



U.S. Department of Energy
Office of Inspector General
Office of Audits and Inspections

AUDIT REPORT

Lawrence Livermore National Laboratory's
Laser Inertial Fusion Energy Endeavor

OAI-M-16-13

July 2016



Department of Energy
Washington, DC 20585

July 7, 2016

MEMORANDUM FOR THE ADMINISTRATOR, NATIONAL NUCLEAR SECURITY
ADMINISTRATION

A handwritten signature in cursive script, reading "George W. Collard".

FROM: George W. Collard
Deputy Inspector General
for Audits and Inspections
Office of Inspector General

SUBJECT: INFORMATION: Audit Report on the "Lawrence Livermore National
Laboratory's Laser Inertial Fusion Energy Endeavor"

BACKGROUND

One of the missions of the Department of Energy's Lawrence Livermore National Laboratory (LLNL) is to strengthen the security of the United States through the development and application of world-class science and technology. In January 2014, LLNL's Independent Audit and Ethics Department reported that from fiscal year (FY) 2008 through March 2013, LLNL expended nearly \$60 million, mainly from indirect and discretionary funding sources, to initiate a series of projects to determine whether a Laser Inertial Fusion Energy (LIFE) power plant was feasible. These projects included reviewing licensing strategy, laser architecture, target fabrication, and chamber protection for a LIFE plant, as well as participating in the National Academy of Sciences study on "An Assessment of the Prospects for Inertial Fusion Energy," which was commissioned by the Department. In FY 2011, the Department's National Nuclear Security Administration (NNSA) directed LLNL not to expend Inertial Confinement Fusion program funds for LIFE activities. In a letter sent to the Livermore Field Office (LFO) Contracting Officer in May 2012, LLNL declared that no Inertial Confinement Fusion funds had been used on LIFE, and that LIFE activities had been funded through indirect pools such as Laboratory Directed Research and Development (LDRD), General and Administrative (G&A), and Program Management Charge.

Due to congressional interest, as well as the magnitude and multiple sources of indirect funds spent on this endeavor, we initiated an audit to determine whether LLNL continued to fund LIFE activities and whether the funding sources used were appropriate.

RESULTS OF AUDIT

While G&A expenditures for LIFE ended in FY 2013, LLNL continued to work on approved LIFE LDRD projects that had a 3-year scope ending in FY 2015. We did not find any evidence that LLNL continued to fund LIFE activities after FY 2015. However, we questioned

approximately \$23.3 million of LLNL's expenditures for LIFE activities from FY 2008 through 2013. Specifically, we determined that LLNL incurred G&A costs for independent research and development (R&D) activities outside its LDRD program, which is expressly unallowable under the terms of its management and operating (M&O) contract. LLNL's M&O contract only allows independent R&D expenditures through its LDRD program, which has congressionally mandated cost limitations. In addition, LLNL incurred G&A costs for LIFE activities that we determined did not meet the definition of G&A costs and are therefore questionable. Federal regulation requires G&A expenses to be incurred for managing and administering the entire business unit. Thus, we are questioning the R&D and G&A costs for LIFE activities, which include approximately:

- \$1.6 million in expenditures for LIFE activities that we found to be questionable R&D costs;
- \$17.7 million for potential questionable R&D activities; and
- \$4 million for LIFE-specific activities classified as G&A costs that we determined did not meet the definition of G&A costs because they did not provide management and administrative support to the entire laboratory.

Questionable R&D Activities and G&A Costs

Based on our reviews of LIFE documents, which were supported through separate reviews by NNSA officials, we found LLNL used \$1.6 million of G&A funds for LIFE-related work that we determined met the Federal Acquisition Regulation (FAR) definition of R&D activities. Although LLNL officials stated that the funds were not expended for R&D activities, our audit identified specific subcontracts for LIFE activities that LLNL categorized as R&D expenditures. In addition, principal investigators and technical representatives who worked on LIFE projects told us that R&D work was performed. Furthermore, NNSA officials concluded that, based on their reviews of LIFE project funding requests and various subcontract documents, the work performed included R&D as defined in FAR 31.205-18, *Independent Research and Development and Bid and Proposal Costs*.

LLNL officials asserted that the established categories of activities in LLNL's disclosure statements, which were reviewed and approved by NNSA, encompassed the work performed on LIFE. The specific category that encompassed LIFE activities was "institutional capabilities and other activities that enhance the laboratory's ability to address future missions" in LLNL's Cost Accounting Standards (CAS) disclosure statements from FY 2008 through 2012. In its FY 2013 disclosure statement, LLNL replaced this description with the term "tech base/core competencies." However, despite LLNL's disclosure of broad categories identifying potential costs, independent R&D costs are expressly unallowable under M&O contracts unless they are incurred as part of the LDRD program in accordance with Department of Energy Acquisition Regulation 970.3102-05-18, *Independent Research and Development and Bid and Proposal Costs*.

LLNL officials also claimed the \$17.7 million in expenditures were not for R&D activities, but described the work as “reduction to practice” activities. LLNL defines “reduction to practice” as the application of good engineering to enhance known scientific technologies to problems of interest. In our view, this “reduction to practice” concept is equivalent to the FAR definition of R&D, which is described as the use of knowledge to improve an existing product to meet specific objectives. However, an NNSA official expressed that a formal review should be conducted by NNSA at the conclusion of our audit to provide information to the LFO Contracting Officer for use in determining the allowability of the \$17.7 million in questioned costs.

