December 2, 2003

The Honorable Spencer Abraham
Secretary of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Secretary Abraham:

On May 6, 2003, due to the accumulation of combustible material, a fire occurred in the basement of Building 371 at the Rocky Flats Environmental Technology Site (RFETS) as workers were preparing to remove Glovebox 8 from the facility. The fire broke out after operators began cutting a hole near the top of Glovebox 8 to establish a ventilation path for the glovebox. A significant firefighting effort ensued, including the discharge of more than a dozen fire extinguishers and eventual use of a fire hose. No workers were harmed, but the potential for severe injury existed, four firefighters received skin contamination, and a significant cleanup effort was required.

Because of the urgency of the matter, the Defense Nuclear Facilities Safety Board (Board) issued a letter on July 31, 2003, imposing a 15-day reporting requirement to ensure that the Department of Energy (DOE) would take appropriate immediate actions to verify that the conditions contributing to the fire did not exist elsewhere at RFETS. DOE provided an action plan to the Board in a letter dated August 15, 2003.

In parallel to the July 31, 2003, letter, the Board and its staff continued to review the causes and implications of the May 6 fire at RFETS. The enclosed reports prepared by the Board's staff documents the results of this review and the results of the staff's review of documentation and practices related to activity-level work planning at RFETS. These reviews identified problems in all five core functions of Integrated Safety Management (ISM)—defining the scope of work, analyzing the hazards, developing and implementing hazard controls, performing work within those controls, and providing feedback and continuous improvement. Furthermore, the Board's staff observed ineffective oversight by DOE's Rocky Flats Field Office (RFFO) of the events leading up to the fire, of the RFETS contractor's actions in response to the fire, and of the subsequent resumption of work. Each of these areas and a number of specific issues are discussed in the enclosed reports. The following examples illustrate some of the principal deficiencies detailed in these reports.

- Despite previous correspondence from the Board regarding the need for improvements in work planning at RFETS and actions committed to by DOE, the RFETS contractor approached the removal of Glovebox 8 using a generic work package that failed to address the unique design of the glovebox and a Job Hazards Analysis that failed to address the uncharacterized combustible contents of the glovebox or other unique hazards associated with its design. As a result, the contractor failed to implement effective safety controls for this task.

- The RFETS contractor inadequately implemented other key safety controls that had been specified for decommissioning work in Building 371, including the combustible control program and the procedure for reducing and neutralizing chemicals used to decontaminate gloveboxes. (Improvements in these areas have been noted subsequent to the Board's letter of July 31, 2003.)

- The materials found in Glovebox 8 after the fire included combustible wastes from chemical decontamination of another glovebox, a condition which violated safety procedures and which was not acknowledged by the site until the Board's staff obtained photographs showing the material amid the debris from the fire.

- The concerted firefighting effort undertaken by the decommissioning workers violated site procedures in which they had been trained and exposed them to severe hazards.

- Despite the ever-changing facility conditions and hazards associated with decommissioning work, RFFO did not perform oversight of decommissioning activities in Building 371 prior to the fire.

- Despite the commitment provided to the Board by DOE's Assistant Secretary for Environmental Management in the letter of August 15, 2003, the Board's staff determined that chemical decontamination of gloveboxes at RFETS had resumed prior to review of the procedure by RFFO and without RFFO oversight.

On October 20–23, 2003, a review team from the Board's staff that included a former Board Site Representative for RFETS conducted an in-depth review of conduct of operations, work control, and safety oversight at RFETS. A summary of the staff's observations from this review is provided in Enclosure 3 to this letter. This review concluded that, although the RFETS contractor has implemented a number of positive practices, its recent safety performance is unsatisfactory, as evidenced by continued lapses in work planning and execution. This review also reinforced the Board's conclusion that the oversight capability of RFFO has degraded considerably in recent years. Improvements are needed to remedy the loss of technical competence within RFFO and to refocus RFFO on performing safety oversight of decommissioning work at RFETS.

