

Independent Review Report
Facility Centered Assessment of the Los Alamos
National Laboratory
Science and Technology Operations - Facility
Operations Director Managed Facilities



August 2011

Office of Health, Safety and Security
Office of Enforcement and Oversight
Office of Safety and Emergency Management Evaluations

Table of Contents

Background.....	1
Results.....	2
Conduct of the FCA.....	2
Follow-up on Selected HSS 2007 Inspection Findings	6
LANL Beryllium Program.....	9
Conclusions.....	10
Appendix A: Supplemental Information.....	11

Acronyms

AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute
CBDPP	Chronic Beryllium Disease Prevention Program
CFR	Code of Federal Regulations
CMMS	Computerized Maintenance Management System
CRAD	Criteria, Review, and Approach Document
CTS	Computer Tracking System
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
FCA	Facility Centered Assessment
FOD	Facility Operations Director
FY	Fiscal Year
HazCom	Hazard Communications
HSS	Office of Health, Safety and Security
IH	Industrial Hygiene
IWD	Integrated Work Document
IWM	Integrated Work Management
LANL	Los Alamos National Laboratory
LASO	Los Alamos Site Office
LIHSM	Laboratory Instruction Health and Safety Manual
NNSA	National Nuclear Security Administration
RLW	Radioactive Liquid Waste
STO	Science and Technology Operations
TA	Technical Area
WI	Work Instruction

Independent Review Report
Facility Centered Assessment of the Los Alamos National Laboratory
Science and Technology Operations - Facility Operations Director
Managed Facilities – August 2011

This independent review report documents the results of the Office of Health, Safety and Security (HSS) review of the Facility Centered Assessment (FCA) of the Los Alamos National Laboratory (LANL) facilities managed by the Science and Technology Operations (STO) Facility Operations Director (FOD). The independent review of the STO FCA, conducted February 24 through April 1, 2011, was sponsored by the U.S. Department of Energy (DOE) Los Alamos Site Office (LASO) and LANL.

FCAs are periodically conducted by the LANL Contractor Assurance Office Performance Feedback Organization at the direction of the LANL Director and sponsored by the LANL Institutional Management Review Board (IMRB). The IMRB has directed that FCAs be performed on a routine (3 year) basis for each major FOD as a means for measuring and improving performance of LANL program and facility work. The intent of a FCA is to provide a site-wide “snapshot” of implementation of safety management programs and management processes within the assessed organizations. The DOE independent review of the STO FCA was led by the HSS Office of Safety and Emergency Management Evaluations, with participation of subject matter experts from LASO, National Nuclear Security Administration (NNSA) Headquarters, the NNSA Albuquerque Complex, and the LASO Facility Representative assigned to STO.

The scope of the review was to: (1) evaluate the depth and breadth of the STO FCA to provide input to LASO, other elements of NNSA, and LANL regarding LANL activity-level work planning and control improvement actions, (2) follow up on the HSS inspection results from 2007 that are directly related to the scope of the FCA, and (3) conduct a limited review of the LANL Beryllium Program. The HSS review of and participation in the FCA was consistent with LASO Work Instruction (WI) 00 04, Revision 3, *Assessment Shadowing Activity Reporting*, and LASO, NNSA, and HSS participated as “shadow assessors.” The overall scope of the FCA was coordinated between LASO, other elements of NNSA, LANL, and HSS and documented in the LANL *Facility Centered Assessment STO Assessment Plan*, dated February 22, 2011.

The Office of Health, Safety and Security decided to delay issuance of this report to allow evaluation and incorporation of the FCA integrated work management final results.

BACKGROUND

In 2007, as part of a LANL-wide integrated safety management inspection, HSS evaluated environment, safety, and health programs and work planning and control systems as applied to various LANL facilities and organizations. The 2007 HSS inspection focused on selected Threat Reduction Directorate laboratory and machine shop work activities performed in Technical Area (TA)-35 and TA-03 and on selected Chemistry Division laboratory and machine shop work activities performed in TA-46 and TA-48. Several findings applicable to STO-FOD managed facilities were presented in the inspection report (issued in January 2008). The six specific findings applicable to STO-FOD (HSS Findings C-1 through C-6) addressed deficiencies in implementation of integrated work management (IWM) requirements; some hazard controls, particularly with respect to chemical fume hoods; inadequate institutional controls for certain hazards (e.g., hydrofluoric acid and nanomaterials); hazard communication postings; cryogen controls; and the LANL exposure assessment process. LANL developed a comprehensive corrective action plan to address all findings from the HSS inspection on March 24, 2008, and entered the actions into the issues and corrective action management system. This HSS review included a review of LANL

