



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

AUDIT REPORT

Follow-up on the Los Alamos National
Laboratory Hydrodynamic Test Program

DOE/IG-0930

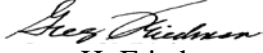
December 2014



Department of Energy
Washington, DC 20585

December 16, 2014

MEMORANDUM FOR THE SECRETARY

FROM: 
Gregory H. Friedman
Inspector General

SUBJECT: INFORMATION: Audit Report on "Follow-up on the Los Alamos National Laboratory Hydrodynamic Test Program"

BACKGROUND

A primary mission of the National Nuclear Security Administration (NNSA) is to ensure the safety, reliability and performance of the Nation's nuclear weapons stockpile. NNSA relies on computer models and simulations to achieve this mission. Data from nonnuclear hydrodynamic tests (hydrotests) is used to validate and refine these computer models for the annual assessment of the stockpile. Hydrotest data also supports the development of new materials, components and safety features, evaluations of replacement parts, and materials for vital Life Extension Programs (LEPs). As the Nation moves further from the era of underground testing, the need for hydrotests increases. NNSA's annual *National Hydrodynamic Test Plan* (National Plan) outlines the integrated work scope and schedule of hydrodynamic testing.

Los Alamos National Laboratory (LANL) performs hydrotests for weapons in the stockpile at its Dual-Axis Radiographic Hydrodynamic Test Facility, and at the Contained Firing Facility located at Lawrence Livermore National Laboratory. Funding for LANL's Hydrodynamic Test Program (hydrotest program) was about \$213 million for fiscal years (FYs) 2010 through 2013. Many hydrotests were multimillion dollar projects spanning multiple years. Performance evaluations of LANL's hydrotest program are provided by NNSA's Los Alamos Field Office.

In September 2005, the Office of Inspector General reported on issues affecting the hydrotest program. In the audit of *The Los Alamos National Laboratory Hydrodynamic Test Program* (DOE/IG-0699, September 2005), we reported that LANL did not complete hydrotests as scheduled because LANL had not fully implemented key project management tools or adopted programmatic changes that could increase its efficiency in conducting such tests. NNSA management generally agreed with our findings and recommendations and indicated that it would implement corrective actions. Because of the importance of hydrotests to the nuclear weapons program, we initiated this follow-up audit.

RESULTS OF AUDIT

We found that LANL continued to experience delays in executing hydrotests. According to NNSA's National Plans, LANL scheduled a total of 19 tests during FYs 2010 through 2013. Of

the scheduled tests, 12 (63 percent) experienced delays ranging from 1 to 3 years. Five of the tests had not been performed as of the end of FY 2013. Of the five tests, three were delayed 1 year and ultimately were executed in FY 2014. The remaining two tests will be delayed an additional year and are now scheduled for FY 2015. Additionally, the testing delays created a backlog in LANL's test schedules for subsequent years.

LANL officials told us that the delays were due to numerous factors, such as complexity of tests, the importance of technical performance, changing program priorities, and budget constraints. While we recognize these issues, we identified various inefficiencies and project management weaknesses related to delayed hydrotest completion. Specifically, of the delayed tests that were completed by the end of FY 2013, we determined that LANL had not done the following:

- Efficiently fabricated pit shell components used in the experimental devices. We found that of the seven delayed tests that were completed, three experienced delays due, in part, to inefficient pit shell fabrication.
- Managed fabrication performance according to cost, schedule and customer needs. According to LANL hydrotest officials, it was difficult for them to anticipate or estimate how much a component would cost and how long it would take to fabricate. As of January 2014, the Prototype Fabrication Division was unable to furnish evidence that it managed hydrotests according to baseline schedules, cost estimates, or customer needs.
- Fully implemented key project management practices to increase efficiency in conducting hydrotests. As we noted in our prior report, LANL had not fully prepared project execution documents, such as work packages, to plan the scope and schedule of work and allocate resources to the various tasks. In our current review, LANL could not provide work packages representing approximately \$27.4 million of the \$52.7 million (52 percent) total costs for the seven hydrotests we reviewed. LANL was also unable to provide an overall, integrated cost and schedule baseline for any of the seven hydrotests we reviewed.