Furthermore, we found that LLNL expended G&A costs of \$4 million for LIFE activities that we determined were not for the general management and administration of the laboratory. CAS 410, *Allocation of Business Unit General and Administrative Expenses to Final Cost Objectives*, requires G&A expenses to be incurred for managing and administering the entire business unit. Although the costs were not incurred for R&D activities, they were expended on other LIFE activities that we determined did not meet the definition of G&A expenses.

Controls and Federal Monitoring

The LIFE-related issues that we discovered can be attributed to weaknesses in LLNL’s internal controls over the disclosure and use of G&A funds. CAS requires that contractors include and adequately describe in their CAS disclosure statements all cost accounting practices they intend to follow. However, LLNL had not ensured that its CAS disclosure statements to NNSA included and adequately described all accounting practices, rendering the disclosures noncompliant with CAS. In response to our finding, the LFO Contracting Officer recently issued a CAS noncompliance letter to LLNL indicating that the term “tech base,” which LLNL officials claimed included LIFE activities, was too broad and not fully described in LLNL’s disclosure statement, and that the inclusion of “tech base” in the G&A pool was noncompliant with the provisions of CAS 410.

We also found that LLNL’s controls over the review and approval of indirect funding requests could be improved. LLNL’s review and approval process relied on individuals who were not technical subject matter experts and, therefore, may not have fully understood whether the proposed activities were R&D or institutional in nature. Additionally, LLNL officials stated that the Financial Policies and Procedures Manual defined “reduction to practice.” The reviewing and approving officials asserted that they relied on the definition to determine whether the proposed activity was acceptable. However, LLNL’s financial policy on G&A expense did not encompass or describe “reduction to practice.” As a result, LLNL’s Finance Department approved projects that were questionable for this funding source.

In addition, we found that the Department had not required in-depth monitoring of its contractors’ indirect costs. The NNSA’s review process for indirect rates, until recently, did not examine individual activities included in the indirect pools to determine whether the activities were consistent with the disclosure statement and the CAS. To its credit, NNSA’s Office of Field Financial Management completed a more detailed review of LLNL’s FY 2014 indirect costs and found that LLNL’s disclosure statement did not disclose all of LLNL’s accounting

practices. While this review was a positive step forward, the Department should continue to perform detailed monitoring and review of the contractors' indirect costs to understand the activities being funded and ensure they align with Federal and Department regulations.

Opportunities to Improve Controls and Oversight

Due to inadequate controls and oversight, LLNL incurred approximately \$23.3 million in questionable costs, including \$1.6 million in cost questioned as expressly unallowable R&D, \$17.7 million in "reduction to practice" costs questioned as potential R&D charges, and \$4 million of questionable charges to G&A because they were not for the management and administrative support of the laboratory. Without stringent controls and oversight over the authorization of activities to be included in the G&A pool, the risk of questionable G&A charges is increased. At a minimum, accounting for efforts such as LIFE should be transparent to ensure that the costs are disclosed and subject to oversight. To address the issues outlined in this report, we made several recommendations designed to strengthen controls over the use of indirect funds.

MANAGEMENT RESPONSE

Management concurred with our findings and recommendations and indicated that corrective actions had been planned to address our recommendations. In particular, management will perform an analysis of its contractors' internal control assessments and evaluate and determine the allowability of the approximately \$23.3 million in questioned costs.

We consider management's comments and planned corrective actions to be responsive to our findings and recommendations. Management's comments are included in Appendix 3.

cc: Deputy Secretary
Chief of Staff

LAWRENCE LIVERMORE NATIONAL LABORATORY'S LASER INERTIAL FUSION ENERGY ENDEAVOR

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LAWRENCE LIVERMORE NATIONAL LABORATORY'S LASER INERTIAL FUSION ENERGY ENDEAVOR

DETAILS OF FINDING

In support of its mission to strengthen the security of the United States through the development and application of world-class science and technology, Lawrence Livermore National Laboratory (LLNL) began developing a Multi-Year Performance Strategy in fiscal year (FY) 2008. LLNL's strategy centers on mission focus areas and core competencies that are funded through the Laboratory Directed Research and Development (LDRD) program and other institutional funds such as General and Administrative (G&A). LLNL's strategic planning effort led to the initiation of a series of projects to assess the feasibility of Laser Inertial Fusion Energy (LIFE) to produce commercial power. These projects included reviewing licensing strategy, laser architecture, target fabrication, and chamber protection for a LIFE plant, as well as participating in the National Academy of Sciences study on "An Assessment of the Prospects for Inertial Fusion Energy," which was commissioned by the Department of Energy. In FY 2011, the National Nuclear Security Administration (NNSA) directed LLNL not to expend Inertial Confinement Fusion program funds for LIFE activities. In a letter sent to the Livermore Field Office (LFO) Contracting Officer in May 2012, LLNL declared that no Inertial Confinement Fusion funds had been used on LIFE, and that LIFE activities have been funded through indirect pools such as LDRD, G&A, and Program Management Charge.