evidence files that documented line management's actions to close selected HSS 2007 findings associated with STO-FOD. In some cases, HSS also analyzed the LANL management review board's review and approval of the closed actions. HSS used its review of the FCA process to determine the effectiveness of the actions taken to address those findings. HSS took into consideration the results of the FCA's performance-based work observations, interviews, and record reviews (assessments, problem identification systems, etc.) in accordance with the STO FCA Assessment Plan, to draw conclusions about the effectiveness of actions taken to prevent recurrence.

To further reinforce the need to improve work planning and control practices at LANL, LASO issued a letter to LANL on January 20, 2010, expressing concerns about worker safety associated with integrated work control in programmatic and research operations. The Defense Nuclear Facilities Safety Board (DNFSB) also made similar observations in an earlier staff review of work planning and control practices at LANL. In response to concerns raised by LASO and DNFSB, LANL initiated a number of continuous improvement activities through mid-fiscal year (FY) 2011. LASO, in concert with other elements of NNSA, plans to shadow the LANL independent IWM assessment to evaluate the status of the Laboratory's improvement activities and implementation of work planning and control at the activity level. That assessment will use the NNSA criteria, review, and approach documents (CRADs) as the basis for the assessment. LASO plans to base future actions, in part, on the results of that assessment and LANL's actions in response to it.

RESULTS

Conduct of the FCA

The LANL FCA process continues to be an effective, consolidated assessment mechanism for evaluating the overall performance and compliance status of critical LANL operations and facilities. In general, the FCA was well staffed with senior LANL and external specialists over a broad set of functional areas. Having representation from LANL institutional organizations provided an effective mechanism for identifying institutional weaknesses that may contribute to performance concerns within the FOD. While the sub-team examining LANL fire protection was sufficiently staffed with qualified individuals, the team had some challenges to conduct and complete a tailored review, given the large size of the STO-FOD managed facilities and the team's level of assessment experience, collateral duties, and available time to devote to the FCA.

The assessment plan was comprehensive and included CRADs to address each functional area. Although each functional area was addressed, most CRADs did not include lines of inquiry associated with the criteria and, in other cases, the distinction between lines of inquiry and criteria was not always readily apparent. The specific maintenance criteria used (e.g., P950) were extensive, but focused primarily on administrative aspects of the maintenance program and not sufficiently on work performance; therefore, the activities did not fully meet the performance-based objectives of a FCA. For a few CRADs, such as fire protection and integrated work management, the criteria used were broad, numerous, and not tailored specifically to the STO FCA; in these cases, additional tailoring, streamlining, and use of lines of inquiry would have been very beneficial to help guide and better focus the evaluation efforts more on implementation.

Planning activities were generally effective, with concise expectations for most assessment tools and products and adequate time for planning before the assessment. However, in some cases, LANL managers did not fully commit personnel to the STO FCA as promised, and in other cases, team members had significant schedule conflicts that prevented full participation early in the assessment. These challenges did not result in a major impact on the overall depth and breadth of the FCA, but had some impact on the efficiency of the FCA team during the planning stage and the start of field work activities.

Overall, assessment activities were effective, appropriately balancing work observations, document reviews, and interviews.

The participation of HSS, NNSA Headquarters, NNSA Albuquerque Complex, and LASO subject matter experts, including LASO STO Facility Representative, as shadow assessors provided an effective mechanism for management oversight of the contractor. However, as discussed below, improvements are still needed to better define the overall expectations for shadow assessors within the FCA process. This FCA implemented several lessons learned from the previous FCA assessment, including better administrative and logistical support to address computers and document assessment needs, work space, and meeting areas.

The STO FCA placed strong emphasis on conducting work observations to evaluate actual performance in the field, with approximately 70 work observations conducted over the field work activity period. In addition, during the course of the FCA, HSS observed that the LASO Facility Representative assigned to the STO-FOD displayed a strong working knowledge of the LANL IWM process and devoted considerable time and attention to observing STO-FOD work activities in order to ensure compliance with P 300, *Integrated Work Management* requirements.