The inability to complete the required tests within established schedules occurred, in part, because LANL did not fully implement key project management tools or fully transition to a more efficient manufacturing process that would improve test execution. In addition, the Los Alamos Field Office did not hold LANL accountable for not completing all the tests planned in NNSA's National Plan despite a specific hydrotest program-related performance measure in the 2010 through 2012 *Performance Evaluation Plans*. Although LANL only completed 54 percent of the planned hydrotests in the National Plans for FYs 2010 through 2012, the Los Alamos Field Office's *Performance Evaluation Report* gave LANL generally positive evaluations in this area. The hydrotest program *Performance Evaluation Report* cited positive technical test results versus completion of all planned tests. The hydrotest program was not included in the FY 2013 *Performance Evaluation Plan* because, according to a Los Alamos Field Office official, the reporting method was changed to be less specific.

Without changes, LANL is at risk of not meeting future hydrotest needs, a performance issue that could potentially affect NNSA's fundamental mission. Given LANL's FYs 2010 through 2013 performance, which achieved an average of 4 hydrotests per year, it is unclear whether

LANL has the ability to meet its new goal of 10 hydrotests per year starting in FY 2016. Because future scheduled hydrotests will support the B61 LEP, continued slippages and long delays in performing hydrotests may affect the B61 LEP schedule. Also, without critical hydrotest data, LANL's delays could affect NNSA's ability to assess and validate the current stockpile and evaluate performance of replacement parts and materials for the LEPs.

LANL officials told us that they had identified areas of concern within the Prototype Fabrication Division and overall hydrotest project management that coincide with our observations and have developed a path forward. Another official also noted that LANL is in the early stages of implementing improved hydrotest and Prototype Fabrication Division business practices that will contribute to achieving LANL's goal to perform 10 hydrotests per year by FY 2016.

While LANL's action to address these problems is commendable, in our opinion, additional sustained action is necessary to ensure that the hydrotest program meets NNSA's stated mission goals and objectives. As such, we have made several recommendations designed to help improve the hydrotest program.

MANAGEMENT REACTION

NNSA management concurred with the recommendations and proposed corrective actions to address the issues identified in this report. We consider management's comments and planned corrective actions to be fully responsive to our findings and recommendations.

Management's comments are included in Appendix 3.

Attachment

cc: Deputy Secretary
Administrator, National Nuclear Security Administration
Chief of Staff

AUDIT REPORT ON FOLLOW-UP ON THE LOS ALAMOS NATIONAL LABORATORY HYDRODYNAMIC TEST PROGRAM

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FOLLOW-UP ON THE LOS ALAMOS NATIONAL LABORATORY HYDRODYNAMIC TEST PROGRAM

HYDRODYNAMIC TEST PROGRAM MANAGEMENT

In September 2005, the Office of Inspector General reported on issues affecting the Los Alamos National Laboratory's (LANL's) Hydrodynamic Test Program. In the audit of *The Los Alamos National Laboratory Hydrodynamic Test Program* (DOE/IG-0699, September 2005), we reported that LANL did not complete hydrodynamic tests (hydrotests) as scheduled because LANL had not fully implemented key project management tools or adopted programmatic changes that could increase its efficiency in conducting such tests. The National Nuclear Security Administration (NNSA) management generally agreed with our findings and recommendations and stated that it had implemented corrective actions.

Hydrotest Management

LANL continues to experience delays in executing hydrotests. The delays occurred, in part, because LANL did not efficiently fabricate test components, capture key fabrication performance data, or fully implement key project management practices. Since our prior report, NNSA has not held LANL accountable for fully implementing key project management tools or improving test execution efficiency. Without critical hydrotest data, LANL delays could affect NNSA's ability to assess and validate the current stockpile and evaluate performance of replacement parts and materials for the Life Extension Programs. Because seven future hydrotests will support the B61 LEP, continued slippages and long durations to perform hydrotests may affect the schedule for the B61 first production unit¹ scheduled in fiscal year (FY) 2020.

Hydrotest Delays

We found that LANL experienced delays on 63 percent of the tests that were planned and sustained a backlog of uncompleted tests annually. An examination of NNSA's *National Hydrodynamic Test Plans* (National Plan) revealed that LANL planned to perform a total of 19 tests during FYs 2010 through 2013. Of the scheduled tests, 12 (63 percent) experienced delays from approximately 1 to 3 years, including 5 tests that had not been completed by the end of FY 2013. In addition, LANL annually carried over hydrotests not completed in a given year to the following year's plan, thus creating a backlog. Specifically, LANL planned to execute between five and nine hydrotests annually. However, on average, LANL only completed 52 percent of its planned tests each year and half of the tests completed experienced delays (see Table 1). Starting in FY 2010, LANL carried over one hydrotest 3 consecutive years until it was finally executed in FY 2013, resulting in a 3-fiscal-year delay. The five tests that were scheduled in FY 2013, but were not completed, were carried over to FY 2014 or later. Of the five tests, three were executed in FY 2014, and the remaining two are scheduled for FY 2015.