In July 2013, a congressional staffer contacted the Office of Inspector General and conveyed concerns that the LIFE endeavor at LLNL had not been authorized or appropriated by Congress and may not have been consistent with Department-approved accounting practices. In January 2014, LLNL's Independent Audit and Ethics Department reported that from FY 2008 through March 2013, LLNL had expended nearly \$60 million on LIFE projects, mainly from indirect and discretionary funding sources. While G&A expenditures for LIFE ended in FY 2013, LLNL continued to work on approved LIFE LDRD projects that had a 3-year scope ending in FY 2015. During our audit, we did not find any evidence that LLNL continued to fund LIFE activities after FY 2015. However, we questioned approximately \$23.3 million of LLNL's expenditures for LIFE activities from FY 2008 through 2013.

Indirect Funding of an LLNL-Specific Endeavor

We determined that LLNL expended G&A funds for independent research and development (R&D) activities outside of its LDRD program, which is expressly unallowable under the terms of its management and operating (M&O) contract. LLNL's M&O contract only allows independent R&D expenditures through its LDRD program, which has congressionally mandated cost limitations. In addition, expending G&A funds for LIFE activities that we determined did not meet the definition of G&A costs is questionable. Federal regulation requires G&A expenses to be incurred for managing and administering the entire business unit. Therefore, we are questioning the R&D and G&A costs for LIFE activities, which include approximately:

- \$1.6 million in expenditures for LIFE activities that we found to be questionable R&D costs;

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- \$17.7 million for potential questionable R&D activities; and
 - \$4 million for LIFE-specific activities classified as G&A costs that we determined did not meet the definition of G&A costs because they did not provide management and administrative support to the entire laboratory.

Research and Development Activities

Our audit revealed that G&A funds were used for R&D activities. Department of Energy Acquisition Regulation 970.3102-05-18, *Independent Research and Development and Bid and Proposal Costs*, which is incorporated in LLNL's M&O contract, states that independent R&D costs are unallowable for M&O contractors except as part of the laboratory's LDRD program. In addition, LLNL's Financial Policies and Procedures Manual states that indirect funds must not be used for R&D activities. Federal Acquisition Regulation (FAR) 31.205-18, *Independent Research and Development and Bid and Proposal Costs*, defines R&D, in part, as "the systematic use of knowledge in the design, development, test, or evaluation of a potential new product or service or of an improvement in an existing product or service to meet specific requirements or objectives." According to the FAR, R&D includes design engineering, prototyping, and engineering testing. We identified several LIFE activities that were either categorized by LLNL as an R&D activity or were considered an R&D activity by LIFE projects' principal investigators, LLNL technical representatives, or NNSA officials. Specifically:

- One project incurred more than \$447,000 to modify and improve the efficiency of semiconductor laser diodes at high output power. The project's principal investigator stated that proof of principle work was performed on the project, which is considered an R&D activity in accordance with Department Order 413.2B, *Laboratory Directed Research and Development*, and LLNL's Financial Policies and Procedures Manual. In addition, a portion of the work was subcontracted and LLNL paid the subcontractor for non-recurring engineering, which is considered an R&D activity in an LLNL-issued request for proposal. LLNL officials asserted that the work performed on this project consisted of purchasing diode bars and performing acceptance testing on them. However, NNSA officials who reviewed the project funding request and subcontract documents stated that the tasks performed were R&D. For instance, the subcontractor was investigating methods to increase power and efficiency, as well as developing ways to grow the structures of the laser diodes.
- LLNL awarded R&D subcontracts described as standard research and "Service – Research & Development" subcontracts to develop a Hazardous Area Inspection Robot, perform other services, and work on hydrodynamics simulation code. The subcontractor for the Hazardous Area Inspection Robot was tasked to modify an existing robot and add additional features such as sensors and shielding to develop a new small-scale inspection robot for hazardous environments. The subcontractor for the hydrodynamics simulation codes conducted applied research to perform various analyses of the reactor chamber and participate in the conceptual design of the reactor system. The combined cost incurred on these subcontracts was over \$406,000.

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- LLNL paid over \$501,000 to subcontractors to develop (1) a friction stir welding parameter map for defect-free weld methods; (2) systems and methods for fast ignition Inertial Fusion Energy targets; (3) systems and methods for indirect drive ignition targets; and (4) laser glass for LIFE. NNSA officials who reviewed these subcontracts' statements of work stated that the work to develop welding processes and parameters was R&D. They also stated that the subcontractor for targets was working to develop technologies that did not exist and that laboratories spend their R&D funds on this type of work. Furthermore, LLNL's technical representative for the laser glass subcontract stated that the subcontractor performed R&D to change the compositions of the laser glass in order to develop glass with properties that did not then exist.
 - Another LIFE project awarded subcontracts to evaluate the LIFE fuel cycle and to optimize the technology for the LIFE tritium handling system and the remote maintenance facility. Two of the principal investigators on the subcontracts told us that the work performed was R&D. The principal investigators explained they were developing design requirements and working on the pre-conceptual design for the LIFE fuel cycle, and they considered these tasks to involve R&D activities. The third principal investigator asserted that he systematically applied knowledge towards the production of useful devices and worked on the remote maintenance conceptual designs, which is the first step in the design engineering function. As previously discussed, design engineering is considered an R&D activity by the FAR. LLNL incurred nearly \$266,000 on these subcontracts.