For most work observed, FCA work observation teams had an appropriate skill mix (including a Federal representative) to evaluate the work performed. To the extent possible, efforts were made to obtain the necessary work documents in time to allow team members to review them before observing work. Most work observations were appropriately characterized, reflected the input of all observers, were formally documented, and received factual accuracy reviews by line management. Overall, the process for scheduling and the observed performance of the conduct of work observations evolved and improved over the course of the FCA, with the more experienced LANL FCA team members, Federal staff members, and the FCA team leadership providing additional guidance where needed. The FCA team leadership kept track of progress and the areas where work observations were being performed to evaluate whether the FCA scope objectives were being met.

In general, team members accurately characterized the status of their functional areas on the assessment forms, with appropriate characterization of findings and observations and inclusion of observed noteworthy practices. The STO FCA demonstrated efforts to better formalize the planning and conduct of work observations (using forms, controlling team sizes, posting activities, etc.), although further improvement is needed in future FCAs (discussed later). The FCA team leadership was effective in keeping the team focused and significantly contributed to the success of the assessment. Of particular note was the participation and responsiveness of STO FOD and program management in this FCA. STO FOD management regularly attended the daily meetings, was responsive to concerns and issues raised by the team, and informed the team in a timely manner about actions taken in response to those concerns and issues.

Consistent with the STO FCA Assessment Plan, most groups of facilities and activities had adequate sampling, including Bioscience facilities, Sigma and Beryllium Technology Facilities, machine shops, and aspects of Global Security activities in various facilities. The overall sample of work activities observed was large and sufficiently comprehensive to provide a sound basis for evaluating most functional areas, although toward the end, the FCA team leadership had to adjust priorities and reassign resources to ensure that the team had adequate observations of facility maintenance work to support the assessment. However, the opportunities to observe work in a few areas were limited, such as work in security-sensitive laboratories and subcontracted work. Similarly, while the STO FCA incorporated many work observations related to programmatic and FOD activities, more targeted work observations of FOD and programmatic interfaces would have been beneficial. These areas should be considered for follow-on

focus areas as part of the scope of the LANL IWM independent assessment to be conducted in the summer of 2011.

The LANL FCA process continues to evolve with each assessment to better meet the needs of all affected parties (including LASO, HSS and NNSA HQ), and HSS noted a few areas, on an institutional level, that should be considered for sustained success of the process. Members of LASO and LANL senior management have acknowledged that the FCA process has evolved into a credible and necessary component of the LANL contractor assurance system. However, some challenges remain in ensuring that all levels of LANL management give the FCA process sufficient priority. In the Radioactive Liquid Waste (RLW) and the STO FCAs, it was noted that some LANL organizations have had difficulty in providing the requested support for the efforts. As in the RLW FCA, a number of STO FCA team members had significant schedule conflicts that prevented full participation early in the assessment. In both assessments, the use of outside expertise has proven valuable, but the existing contract mechanism and funding constraints present challenges in bringing in qualified outside expertise early enough to allow sufficient planning as required by P 328-2, *Independent Assessment Process*. To date, these challenges have primarily affected the FCA team's efficiency in planning and starting field work activities and did not result in a major impact on the overall depth and breadth of the FCA.

At the broader, institutional level, the LANL Institutional Management Review Board endorsed the FCA concept in August 2010 and approved the decision to conduct three FCAs in FY 2011. However, the third FCA was subsequently removed from the FY 2011 FCA schedule due to lack of funding. HSS has successfully worked with LASO and LANL to conduct independent oversight through integration of HSS oversight activities within the LASO and LANL assessment processes, including the LANL FCA process. Continued visible senior NNSA/LASO and LANL management support and attention are essential if the FCA process is to continue to mature and be a key element of the LANL contractor assurance system.

The amount of integration of HSS, NNSA Headquarters, and LASO oversight activities into FCAs has also evolved over the last few assessments, and integration of Federal staff in the STO FCA has worked well overall. However, throughout the STO FCA, both LASO and LANL team members showed considerable confusion about the actual role of Federal participants, especially when Facility Representatives are assigned as shadow assessors, but are still expected to perform their normal oversight duties, and when multiple NNSA/DOE organizations with multiple types of assessment activities are integrated into the scope of the FCA. The current practices of the Federal oversight personnel have evolved beyond the current LASO WI for shadowing typical LANL assessments, especially for FCAs. The LASO WI would benefit from a revision that more clearly defines the expectations for Federal participants in providing feedback to the contractor while overseeing an assessment, and the expected end product of the Federal oversight activity. LASO should also consider developing a CRAD with lines of inquiry that can be used as a basis for developing a LASO review plan to improve the consistency and level of detail expected in a "shadow" report.

