecasted that they will bring the total project cost to \$91 million, which is \$1.2 million below the \$92.2 million approved total project cost. There are no recommendations or questioned costs.

10. Keywords:

Department of Energy
National Nuclear Security Administration
Livermore Site Office
Lawrence Livermore National Laboratory
University of California

Office of the Inspector General (OIG)
Audit Project Office Summary (APS)

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**** Keywords ****

LAWRENCE LIVERMORE NATIONAL LABORATORY
LIVERMORE SITE OFFICE
NATIONAL NUCLEAR SECURITY ADMINISTRATION
TERASCALE SIMULATION FACILITY
UNIVERSITY OF CALIFORNIA

**** Location Information ****

Loc

Code

Description

LLN LAWRENCE LIVERMORE NATION

**** Finding Information ****

Find#

Title

Type Amount

Yrs

Bud

Mgt

Dept

Dept

Dept

Imp

Pos

Pos

Amount

Date

Office of the Inspector General (OIG)
Audit Project Office Summary (APS)

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