LLNL incurred more than \$1.6 million of G&A costs on these R&D activities, which we question because independent R&D costs are expressly unallowable costs under Department of Energy Acquisition Regulation 970.3102-05-18. LLNL officials asserted these LIFE activities, for which we questioned the costs, were not R&D activities. However, during our audit, we discussed the definitions associated with R&D in Office of Management and Budget Circular A-11, *Preparation, Execution, and Submission of the Budget*, and FAR 31.205-18 with LLNL officials who agreed that the R&D definitions adequately described the work performed on LIFE. In addition, NNSA officials reviewed the project funding requests and various subcontract documents of the previously identified examples and concluded that the work performed was clearly R&D, with the exception of one example. NNSA officials stated that, based on their review, it appeared that LLNL's subcontractors were working to develop technologies that did not exist, performing R&D to analyze a new system, or working towards a defined goal but they needed to perform R&D to solve the problem. For the one exception, although the subcontract was categorized as an R&D service, an NNSA official was not able to make a definitive determination on whether the work was R&D because the subcontract lacked detail on the work performed, and the LLNL technical representative could not fully recall what work was performed on the subcontract.

LLNL officials also asserted that the established categories of activities in LLNL's disclosure statement encompassed LIFE activities. The specific category that encompassed LIFE activities was "institutional capabilities and other activities that enhance the laboratory's ability to address future missions" in LLNL's Cost Accounting Standards (CAS) disclosure statements, which were reviewed and approved by NNSA from FY 2008 through 2012. In its FY 2013 disclosure

statement, LLNL replaced this description with the term “tech base/core competencies.” However, despite LLNL’s disclosure of broad categories of potential costs, independent R&D costs are expressly unallowable under M&O contracts unless they are incurred as part of the LDRD program in accordance with Department of Energy Acquisition Regulation 970.3102-05-18.

Potential R&D Activities

We also identified an additional \$17.7 million expended on potential R&D activities for LIFE efforts funded through G&A accounts. LLNL officials told us, and our review of actual LIFE funding documents disclosed, that work was described as “reduction to practice” activities. LLNL defines “reduction to practice” as the application of good engineering to enhance known scientific technologies to problems of interest. In our view, this “reduction to practice” concept is equivalent to the FAR definition of R&D, which is described as the use of knowledge to improve an existing product to meet specific objectives. We found LIFE activities included optimizing the power plant design; designing the laser architecture for LIFE; developing laser code; and enhancing capabilities in target manufacturing, remote handling technology, and advanced thermal-electric cycles. Furthermore, LIFE was considered a new system that required research, adaptation, and integration of technologies into a first-of-a-kind LIFE power plant. Therefore, based on our limited review, we consider these activities to be R&D in accordance with the FAR, and we are questioning the \$17.7 million. An NNSA official expressed that a formal review should be conducted at the conclusion of our audit to provide information to the LFO Contracting Officer for use in determining the allowability of the questioned costs.

Questionable G&A Costs

We found several LIFE activities that were charged to laboratory G&A that we determined were not incurred for managing and administering the entire laboratory. According to CAS 410, *Allocation of Business Unit General and Administrative Expense to Final Cost Objectives*, an expense is to be incurred for managing and administering the entire business unit in order to be classified as G&A. In addition, LLNL’s Financial Policies and Procedures Manual also states that G&A costs are to be incurred for the general management and administration of the laboratory as a whole. However, we found LLNL charged nearly \$4 million to G&A accounts for LIFE expenditures that we determined were not for the general management and administration of the laboratory. For example:

- One LIFE activity generated the licensing and regulatory roadmap for fusion energy demonstration and commercial power plants. This work included the development of the facility layout of the power plant.
- Another LIFE activity used an energy system model to conduct cost-benefit analyses of fusion energy commercialization and a Monte Carlo simulation tool to evaluate the availability of the power plant.
- LLNL established strategic partnerships with companies to demonstrate mass manufacturing of low-cost targets.

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- LLNL also subcontracted work to support LIFE activities. One subcontractor developed an institutional strategy to reach out to stakeholder audiences in support of the LIFE project. This subcontractor also facilitated logistics and administrative contacts with members of the utility community and traveled to participate in utility industry events. Another subcontractor developed detailed design input for general arrangement drawings for LIFE using LLNL-provided descriptions of the physical site, site improvements, and buildings necessary to house various LIFE systems. Furthermore, LLNL subcontracted work to develop inspirational elevations, renderings, and images that graphically illustrated the design of the LIFE facility.

Controls and Federal Monitoring of Indirect Costs

The issues we identified can be attributed to weaknesses in LLNL's internal controls over the disclosure and use of G&A funds. In addition, the Department does not require in-depth monitoring of its M&O contractors' indirect costs.

Internal Control Deficiencies

LLNL had not ensured that all accounting practices were included and described in its disclosure statement, which is noncompliant with CAS. CAS requires that all cost accounting practices that contractors intend to follow be included and described in their CAS disclosure statements. While LLNL officials asserted that LIFE projects were funded consistently using "reduction to practice" as a standard, we found that LLNL's CAS disclosure statements did not include or describe LLNL's "reduction to practice" concept.