Similarly, LANL has not yet revised P 328-2, *Independent Assessment Process*, to recognize and address FCAs as a credible and necessary component of the LANL contractor assurance system. The FCA process would benefit from a better institutional description and procedure for conducting FCAs as currently envisioned.

Finally, several factors presented some unique challenges to the STO FCA, including: (1) the large size of the STO-FOD, which spans four LANL Responsible Associate Directorates, including over 500 buildings; (2) the diversity of the types of laboratories and activities involved, including radiological, chemical, biological, and security-sensitive laboratories; (3) the size and diversity in level of prior facility operations and assessment experience of the FCA team, including 49 LANL and Federal staff; (4) the

duration of the FCA onsite field evaluation activities, which lasted approximately six and half weeks; and (5) the limited time between the STO FCA and the follow-on FCA, which began less than four weeks after the data collection phase of the STO FCA and impeded timely completion of the FCA report in accordance with the STO FCA plan. The following STO FCA-specific areas for improvement addressing these factors should be considered for future assessments:

- Ensuring that FCA team management places more emphasis on advance planning, including better strategies being defined by some functional area leads to address binning and analysis of large amounts of data (such as for IWM), and using lines of inquiry to further target and focus their review areas in addition to the CRADs themselves.
- Ensuring that staffing needs match the scope of the review, particularly for larger FCAs.
- Ensuring that adequate direction is provided during orientation to personnel who may be subject matter experts in their particular subjects but do not have sufficient assessment experience to fully understand expectations for assessment conduct and documentation, particularly in being self-critical of their own program.
- Providing more guidance and techniques for meeting expectations (provided in the discussion of results section in CRAD IIs) in order to better present an objective and well-balanced summary of the overall evaluation of the results for the criteria being examined.
- Ensuring up-front involvement of DOE/LASO senior management to provide direction and expectations to the Federal oversight team to address Federal personnel roles, responsibilities, and expectations; and to answer questions from the contractor FCA team.
- Ensuring appropriate integration of embedded assessments and reviews by LASO, HSS, and LANL within the FCA scope, such as the conduct-of-maintenance implementation review, particularly with the functional area of IWM.
- Using designated leads for controlling facility- or area-specific work observation teams, particularly in larger FCAs where functional area reviews reach across multiple facilities.
- Providing better direction for consistent use of the FCA forms, including the use of the work observation form to document work activities.
- Integrating a “host peer” from the facilities and/or programs being assessed. These individuals would typically be members of the facility or program management team and would be expected to understand the process and facilitate the assessment in an unbiased manner.
- Requesting a contact list identifying each functional area lead and their respective facility counterparts. Each facility contact would be expected to understand his/her role in assisting the assessment team members, including (but not limited to) arranging for facility walkdowns, obtaining key facility documents, and providing access to other relevant information.
- Where possible, ensure that facility tours are conducted for the FCA team before the field work commences. This activity would be integrated as part of the in-brief process to give the FCA team members a general understanding of the facility, access requirements, and ongoing work. It also provides a forum for team members to meet with their facility counterparts.

Overall, the STO FCA was successful in assessing the performance and compliance implementation status of STO facility operations and tenant programmatic and R&D activities within the STO FOD managed facilities. The FCA accurately characterized the status of the facilities and operations, with appropriate characterization of findings and observations, as well as inclusion of observed noteworthy practices. Additionally, the FCA found significant non-compliances with requirements in several functional areas. Of particular note is that the FCA resulted in 129 findings in the Fire Protection area and judged this area to be “needing significant improvement.” STO FOD and program management were responsive to concerns and issues raised by the team and maintained the team informed in a timely manner of actions taken in response to those concerns and issues. Although there was some initial confusion about roles, HSS, NNSA HQ and LASO subject matter experts participation as shadow

assessors, shadowing the FCA provided an effective mechanism for DOE management oversight of the contractor. Although the FCA was overall a satisfactory assessment effort, certain areas of the FCA would benefit from further improvements. In particular, fire protection, maintenance, and IWM functional area CRADs warrant additional tailoring, streamlining, and use of lines of inquiry to focus more on implementation. In addition, more consideration needs to be given to the management of subteams for very large FCAs, interface of diverse functional areas within an assessment of this magnitude, and commitment of LANL senior management to ensure the necessary resources are applied to complete all aspects of the review.