¹ The first production unit is the first complete bomb or warhead from a production line that is certified for deployment.

Table 1: Los Alamos Annual Hydrotest Performance

	FY10	FY11	FY12	FY13	Average
Planned	5	5	8	9	7
Completed	3	2	5	4	4
Percent Completed	60%	40%	63%	44%	52%

Note: Uncompleted hydrotests were generally moved to the next year; therefore planned numbers cannot be added. Unique total is 19.

Factors Affecting Testing Delays

While LANL officials noted that numerous factors, such as complexity of tests, the importance of technical performance, changing program priorities, and budget constraints, delayed tests, our review also revealed various inefficiencies and project management weaknesses related to hydrotest completion. Associated with those issues, we reviewed the seven delayed tests that were completed by the end of FY 2013 and determined that in three of those tests, LANL had not efficiently fabricated components used in the experimental devices, managed the fabrication of parts essential to hydrotests according to test requirements, and fully implemented key project management practices to increase efficiency in conducting hydrotests.

Delays Related to Pit Shell Fabrication

Pit shell fabrication was one of the most frequently cited reasons in the National Plan for hydrotest delays. LANL used an inefficient method to fabricate depleted uranium (DU) shells, which contributed to hydrotest delays in three of the seven delayed tests that were completed. We followed up with laboratory officials and learned that LANL used a method to fabricate DU shells that was less efficient than that used to fabricate all other pit shells. According to a LANL hydrotest official, "full path programming" was used to fabricate stainless steel, beryllium, and plutonium shells, but "single path programming" was used for DU shells. The official stated that full path programming places less reliance on the operator of the machining equipment because the majority of the machining occurs based on preprogrammed machine instructions, is repeatable, and requires fewer inspections. In contrast, single path programming is a much more labor intensive effort. A machinist fabricates the DU shells by incrementally cutting the metal, removing the shell from the machine for inspection, and reinstalling the shell for additional cuts. This process is repeated until the shell meets specifications. LANL stated that they are developing a machining tool investment strategy to eventually procure a machine that will meet the desired tolerances and allow full path programming for DU shell fabrication.

Despite plans to move to the more efficient method in the early 2000s, LANL did not complete the transition to full path programming. For example, LANL had not repaired and maintained the necessary equipment nor trained machine operators to use this method for DU shells. According to a LANL official, a full path programming machine procured in the early 2000s for DU shell fabrication was dropped and damaged during the setup process, and it was not adequately repaired at the time. Because the machine was not adequately repaired, according to

the LANL official, the machine obtained a reputation for being unreliable, and the machinists did not want to use it to fabricate DU shells. The machinists continued using the older equipment with the single path programming method. LANL stated that although a single machine may have been damaged, there were other machines available that are capable of full path programming.

Fabrication Management

LANL did not manage fabrication performance according to cost, schedule and customer need. According to LANL hydrotest officials, it was difficult for them to anticipate or estimate how much a component would cost and how long it would take to fabricate because the fabrication division did not provide customers with cost or schedule estimates. The only fabrication document that provided any semblance of a schedule with a request date and due date for fabricating a shell was the "Prototype Fabrication Job Initiation Worksheet". This document was used by the Weapons System Engineering Division and required by the Prototype Fabrication (PF) Division to initiate the fabrication of a pair of shells. According to a fabrication official, the individual filling out the worksheet did not receive input from the PF Division, such as a realistic expectation as to when the shell would be completed. The fabrication official stated that he would sometimes cross out the entered date and modify it because the delivery date requested was not consistent or achievable with previously agreed-to work requests and therefore was incorrect. The due date entered was more of a best case scenario. For example, a LANL hydrotest official requested an August 2009 due date for a hydrotest DU shell. However, due in part to rework, the shell was not completed until October 2011, more than 2 years after the original request date. Overall, the PF Division was unable to provide any evidence that the division fabricated hydrotest components according to a schedule, cost estimates, or customer needs.