LLNL officials also asserted that since FY 2008, activities such as LIFE were adequately described in LLNL's CAS disclosure statement as "institutional capabilities and other activities that enhance the laboratory's ability to address future missions." This description was carried throughout the CAS disclosure statements until FY 2013, when it was replaced with the term "tech base/core competencies." LLNL officials explained that the terms might have changed throughout the years, but the activities being described have not changed. However, as an independent third party assessing the disclosure statement, we could not see the connection between institutional capabilities/tech base activities and LLNL's "reduction to practice" concept of applying good engineering to enhance known scientific technologies to problems of interest.

Moreover, we agree with NNSA's view that the disclosure statement was too broad as we could not determine what efforts would fall within LLNL's disclosed activity. In particular, in response to our finding, the LFO Contracting Officer recently issued a CAS noncompliance letter to LLNL. In the letter, the Contracting Officer stated that the NNSA Office of Field Financial Management (OFFM) found the term "tech base" was too broad and not fully described in LLNL's disclosure statement, and the inclusion of "tech base" in the G&A pool was noncompliant with the provisions of CAS 410.

We also found that the controls over the review and approval of indirect funding requests could be improved. Although LLNL's controls required the Finance Department to review and approve indirect funding requests, the individuals approving the requests did not have technical

subject matter backgrounds and, therefore, may not have fully understood whether the proposed activities were R&D or institutional in nature. Officials from LLNL's Finance Department asserted that they depended on the funding requestor for technical assistance to understand the scope of work proposed. However, the approving officials' reliance on the funding requestor for technical assistance represents a conflict of interest. In our view, a more appropriate approval process for projects requesting G&A funds should include technical officials representing the entire organization, similar to the LDRD approval process. A prior OIG audit, *Lawrence Livermore National Laboratory's Laboratory Directed Research and Development Program* (OAS-L-15-04, November 2014), found that LLNL's LDRD proposals were evaluated by a peer review committee comprised of personnel who may be internal or external to LLNL. A large number of technical and programmatic leaders from across the laboratory provide input and guidance in the review of the LDRD proposals. This enhanced review process would help provide assurance that the project's scope of work does not include R&D activities and that the activity is necessary for the management and administration of the entire laboratory.

Additionally, LLNL Finance officials stated they relied on the Financial Policies and Procedures Manual when reviewing and approving funding requests. LLNL officials asserted that the Financial Policies and Procedures Manual defined "reduction to practice" activities. However, we found that "reduction to practice" was not defined or described in LLNL's Financial Policies and Procedures Manual. Furthermore, LLNL's understanding of "reduction to practice" was not based on any Federal or Department guidance. LLNL officials told us that "reduction to practice" was intended to justify the use of indirect funds to continue work to "bridge the gap" between when an LDRD project was completed and when the concept was subsequently mature enough to receive direct funding. However, officials from the Department's Office of the Chief Financial Officer and NNSA's OFFM were unfamiliar with the term "reduction to practice" and were unaware of any Federal or Department guidance governing these activities. OFFM officials also stated that "reduction to practice" seems to be a term specific to LLNL. As noted earlier in this report, we found LLNL's understanding of "reduction to practice" to be equivalent to R&D as defined in the FAR and Department guidance. As a result, LLNL's Finance Department approved projects that were questionable under this funding source.

Federal Monitoring

We determined that the Department had not required in-depth monitoring of its management and operating contractors' indirect costs. Specifically, an LFO official asserted that no one in the Department complex conducts detailed reviews of G&A-funded projects because there is no requirement to do so. We found that Department Order 520.1A, *Chief Financial Officer Responsibilities*, places responsibility on the Head of Contracting Activity to ensure the CAS disclosure statements, including indirect rates calculations, are approved by the Contracting Officer in consultation with the field Chief Financial Officer. In addition, the field Chief Financial Officer serves as the Contracting Officer Representative to review indirect rates for contracts within their cognizance. NNSA's OFFM has been reviewing the CAS disclosure statements and indirect rates of the Department's contractors under its purview. However, OFFM's review of disclosure statements and indirect rates consisted of evaluating at a high level the elements disclosed by the laboratories for each indirect pool, determining whether the indirect rates were comparable to the previous year, and identifying the factors that caused any

significant changes. Until recently, the reviews did not examine individual activities charged to the indirect cost pools to determine whether the activities were consistent with the disclosure statement and CAS. In our view, it is important to perform an in-depth review of the activities in the indirect cost pools, at least on a sample basis, to ensure activities included in the G&A pool are not R&D and are institutional in nature.

OFFM officials stated that although reviews are performed on the indirect rates and disclosure statements, the reviews would not have examined the project-level and transaction-level details. Similarly, an LFO official asserted that the indirect rates reviews were at a high level and the transactions in the pool or base were not reviewed in detail. Therefore, these reviews would not have identified the issues in our report.

To its credit, OFFM recently completed a more rigorous review of LLNL's FY 2014 final actual indirect costs and rates. OFFM requested a breakout of procurement transactions and performed analyses on five selected transactions to determine if LLNL accounted for the transactions in accordance with Department regulations, policies, and public law. OFFM found that one transaction was inappropriately charged to G&A. Additionally, OFFM found that LLNL did not disclose a category of activity in its disclosure statement. While this review was a positive step forward, the Department should continue to perform detailed monitoring and review of the contractors' indirect costs to understand the activities being funded and ensure they align with Federal and Department regulations.