HSS and LASO provided a more detailed evaluation of these areas to the LANL Contractor Assurance Organization as feedback to further improve the FCA process. That evaluation was provided in accordance with LASO WI 00 04, Revision 3, *Assessment Shadowing Activity Reporting*.

Follow-up on Selected HSS 2007 Inspection Findings

On March 24, 2008, LANL issued a comprehensive corrective action plan that addressed all findings from the HSS inspection. The following paragraphs summarize HSS's input to the FCA with regard to closure of each of the findings selected for this review (HSS 2007 Findings C1 through C6). Detailed observations and conclusions from the HSS team's review of the selected 2007 findings were integrated into the results of the STO FCA.

HSS 2007 Finding C-1: The LANL integrated work management process does not provide adequate guidance and requirements to ensure that all activity-level hazards are fully analyzed and that controls are developed for repetitive or ongoing operations and research activities, as required by LANL Institutional Policy IP-300-SD1, Integrated Safety Management System Description Document with Embedded 10 CFR 851 Worker Safety and Health Program, and DOE Policy 450.4, Safety Management System Policy.

HSS 2007 Finding C-5: The work scope in some research IWDs [integrated work documents] and the research change control process are not sufficiently defined to ensure that activity-level hazards and controls are adequately defined, and that work performed on an infrequent basis is addressed in IWDs, as required by IMP 300.4.

During the development of the corrective actions for HSS Findings C-1 and C-5, LANL determined that the causal analyses for these findings were very similar and thus, combined the corrective actions for these findings. The following section discusses the HSS review of the combined corrective actions for both C-1 and C-5.

LANL has made significant improvements in its IWM process to ensure that the deficiencies identified in HSS Findings C-1 and C-5 have been addressed. In response to HSS Findings C-1 and C-5, LANL developed a set of 16 corrective actions and sub-actions to address the concerns that were identified in the 2007 HSS inspection report. P 300, *Integrated Work Management*, Revision 2, (the operative IWM procedure during this review) addresses the specific deficiencies identified by HSS. With regard to Finding C-5, LANL has made substantial improvements in the implementation of research IWDs and has defined mechanisms to better address the change control process within research activities. The quality and technical adequacy of most IWDs reviewed for research activities showed improvement in attention to detail, with many of the IWDs reviewed addressing bounding conditions for the scope of the work to be conducted. However, the FCA found that most line personnel, and some FOD personnel, did not clearly understand the importance of the STO activity approval process as the key mechanism for assuring that new or changed facilities or activities do not violate facility safety plans (i.e., the non-nuclear facility safety basis). In addition, the FCA found varying degrees of implementation of P 300

within line organizations performing activities within the STO FOD, and external reviews and recent adverse events since closure of Findings C-1 and C-5 have also indicated that implementation of the IWM process was not fully effective. While there has been improvement in IWM implementation since the 2007 HSS inspection, the FCA team still found several significant concerns with work control. Most of these concerns were deficiencies in attention to detail in following P300 requirements. Additional efforts are needed, primarily in providing continued LASO and LANL line management oversight, honing IWM tools in the IWM toolbox, and allowing LANL line organizations and FOD to implement P 300 with minimal changes until the Laboratory can demonstrate the effectiveness and sustainability of its IWM system. Sustained improvement can only be obtained by the commitment and involvement of all levels of line management in continued line management oversight of P 300 implementation; however, there was a distinct absence of corrective actions assigned to LANL line management to ensure implementation of improvements in the IWM process. Appropriate attention to oversight of the IWM process has not been adequately demonstrated within all levels of line and program management to ensure acceptance and use of the process by the work force. More broadly, LANL has not demonstrated that the corrective action process consistently includes line management responsibility and actions for verification of implementation of any new processes or procedures. (FCA Findings MGMT.4 F-1 and MGMT.4 F-6)

HSS 2007 Finding C-2: Chemical fume hood procedures, testing, and user training lack sufficient rigor and/or adherence to ensure that the hoods are operated in compliance with LANL and manufacturer's requirements and applicable ANSI [American National Standards Institute] Standards (e.g. ANSI/AIHA Z9.5).