A December 2012 LANL report, *Performance Gap Analysis for Experimental Component Fabrication Process*, examined how well production processes were performing in relation to a desired performance goal. Key mission goals for production processes included the following: meet deliverable dates and quantities to internal scientists, increase efficiency by reducing unit costs and consolidate processes, and deliver weapon components on or under budget. Underperforming processes were labeled as gaps. The report identified multiple data gaps in collecting performance information when fabricating components, such as percent of job initiation forms with agreed-upon schedules, number of days slipped at the end of the production from original planning estimate due to changing priorities, and standardized process for programming machine parts. The report concluded that "there is widespread agreement that measuring the performance of these activities is a needed first step that will lead to more informed decisions in the future."

As part of the performance gap analysis process, the PF Division identified its top 10 actions to focus on improving data collection for metrics that would highlight the importance of failures in quality and their impact on the larger project schedule. The report stated that the information would allow the PF Division to address customer concerns regarding product status and quality issues. According to a June 2013 follow-on report, *Experimental Component Fabrication Follow-On Status and Path Forward*, the goal of the PF Division was to begin data collection

and process improvements in the months following the performance gap analysis. For example, in September 2013, the PF Division replaced its old work management system. LANL officials stated that the old system tracked work by employee while the new system tracks work by both employee and component. According to a LANL official, tracking work by component assists the hydrotest officials by providing them more transparency of costs and labor hours associated with the components being fabricated instead of solely tracking the employees' labor hours. Thus, LANL has identified areas of concern within the PF Division that coincide with our observations and is in the early stages of implementing changes that will contribute to achieving LANL's goal to perform 10 hydrotests per year by FY 2016.

Project Management Practices

LANL had not addressed project management issues identified in our prior report. For example, in our prior report, we noted that LANL had not fully prepared project execution documents, such as work packages, to plan the scope and schedule of work and allocate resources to the various tasks. As part of our current effort, we reviewed seven delayed hydrotests, in which LANL either misplaced or did not prepare work packages representing approximately \$27.4 million of the \$52.7 million (52 percent) total costs. According to a best practices guide, the American National Standards Institute/Project Management Institute 99-001-2008, *A Guide to the Project Management Body of Knowledge*, projects should have approved integrated project management plans that include cost and schedule baselines. However, LANL was unable to provide us an overall, integrated cost and schedule baseline for any of the seven hydrotests we reviewed. In three B61 hydrotests, we found intermittent cost and schedule baseline reports for a subset of costs starting in FY 2012. However, LANL did not use this practice for all hydrotests, but when it did, it did not implement the practice throughout the duration of a hydrotest project. For example, substantial work began on a B61 hydrotest in FY 2009, but LANL was unable to provide reports including baselines prior to FY 2012.

LANL managed hydrotests across two separate divisions responsible for different activities. The Weapons Systems Engineering Division managed the design, fabrication, and assembly activities, while the Weapons Experiments Division managed the diagnostic and execution activities. The majority of the missing work packages (\$26.7 million) were for Weapons Systems Engineering Division activities, which included the fabrication of hydrotest pit components. LANL has an engineering records management system called PDMLink with designated space for hydrotest project management documents; however, hydrotest officials did not always use this system. The lack of adequate planning support for the seven tests we reviewed led us to conclude that inconsistent or ineffective project management practices contributed to the delays that these tests experienced.

NNSA Oversight

The Los Alamos Field Office had not held LANL accountable for implementing project management tools or the National Plan requirements. Since our prior report, the Los Alamos Field Office still did not require LANL to fully implement key project management tools or improve test execution efficiency. Although NNSA's response to our prior report stated that LANL had effectively implemented project management tools, the Los Alamos Field Office did

not require baseline schedules and more efficient fabrication methods to minimize delays. We found that LANL's management practices still lacked basic project management tools, such as baseline schedules and costs.

Furthermore, the Los Alamos Field Office's level of oversight of the hydrotest program may have contributed to LANL not executing tests within schedule. Specifically, oversight focused on technical performance rather than maximizing the accomplishment of planned tests in the National Plan by using project management tools to achieve timely and efficient hydrotest execution. The Los Alamos Field Office included a hydrotest performance measure in LANL's FYs 2010 through 2012 *Performance Evaluation Plans* to use the DARHT Facility to meet the requirements of the National Plan. Although LANL only completed 54 percent of the planned hydrotests in the FY 2010 through 2012 National Plans, the Los Alamos Field Office's *Performance Evaluation Report* gave LANL generally positive evaluations in this area. The hydrotest program evaluations cited positive technical test results as opposed to completion of planned tests in the National Plan. In addition, the hydrotest program was not included in the FY 2013 *Performance Evaluation Plan* because, according to a Los Alamos Field Office official, the reporting method was changed to be broader and less specific.