Opportunities to Improve Controls and Oversight

LLNL incurred approximately \$23.3 million in questionable costs for LIFE activities, including \$1.6 million in costs questioned as expressly unallowable R&D costs, \$17.7 million in "reduction to practice" costs questioned as potential R&D charges, and \$4 million of questionable charges to G&A because they were not for the management and administrative support of the laboratory. Without stringent controls and oversight over the authorization of activities to be included in the G&A pool, the risk of questionable G&A charges is increased. At a minimum, accounting for efforts such as LIFE should be transparent to ensure that the costs of such activities are disclosed and subject to oversight.

RECOMMENDATIONS

To strengthen controls over the use of G&A funds and ensure that only allowable activities are conducted:

We recommend that the Administrator, National Nuclear Security Administration:

1. Ensure controls are in place and working effectively to minimize the risk of questionable activities being charged to indirect costs.

We also recommend that the Manager, Livermore Field Office:

2. Direct LLNL to update its CAS disclosure statement and Financial Policies and Procedures Manual to adequately describe its actual accounting practices, in compliance with Federal and Department requirements;
3. Direct LLNL to modify the review and approval process for G&A-funded activities to include technical representatives throughout the laboratory to ensure G&A funds are not used for R&D activities but rather for the management and administration of the laboratory; and
4. Direct the Contracting Officer to determine the allowability of the approximately \$23.3 million in costs questioned in this report, and seek recovery of those costs determined to be unallowable, including \$1.6 million in costs questioned as expressly unallowable R&D, \$17.7 million in “reduction to practice” costs questioned as potential R&D charges, and \$4 million of questionable charges to G&A because they were not for the management and administrative support of the laboratory.

MANAGEMENT RESPONSE

Management concurred with each of the report's recommendations and indicated that corrective actions were planned to address the issues identified. Specifically, management stated that it will evaluate the sufficiency of controls at all sites using the risk-based assessment process under the Federal Managers' Financial Integrity Act (FMFIA) and Office of Management and Budget Circular A-123 (OMB A-123). Management will also enhance visibility regarding the risks and controls associated with properly charging indirect costs by highlighting this as an OMB A-123 focus area. Management will also consider the results of the audit in its analysis of the FMFIA and the OMB A-123 internal controls assessments and will take action to address any noted deficiencies beyond those identified in the audit. Management stated that, if the OMB A-123 assessments determined that the risk of potential mischarges to G&A or other indirect costs is sufficient, NNSA may request the OIG, as the cognizant audit agency, to consider expanding its audit coverage in this area.

In addition, the Contracting Officer will direct Lawrence Livermore National Security to (1) update its Cost Accounting Standards disclosure statement, (2) update its Financial Policies and Procedures Manual, and (3) modify its review and approval process for general and administrative funded activities. Furthermore, the Contracting Officer will evaluate and determine the allowability of the approximately \$23.3 million in questioned costs as well as determine whether LLNL's definition of "reduction to practice" inappropriately includes R&D work and may request a review of other "reduction to practice" activities as appropriate.

Management's comments are included in Appendix 3.

AUDITOR COMMENTS

Management's comments and planned corrective actions were responsive to our recommendations. However, while we agree that the OIG is the cognizant audit agency for the Department, NNSA is ultimately responsible for overseeing its contractors' financial management systems and ensuring that they include effective internal controls.

OBJECTIVE, SCOPE, AND METHODOLOGY

Objective

The objective of this audit was to determine whether Lawrence Livermore National Laboratory (LLNL) continued to fund the Laser Inertial Fusion Energy (LIFE) activities and whether the funding sources used were appropriate.

Scope

The audit was performed between January 2015 and July 2016 at LLNL in Livermore, California. The audit scope included a review of costs and activities related to the LIFE endeavor. However, we were unable to validate that all LIFE costs and activities were included in our review because LLNL does not group costs by endeavor in its accounting system. The audit was conducted under Office of Inspector General (OIG) project number A15LL013.

Methodology

To accomplish our audit objective, we:

- Interviewed key Department and contractor personnel;
- Reviewed prior reports issued by the OIG, LLNL's Independent Audit and Ethics Department, and the Government Accountability Office;
- Reviewed Federal, Department, and contractor regulations, policies, and procedures for managing indirect funds;
- Reviewed LIFE project documents; and
- Analyzed general ledger data, project funding request data, strategic plans, and current project listings.

In addition, we reviewed 37 LIFE subcontracts. This included an initial review of the 17 subcontracts identified by LLNL's Independent Audits and Ethics Department that were charged to various indirect pools such as general and administrative (G&A) and Program Management Charge. We also identified 72 subcontracts charged to the G&A pool and excluded 11 from our universe because we reviewed them as part of the initial review; thus, our sample universe was 61 subcontracts charged to the G&A pool. We judgmentally selected for review 20 of these 61 subcontracts funded with G&A, based on preliminary information that indicated the work performed was not for the management and administration of the entire laboratory or included research and development activities. A non-statistical sample design was chosen because of the relatively small size of the universe and our audit objective to test for specific attributes related to general and administrative funds. Because the selection was based on a judgmental sample, results and overall conclusions cannot be projected to the entire population or universe of subcontracts subject to the audit.