LANL has made significant improvements in the chemical hood and local exhaust ventilation program to address the deficiencies identified in HSS Finding C-2. LANL developed 11 corrective actions associated with Finding C-2 that resulted in an expanded and improved institutional procedure and a self-study training course for chemical fume hood users. In addition, significant efforts were initiated to define maintenance and industrial hygiene (IH) requirements for hoods and local exhaust ventilation systems, and to include all hoods in the Master Equipment List. However, the continued development and improvement of the chemical fume hood and local exhaust ventilation systems is a work in progress. Areas that warrant further attention, as identified by the STO FCA and HSS team, are discussed below.

Although the Ventilation Fume Hood Training (Self-Study Course #48002) is excellent, no corrective actions addressed line management verification of implementation of the training; consequently, a number of the IWDs that the FCA team reviewed did not include this course as a training requirement in either the IWD or the individual training plans. In addition, P 101-16 does not provide clear instructions on who should take this course (users and/or workers stationed near a hood). The IH Effectiveness Evaluation Report for Finding C-2 (January 2011) indicated that only 67 percent of hood users had completed the course.

The proposed changes to Laboratory Instruction Health and Safety Manual (LIHSM) Chapters 39 and 41 were either not implemented as planned or not appropriate. The proposed changes were not appropriate for Chapter 41 of the LIHSM since this chapter addresses local exhaust ventilation systems, which typically do not have magnehelic or photohelic gauges. Chapter 39 addresses chemical fume hoods, which sometimes have magnehelic or photohelic gauges; however, these gauges should be used only as a qualitative measurement to alert the user if the hood flow rate has changed significantly between annual hood calibration cycles, so the proposed quantitative guidance for calibrating these instruments is not appropriate. IH is currently developing (but has not issued) more appropriate qualitative guidance for using these instruments and will include it in the next revision of Chapter 39 of the LIHSM.

Certification and maintenance of hoods were found to be only partially effective because many of the hoods examined by the FCA team were not yet included in the work control system's Computerized

Maintenance Management System (CMMS) or because maintenance had not been performed or scheduled. The IH Effectiveness Evaluation Report (January 2011) for this corrective action indicated that of the hoods sampled, only 75 percent were entered into CMMS, and only 58 percent of the hoods had maintenance performed in the past year or were scheduled for maintenance in the coming year.

Therefore, there is insufficient support for closing Action Items 2, 4, 10, and 11 for HSS 2007 Finding C-2. (FCA Finding MGMT.4 F-2)

HSS 2007 Finding C-3: LANL lacks institutional mechanisms to adequately address several common hazards encountered by LANL workers, such as hydrofluoric acid or nanomaterials, as required by 10 CFR 851 and DOE Policy 456.1, Secretarial Policy on Nanoscale Safety.

In response to HSS Finding C-3, LANL developed a set of ten corrective actions and sub-actions to establish and implement institutional mechanisms for common hazards encountered by workers, such as hydrofluoric acid and nanoparticles. Actions included identification of hazards warranting unique controls; development of institutional procedures, policies, or training programs for working with hydrofluoric acid and nanomaterials; and improvement of communications within the Associate Director for Environment, Safety, Health and Quality organization. Overall, these actions were effective in addressing and closing HSS Finding C-3.

HSS 2007 Finding C-4: LANL hazard communication and cryogen programs lack sufficient definition in some areas to be effectively and consistently implemented, as required by DOE Policy 450.4, Safety Management System Policy.

LANL has made significant improvements with respect to the LANL hazard communications (HazCom) and cryogen programs to ensure that the deficiencies identified in HSS Finding C-4 have been addressed. LANL developed and completed seven corrective actions associated with Finding C-4 that resulted in improvements to the Chemical Management procedure (P 101-14), including clearer definition of hazardous chemicals, clarification of requirements to be tracked in ChemLog, and institutional guidance on cryogenics. Improvements were also made to the ChemLog tracking system and associated tools. In addition, institutional guidance has been provided with respect to HazCom door postings, but since there are limited regulatory requirements for such postings, implementation has been left to the LANL Divisions. The STO-FOD has been proactive in issuing guidance for all STO organizations, but implementation among the various STO organizations has been mixed.