Consequences

Without improvements in project management and increased efficiency in component fabrication, LANL is at risk of not meeting future hydrotest needs, which could potentially affect NNSA mission needs. Based on LANL's FY 2010 through 2013 performance, which achieved an average of 4 hydrotests per year, it is unclear whether LANL will be able to meet its new goal of 10 hydrotests per year starting in FY 2016. Because seven future hydrotests will support the B61 Life Extension Program, continued slippages and long delays in performing hydrotests may affect the schedule for the B61 first production unit scheduled in FY 2020. LANL officials told us that they had identified areas of concern within the PF Division that coincide with our observations, have developed a path forward, and are in the early stages of implementing a new PF Division business model that will contribute to achieving LANL's goal to perform 10 hydrotests per year by FY 2016.

Without critical hydrotest data, LANL delays could affect NNSA's ability to assess and validate the current stockpile and evaluate performance of replacement parts and materials for the LEPs. For example, eight of the delayed tests were in support of certifying the present stockpile and studying enhanced safety and surety features, while the remaining four were in support of counterproliferation or other nonstockpile programs.

RECOMMENDATIONS

To help improve the hydrotest program, we recommend that the Administrator, National Nuclear Security Administration, ensure that:

1. LANL completes planned improvements to production processes by improving component machining and collecting production process performance data to meet key production goals such as: meet deliverable dates, increase efficiency, and deliver components on or under budget;
2. LANL develops and uses project management practices for hydrotest projects, including work packages, overall integrated cost and schedule baselines, and performance measures;
3. Los Alamos Field Office officials evaluate contractor performance using the official *National Hydrodynamic Test Plans*; and
4. Los Alamos Field Office officials monitor LANL's progress toward the goals of the LANL hydrotest program and develop a contingency plan should performance indicate that test capabilities will not be sufficient to meet potential mission requirements.

MANAGEMENT RESPONSE

NNSA management concurred with the report's findings and recommendations and provided corrective actions to address the issues identified in this report. NNSA agreed to support enhancing current and future production processes, and Los Alamos has initiated actions to increase formality with which it plans, fabricates, and executes hydrotests, including the formation of a "Hydro Council" that reviews proposed tests and identifies challenges that could affect manufacturing and fielding. Further, NNSA remains committed to effectively executing the appropriate number of hydrotests per year to sufficiently support mission needs and will continue to regularly evaluate the data needs of specific programs.

AUDITOR COMMENTS

We consider management's comments and planned corrective actions to be fully responsive to our findings and recommendations.

OBJECTIVE, SCOPE AND METHODOLOGY

Objective

The audit objective was to determine whether the National Nuclear Security Administration (NNSA) is effectively managing the hydrodynamic test program.

Scope

The audit was performed between June 2013 and December 2014 at the Albuquerque Complex, Albuquerque, New Mexico; Los Alamos Field Office, Los Alamos, New Mexico; and Los Alamos National Laboratory (LANL), Los Alamos, New Mexico. The audit examined LANL hydrotests that were planned to be completed in fiscal years (FY) 2010 through 2013. The audit was conducted under the Office of Inspector General Project Number A13AL045.

Methodology

To accomplish the audit objective, we performed the following:

- Reviewed applicable laws, policies and procedures;
- Reviewed related reports issued by the Office of Inspector General, JASON Program Office and the National Academy of Sciences;
- Compared project management best practices published by the American National Standards Institute/Project Management Institute to LANL project management practices;
- Analyzed LANL hydrotest project management documents and costs;
- Analyzed FYs 2007 to 2014 *National Hydrodynamic Test Plans*;
- Analyzed LANL fabrication documentation of hydrotest shells;
- Reviewed LANL's hydrotest and fabrication performance improvement plans;
- Reviewed Los Alamos Field Office FYs 2010 through 2013 *Performance Evaluation Plans* and *Performance Evaluation Reports* for LANL; and
- Held discussions with key officials at NNSA Headquarters, Albuquerque Complex, Los Alamos Field Office, and LANL.