We conducted this performance audit in accordance with generally accepted Government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. The audit included tests of controls and compliance with laws and regulations to the extent necessary to satisfy the audit objective. Additionally, we assessed the implementation of the *GPR Modernization Act of 2010* and found that although the Department had established goals to catalyze the timely, material, and efficient transformation of the nation's energy system, there were no specific performance measures related to LIFE. Because our review was limited, it would not have necessarily disclosed all internal control deficiencies that may have existed at the time of our audit. We relied on computer-processed data to satisfy the audit objective. Based on recent reviews of LLNL's information technology controls performed by KPMG, LLP, on behalf of the OIG, we determined that the data was sufficiently reliable for the purposes of the audit. An exit conference was held on July 6, 2016.

RELATED REPORTS

Prior Office of Inspector General Reports

- Audit Report on the [*Argonne National Laboratory Infrastructure Projects*](#) (OAS-M-15-02, February 2015). The audit found that Argonne National Laboratory may have inappropriately used, or planned to use, indirect funding to complete 4 of 10 minor construction projects funded as Institutional General Plant Projects (IGPPs). The four projects, totaling \$15.9 million, were not of a general institutional nature but instead related to specific program needs. The use of indirect funds for these program-specific construction projects occurred because the Office of Science did not clearly communicate to its laboratories the availability of direct program funding for program-specific infrastructure projects. The audit also found that there were differing interpretations of the Department's IGPP requirements. Furthermore, various Argonne Site Office managers and project officers did not adequately review or enforce IGPP requirements in the Department Order. Because program-specific construction was accomplished as IGPPs, other Department programs shared in the cost of the projects that, based on the information furnished, may not have provided benefit to them.
- Audit Report on the [*Lawrence Livermore National Laboratory's Laboratory Directed Research and Development Program*](#) (OAS-L-15-04, November 2014). The audit found nothing to indicate that the Lawrence Livermore National Laboratory (LLNL) did not have controls in place over initial Laboratory Directed Research and Development (LDRD) project approval and subsequent project management. Proposals were evaluated by peer review committees comprised of personnel who may be internal or external to LLNL for technical merit and relevance to the National Nuclear Security Administration's mission.
- Audit Report on the [*Idaho National Engineering and Environmental Laboratory's Strategic Initiative Fund*](#) (DOE/IG-0601, May 2003). The audit found that Bechtel had used the Strategic Initiative Fund for questionable purposes. Specifically, the funds had been used to supplement the LDRD program, pay for activities that should have been funded directly by program offices, and pay for activities that did not directly support Idaho National Engineering and Environmental Laboratory's primary missions. Additionally, the audit disclosed that the major programs providing funding to the Strategic Initiative Fund did not receive benefits commensurate with their contributions. Furthermore, the audit found that the Department did not have adequate policies and procedures to control mission development activities, and that Bechtel's contract was unclear as to the allowability of advertising, marketing, and direct selling expenses.
- Audit Report on the [*Research and Development at Lawrence Livermore National Laboratory*](#) (DOE/IG-0511, July 2001). The audit found that 26 projects involved Research and Development (R&D) efforts for which the contractual authority to do the work was questionable. Instead of funding the 26 R&D projects through one of the approved mechanisms such as the laboratory's Work Authorization System, Work for Others, or LDRD program, Livermore used several overhead accounts for this purpose.

The audit found that Livermore did not have effective controls to eliminate R&D activities from its overhead accounts. Unless better controls are established, Livermore can be expected to expend an additional \$11.2 million annually on unauthorized R&D if such spending continues at the rate experienced during FYs 1998-2000.

LLNL's Independent Audit & Ethics Department

- Advisory Service Report on *NIF Subcontracting – LIFE Value Proposition* (No. 4241, January 2014). The objective of the review was to ascertain the extent of Inertial Confinement Fusion funds expended for the LIFE value proposition, the source of those funds, the extent of some subcontractors' work scope supporting LIFE business development activities, and the possible existence of organizational conflicts of interest associated with LIFE subcontractors and consultant agreements with employees of these subcontractors. The review found that from October 1, 2007, to March 31, 2013, about \$58.4 million of indirect and discretionary funds had been spent in support of LIFE-related R&D and business development activities.

MANAGEMENT COMMENTS



Department of Energy
Under Secretary for Nuclear Security
Administrator, National Nuclear Security Administration
Washington, DC 20585



June 15, 2016

MEMORANDUM FOR RICKEY R. HASS
ACTING INSPECTOR GENERAL

FROM: FRANK G. KLOTZ *F. Klotz 6/15/2016*

SUBJECT: Comments on the Office of Inspector General Draft Report Titled
*Lawrence Livermore National Laboratory's Laser Inertial Fusion
Energy Endeavor (2014-03021/A15LL013)*

Thank you for the opportunity to review and comment on the subject draft report. We appreciate the Office of Inspector General's (OIG) independent review of Lawrence Livermore National Laboratory's (LLNL) Laser Inertial Fusion Energy (LIFE) activities. As noted in the report, the issues raised were previously highlighted in an internal audit, and subsequent actions have been taken to review and address related concerns. We concur with the auditors' four recommendations to address the remaining issues.