Overall, the corrective actions for HSS Finding C-4 have been appropriate and effective, with one exception: namely, the HazCom entrance postings in some buildings in TA-35 do not meet the HazCom posting requirements established for these buildings in STO-FOD Procedure, Hazard Communication Posting (PRO-0374-STO-HZD-COMM POSTING). (FCA Finding MGMT.4 F-3)

HSS 2007 Finding C-6: Many worker exposures to chemical, physical or biological hazards have not been adequately evaluated, assessed, documented, and/or communicated in both research activities and fabrication shop activities, as required by 10 CFR 851.

Since the 2007 HSS inspection report, LANL has made significant improvements in the LANL exposure assessment process. LANL developed and completed seven corrective actions associated with Finding C-6 that resulted in the development and implementation of an institutional procedure for Worker Exposure Assessments (P101-32), improvements to the exposure assessment computer tracking system (CTS), and the establishment and execution of a resource-intensive project to perform and document over 4000 qualitative baseline exposure assessments within a two-year period. All seven of these corrective

actions were appropriate and have been closed. However, the completion of Corrective Action 2, with respect to the CTS, was not fully effective.

Based on a limited sampling of completed health risk assessment reports and associated IWDs, the implementation of the LANL exposure assessment process is a work in progress, and continued improvement and management attention are warranted. For the exposure assessment process to be fully effective, more needs to be done with respect to: (1) improving the accuracy, completeness, and quality of some of the health risk assessment reports; (2) improving the mechanisms for both IH and line management to easily identify and retrieve all the appropriate exposure assessments for a work area or activity (e.g., machine operations in TA-3, Building 39/102); (3) linking IWDs to health risk assessment reports; (4) verifying that hazards and controls in health risk assessment reports are incorporated into the appropriate IWDs; (5) improving the quality, rigor and consistency of peer reviews of health risk assessment reports; and (6) ensuring that industrial hygienists maintain health risk assessment reports current with respect to workplace hazards and utilize the assessment reports in the preparation and/or review of IWDs.

Collectively, the seven corrective actions did not fully address the adequacy of implementing the exposure assessment process to support closure of Finding C-6. (FCA Findings MGMT.4 F-4 and MGMT.4 F-5)

LANL Beryllium Program

Within the last several years, HSS and other organizations (such as the DOE Inspector General) have devoted significant attention to chronic beryllium disease prevention programs (CBDPPs) at a number of DOE sites in response to concerns and questions raised by various stakeholders regarding the adequacy of CBDPP implementation. HSS continues to place priority on review of current practices for protecting workers against beryllium hazards. Since the publication of the Beryllium Rule (10 CFR 850) over ten years ago, the Department has gained a better understanding of beryllium health effects and has developed more effective mechanisms for controlling beryllium in the workplace, better hazard assessment methodologies, and better facility characterization techniques. As a result of this increased knowledge and experience, some DOE sites have begun to implement beryllium programs that are considerably more robust than the Rule requires.

As part of the STO FCA, the Annual Joint LASO/LANL Beryllium Program assessment was also conducted, focusing on beryllium hazards identification and communication, a prior HSS concern that contributed to HSS Finding C-6. The STO FCA found that the LANL beryllium program generally meets the requirements of the Beryllium Rule, and the results of the assessment were accurately characterized in the assessment forms, with appropriate characterization of findings and observations. However, HSS did not observe the degree of robustness in some elements of the LANL beryllium program that are common at other DOE sites (the HSS observations of beryllium activities during the FCA were limited because few such activities were ongoing). For example, the STO FCA beryllium subteam noted a number of concerns with respect to beryllium contamination control, such as a lack of clear contamination boundaries in the electroplating area in Sigma-66, and work areas where the location of the beryllium contamination was unclear. Similarly, with respect to facility characterization, there was a considerable variance in the rigor of facility hazard assessment, characterization, and sampling among the facilities that were visited; implementation appeared to be driven more by the preferences of the industrial hygienist assigned to the facility than by a standardized process for performing these activities. Enhanced contamination control processes, such as beryllium work permits and procedures, provide a greater measure of control for beryllium contamination areas and have proved to be beneficial at other sites. The LANL beryllium program manager has been informally benchmarking LANL's current program against other sites, has recognized the need to improve some aspects of the LANL beryllium program, and has

initiated plans for such improvements. However, IH resources to achieve such improvements are currently limited. To ensure the beryllium program is enhanced, LANL should benchmark the “best in class” beryllium programs within the DOE complex, incorporate elements of those programs that have been effective in improving beryllium contamination controls and beryllium facility characterization, and ensure that sufficient resources are available to implement any changes to the beryllium program.