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 the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. Accordingly, we assessed internal

controls and compliance with laws and regulations to the extent necessary to satisfy the audit objective. We assessed performance measures in accordance with the *GPRRA Modernization Act of 2010* and concluded that the Department inconsistently established performance measures related to the hydrotest program. 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 relied on computer-processed data to satisfy our audit objective and tested the validity of the data by comparing reports to the cost codes provided by the program. We determined that the data was sufficiently reliable for the purposes of our audit objective.

Management waived an exit conference.

RELATED REPORTS

Office of Inspector General

- Audit Report on [*The Los Alamos National Laboratory Hydrodynamic Test Program*](#) (DOE/IG-0699, September 2005). The Office of Inspector General's (OIG) review found that Los Alamos National Laboratory (LANL) did not complete hydrotests as scheduled in support of the National Nuclear Security Administration (NNSA) Stockpile Stewardship Program. Specifically, 15 hydrotests were scheduled at the Dual-Axis Radiographic Hydrodynamic Test (DARHT) Facility in fiscal years 2002 through 2004, 6 were completed as scheduled, 6 were delayed up to 2 years, and 3 had not been completed as of April 2005. Delays with the hydrotest occurred, in part, because LANL had not fully implemented key project management tools or adopted programmatic changes that could increase its efficiency in conducting such tests. The Laboratory did not define the scope of work for conducting tests; assign responsibility to specific managers for carrying out tasks associated with the tests; develop and use the most efficient strategy to mitigate environmental contamination and reduce the turnaround time at the test facility; and determine if facilities at Lawrence Livermore National Laboratory could be used to meet some hydrotest needs. In response to the review, LANL took corrective actions to develop and use project execution plans; assign work packages to appropriate managers; reevaluate the mitigation strategy used at the DARHT Facility, expedite the vessel schedule, and fully implement the National Hydrodynamic Test Plan.
- Audit Report on the [*Dual Axis Radiographic Hydrodynamic Test Facility*](#) (DOE/IG-0599, May 2003). The OIG's review found that the DARHT Facility would not be completed until June 2004, 15 months behind schedule. Additionally, scope changes had reduced or eliminated work elements, critical activities had been shifted to other projects, and some activities were being completed using nonproject funds. These activities gave the erroneous appearance that the total project costs had remained within the planned budget. The audit also found that project management control, as exercised by the NNSA and LANL, needed improvement. Consequently, delays in the completion of the DARHT Facility may impede the performance of the Stockpile Stewardship Program. As a result of our audit, corrective actions were taken by the NNSA Administrator to require LANL to adjust the DARHT baseline, accurately reflecting the total cost of bringing DARHT to full operations capability; ensure that guidance for estimating the cost of state-of-the-art, one-of-a-kind projects is followed; ensure guidelines for requesting additional funds or reprogramming funds are implemented, and direct the Office of Field Financial Management Director, to make a determination regarding the appropriateness of using nonproject operating funds to complete the confinement and commissioning activities.

JASON Program Office

- JASON report on *Life Extension Options for the U.S. Nuclear Weapons Stockpile* (JSR-09-334, September 11, 2009). The JASON Program (JASON) Office report found challenges regarding staff development in science, technology and engineering. In

addition, the JASON report identified that the expensive test facilities are being underutilized. For example, the DARHT facility had been underutilized with a low number of experiments being conducted. JASON believes the facilities such as DARHT are important in attracting young people in the stockpile stewardship program; however, resources have not been devoted to hydrotests or experimental campaigns to develop skills of new designers. The report suggested that the hydrotest facilities, including DARHT and the Contained Firing Facility, should be used for developing staff expertise by having senior engineers mentor engineers with less hydrotest experience.

National Academy of Sciences Report

- Report on *The Quality of Science and Engineering at the NNSA National Security Laboratories* (2013). The National Academy of Sciences committee identified challenges with the amount of experimental work being performed, the balance between maintaining large and small facilities, and staffing. For example, an increase in costs and safety requirements is leading to a decline in the amount of experimental work, including hydrotests, conducted at the laboratories. The current oversight environment does not weigh the inherent safety risks of an experiment against the benefits of the experiment and the associated risk to the nuclear weapons program of not conducting the experiment. Additionally, the increasing costs of building and operating large signature facilities, such as the DARHT facility, can threaten the continued support of smaller vital facilities, such as beryllium parts fabrication. The Laboratories and NNSA should ensure a balance between the large and small facilities. The report also found that the Laboratories continue to face workforce challenges, including a significant percentage of retirement-eligible employees.