The Contracting Officer over Lawrence Livermore National Security (LLNS) will certainly draw upon the results of the OIG's audit, along with other supporting reviews and analyses, in evaluating the allowability of costs and identifying any needed internal control enhancements. Corrective actions to address three of the recommendations are on schedule to be completed by December 2016. The issues surrounding the resolution of costs questioned by the auditors are complex and will require additional time and the support of technical experts to properly evaluate the appropriateness of those costs. Accordingly, we anticipate these evaluations and allowability determinations may extend into 2017.

We note that the report presents the views of several laboratory and field office officials on various aspects of the LIFE activities. These views will be considered as part of the evaluation process, but they should not be interpreted or presented as NNSA's final position.

The attachment to this memorandum details the specific actions taken and planned to address the recommendations, as well as timelines for completion. We have also separately provided technical comments for your consideration to enhance the clarity and factual accuracy of the report. If you have any questions regarding this response, please contact Mr. Dean Childs, Director, Audits and Internal Affairs, at (301) 903-1341.

Attachment



Attachment

**NATIONAL NUCLEAR SECURITY ADMINISTRATION (NNSA)
Response to Report Recommendations**Lawrence Livermore National Laboratory's Laser Inertial Fusion Energy Endeavor
(A15LL013)**Recommendation 1:** Ensure controls are in place and working effectively to minimize the risk of inappropriate activities being charged to indirect costs.**Management Response: Concur**

NNSA and the Department evaluate the sufficiency of controls at all sites using the risk-based assessment process under the Federal Managers' Financial Integrity Act (FMFIA) and Office of Management and Budget Circular A-123, *Management's Responsibility for Internal Control (A-123)*. The annual assessment includes evaluation of specific processes, risks and controls associated with proper charging of indirect costs, including General and Administrative Expenses (G&A). This assessment is designed by Government-wide standards to provide reasonable assurance regarding the effectiveness of controls.

The NNSA Office of Management and Budget (MB) will enhance visibility in this area by highlighting it as an A-123 focus area to be addressed by all sites, regardless of assessed risk. NNSA will consider the results of this audit in its analysis of FMFIA and A-123 results for FY 2016 and will take action to address any noted control deficiencies beyond those in the remaining recommendations from this audit. Should a determination be made that the risk of potential mischarges to G&A or other indirect costs is sufficient, NNSA may request the Office of Inspector General, as the cognizant audit agency for NNSA's Management and Operating Contractors, consider expanding its audit coverage in this area as part of the Cooperative Audit Strategy.

To provide sufficient time for complete A-123 assessments, validate results, and assess the need for additional corrective actions, NNSA will evaluate this recommendation for closure in December 2016.

Recommendation 2: Direct LLNL to update its Cost Accounting Standards (CAS) disclosure statement and Financial Policies and Procedures Manual to adequately describe its actual accounting practices, in compliance with Federal and Departmental requirements.**Management Response: Concur**

The Contracting Officer (CO) will reiterate previous direction to Lawrence Livermore National Security (LLNS) to update its CAS disclosure statement and will direct LLNS to

Attachment

update its Financial Policies and Procedures Manual to clarify its accounting practices as appropriate, in compliance with Federal and Departmental requirements. MB will review the revised disclosure statement, with subsequent approval by the CO.

The estimated completion date for these actions is December 31, 2016.

Recommendation 3: Direct LLNL to modify the review and approval process for G&A-funded activities to include technical representatives throughout the laboratory to ensure G&A funds are not used for Research and Development (R&D) activities, but rather for management and administration of the laboratory.

Management Response: Concur

The CO will direct LLNS to modify its review and approval process for G&A-funded activities to include technical representatives to ensure G&A funds are not used for inappropriate activities, including R&D. NNSA will review the revised process and provide LLNS feedback through the Contracting Officer.

The estimated completion date for these actions is December 31, 2016.

Recommendation 4: Determine the allowability of the \$23.3 million in costs questioned in this report, and seek to recover any costs deemed unallowable. These costs consist of \$1.6 million in costs questioned as expressly unallowable R&D; \$17.7 million in “reduction to practice” costs, questioned as potentially inappropriate R&D charges; and \$4 million questioned as inappropriately charged to G&A.

Management Response: Concur

In close coordination with NNSA General Counsel, the CO will evaluate and determine the allowability of the \$23.3 million in costs questioned and will seek recovery of any costs deemed unallowable as appropriate. We anticipate that each of the questioned activities will undergo an independent review by a team of fully qualified technical experts knowledgeable in project requirements under M&O contracts. The CO will consider the results of this OIG report, along with other supporting reviews and analyses, in making the final determinations.

The CO will also determine whether the contractor’s definition of “reduction to practice” activities inappropriately includes R&D work and may request a review of other (non-LIFE related) reduction to practice activities as appropriate.

The estimated completion date for these actions is June 30, 2017.

FEEDBACK

The Office of Inspector General has a continuing interest in improving the usefulness of its products. We aim to make our reports as responsive as possible and ask you to consider sharing your thoughts with us.

Please send your comments, suggestions, and feedback to OIG.Reports@hq.doe.gov and include your name, contact information, and the report number. Comments may also be mailed to:

Office of Inspector General (IG-12)
Department of Energy
Washington, DC 20585

If you want to discuss this report or your comments with a member of the Office of Inspector General staff, please contact our office at (202) 253-2162.