CONCLUSIONS

The LANL FCA process was an effective, consolidated assessment mechanism for evaluating overall performance and compliance status within the STO FOD. Assessment activities were performed at the appropriate breadth and depth and with the right balance of work observations, document reviews, and interviews. The FCA team leadership significantly contributed to the success of the assessment. The participation of NNSA, LASO and HSS as shadow assessors provided an effective mechanism for line management oversight of the contractor. Although the FCA was overall a satisfactory assessment effort, certain areas of the FCA would benefit from further improvements. In particular, fire protection, maintenance, and IWM functional area CRADs need additional tailoring, streamlining, and use of lines of inquiry to focus more on implementation, and more consideration needs to be given to the management of subteams for very large FCAs. Several factors presented some unique challenges to the STO FCA and a number of specific areas for improvement addressing these factors were provided for consideration. A more detailed evaluation of the conduct of the FCA was provided separately to the LANL Contractor Assurance Organization as feedback for improvement for the FCA process in accordance with LASO WI 00 04, Revision 3, *Assessment Shadowing Activity Reporting*.

Sufficient evidence exists to demonstrate that most of the specified actions taken to address the selected findings from the 2007 inspection were adequate and support closure. However, a number of corrective actions addressing specific elements within HSS Findings C-1, 2, 4, 5, and 6 were not fully effective. While there has been improvement in IWM implementation since the 2007 HSS inspection, the FCA team still found several significant concerns with work control. Most of these concerns were deficiencies in attention to detail in following P300 requirements. Additional efforts are needed, primarily in providing continued LASO and LANL line management oversight, honing IWM tools in the IWM toolbox, and allowing LANL line organizations and FOD to implement P 300 with minimal changes until the Laboratory can demonstrate the effectiveness and sustainability of its IWM system. In addition, the implementation of the LANL exposure assessment process is a work in progress, and continued improvement and management attention are warranted. More broadly, LANL has not demonstrated that the corrective action process consistently includes line management responsibility and actions for verification of implementation of any new processes or procedures. These deficiencies were appropriately characterized as findings, integrated into the overall results of the management element of the STO FCA report, and the report entered into the LANL Performance Feedback and Improvement Tracking System (PFITS) issues management system. (PFITS 2010-1628).

While the FCA determined that the LANL beryllium program generally meets the requirements of the Beryllium Rule, LANL IH personnel recognize the need to further improve the program. To this end, LANL should benchmark the “best in class” beryllium programs within the DOE complex, and incorporate elements of those programs that have been effective in improving beryllium contamination controls and beryllium facility characterization.

HSS’s participation with LASO in evaluating the FCA process promoted efficiency and effectiveness. With this process, HSS was able to independently observe the effectiveness of LANL and LASO processes, maintain operational awareness, and gain a detailed understanding of specific issues at the

LANL site. In addition, the process was effective in supporting both the LANL assessment and LASO oversight efforts, while minimizing the impact on site operations and resources. HSS will continue to monitor further actions at LANL in addressing the specific concerns identified in this report, primarily through the LANL independent IWM assessment, future FCAs, and focused reviews coordinated through the HSS site lead program.

Appendix A

Supplemental Information

Dates of Review

Onsite Data Collection: February 24 through April 1, 2011

Office of Health, Safety and Security Management

Glenn S. Podonsky, Chief Health, Safety and Security Officer
William A. Eckroade, Deputy Chief for Operations
John S. Boulden III, Director, Office of Enforcement and Oversight
Thomas P. Staker, Deputy Director for Oversight
William Miller, Deputy Director, Office of Safety and Emergency Management Evaluations

Quality Review Board

John Boulden III
William Eckroade
Thomas Staker
George Armstrong
Thomas Davis
Michael Kilpatrick

HSS Independent Oversight Site Lead for LANL

Robert Freeman

HSS Review Team

Robert Freeman
Ed Stafford
Jim Lockridge
Jeff Robinson