MANAGEMENT COMMENTS



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



December 10, 2014

MEMORANDUM FOR GREGORY H. FRIEDMAN
INSPECTOR GENERAL

FROM: FRANK G. KLOTZ *FK 12/10/2014*

SUBJECT: Response to Office of Inspector General Draft Report
Titled "Follow-up on Los Alamos National Laboratory
Hydrodynamic Test Program" (A13AL045/2013-01532)

Thank you for the opportunity to review the subject draft report. NNSA concurs with the four recommendations in the report, which support enhancing current and future production processes. Los Alamos has already initiated actions to increase the formality with which it plans, fabricates and executes hydrotests, including the formation of a "Hydro Council" that reviews proposed tests and identifies challenges that could impact manufacturing and fielding. We remain committed to effectively executing the appropriate number of hydrotests per year to support mission needs and will continue to regularly evaluate the data needs of specific programs.

We appreciate the auditors' efforts and will consider all of the report's observations in our future plans. The attachment to this memorandum provides our detailed response to each of the recommendations, in addition to technical and general comments for consideration to enhance the clarity and factual accuracy of the report. If you have any questions, please contact Dean Childs, Director, Audit Coordination and Internal Affairs, at (301) 903-1341.

Attachment



Attachment

Response to the Inspector General Draft Report Titled
Follow-up on the Los Alamos National Laboratory Hydrodynamic Test Program
(A13AL045/2013-01532)

Response to Report Recommendations

The Office of Inspector General recommended:

Recommendation 1: Los Alamos National Laboratory (LANL) complete planned improvements to production processes by improving component machining and collecting production process performance data to meet key production goals such as: meet deliverable dates, increase efficiency, and deliver components on or under budget.

Management Response: *Concur*

National Nuclear Security Administration (NNSA) will ensure LANL completes planned improvements to production processes through the application of project management systems. As this will also require acquisition of necessary equipment and reconfiguration of fabrication facilities, the estimated completion date is September 30, 2016.

Recommendation 2: LANL develop and apply project management practices for hydrotest projects, including work packages, overall integrated cost and schedule baselines, and performance measures.

Management Response: *Concur*

NNSA recognizes that current project management systems in place at LANL can be more uniformly developed and applied. LANL will enhance project management practices for hydrotest projects, including work packages, overall integrated cost and schedule baselines, and performance measures. The estimated completion date is September 30, 2015.

Recommendation 3: Los Alamos Field Office officials evaluate contractor performance using the official *National Hydrodynamic Test Plans*.

Management Response: *Concur*

The NNSA assesses the Management and Operating contractor (M&O) performance against the strategic Performance Evaluation Plan (PEP). Included in the PEP are Performance Objectives, Contributing Factors, and Site Specific Outcomes that allow the NNSA to specify strategic mission and operational functional areas for evaluation. Currently, the NNSA will assess the M&O performance in the Hydrotest Program against the current strategic PEP. With the next PEP development cycle, the NNSA will re-evaluate the PEP requirement given the current M&O performance to determine the next phase of the Hydrotest program. The estimated completion date is September 30, 2015.

Recommendation 4: Los Alamos Field Office officials monitor LANL's progress toward the goals of the LANL Hydrotest Program, and develop a contingency plan should performance indicate that test capabilities will not be sufficient to meet potential mission requirements.

Management Response: *Concur*

The current goal of the LANL Hydrotest Program is to establish a capability to conduct 10 hydrotests per year by 2016. However, it is important to note that the actual number of tests required varies from year to year depending on mission needs and availability of funding. NNSA will continue to monitor LANL's progress towards the current goal, while also regularly evaluating and considering actual programmatic data needs in determining the sufficiency of testing goals. Should challenges arise that threaten achieving the goals, the field office will engage the program office at Headquarters and the lab to ensure either appropriate resources are allocated against the requirements, or contingency plans are developed. We will also aggressively pursue the process improvements noted in recommendations one and two to help ensure our success.

NNSA will track this recommendation through September 2016 to ensure monitoring activities are effectively implemented and sustained.

FEEDBACK

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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.