Given the scope and significance of the lapses in the implementation of the core functions of ISM at RFETS and the deficiencies in safety oversight by RFFO, the Board concludes that the ISM System at RFETS, including safety management within both the RFFO and its contractor, needs improvement. The Board believes that an independent review is needed to thoroughly evaluate the state of ISM at the site, including an assessment of the effectiveness of RFFO's health and safety oversight of decommissioning activities, and that comprehensive corrective actions are needed to correct the root causes of the specific issues identified in the enclosed reports prepared by the Board's staff and highlighted above.

Therefore, pursuant to 42 U.S.C. § 2286b(d), the Board requests that DOE provide a corrective action plan to the Board within 60 days of receipt of this letter regarding how DOE and its contractor at RFETS will address the findings documented in this letter and the enclosed reports.

Sincerely,

John T. Conway
Chairman

c: The Honorable Jessie Hill Roberson
Mr. Frazer R. Lockhart
Mr. Mark B. Whitaker, Jr.

Enclosures

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

October 29, 2003

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: D. Burnfield
J. Contardi

SUBJECT: Documentation and Practices Related to Activity-Level Work Planning at the Rocky Flats Environmental Technology Site

This report documents a programmatic review focused on the general aspects of work planning and control for tasks associated with deactivation and decommissioning (D&D) efforts at the Rocky Flats Environmental Technology Site (RFETS). This review was conducted during September 30–October 2, 2003, by members of the staff of the Defense Nuclear Facilities Safety Board (Board) D. Burnfield, J. Contardi, and C. Goff, assisted by outside expert D. Volgenau and supported by a review of work packages conducted by outside expert R. West during August 2003.

Background. At RFETS, procedures for work planning and execution are prescribed principally in an Integrated Work Control Program (IWCP) manual and in a Conduct of Operations manual. These directives provide procedures for preparing and performing six types of work packages: (1) Type 1 Work Packages, used for one-time activities, which may contain engineering documentation; (2) Standard Work Packages (SWPs), intended for repetitive work activities, including D&D; (3) Technical Plans and Procedures; (4) Preventive Maintenance Work Packages; (5) Craft Work Packages (CWPs), for work not requiring step-by-step instructions and not resulting in a design basis modification; and (6) Emergency Work.

In the recent past, the majority of the work activities associated with D&D has been accomplished using the SWP and CWP processes. The site's IWCP web page provides a detailed planning guide for preparing work packages and contains a D&D Best Practices Collection (planning guide). Although the use of these guides is optional, the stated intent is that they be used in developing, approving, and changing work packages and procedures.

Much of the D&D work at the site is being completed through the use of subcontractors. Provision has been included in the work directives to permit the use of commercial approaches for this

work. These approaches must meet the requirements of Integrated Safety Management (ISM) and must be approved by the RFETS contractor.

Observations and Comments. The Board's staff observations and comments are presented below for each of the five core functions of ISM.

Define the Scope of Work—At RFETS, work is assigned to individual projects through a standard work breakdown structure process. Of the five projects at RFETS, three are responsible for buildings in which nuclear material processing was formerly conducted. One project has responsibility for non-nuclear-related structures, and another is assigned responsibility for the management of waste. The project managers set the goals, scope, and priorities for work under their projects. Each project operates independently, with its own internal organizations responsible for work control, radiological protection, engineering, and fire protection. The projects are required to follow the site work directives, but have the authority to modify them to suit work requirements. This arrangement can lead to inconsistency in work planning and execution across the site. It is not clear whether this flexibility aids in the safe completion of work, or hinders it.

The staff reviewed the planning and execution of several SWPs. A number of the work packages had not been made job-specific (tailored) as required by the site's IWCP manual. Work boundaries were not well established, and specific task assignments were not clearly defined. A single work package was used for two different work scopes. This review raised significant questions as to whether the tailoring of SWPs is being performed in a thorough and effective manner.

The detailed planning guide for preparing work packages provided on the site's IWCP web page does not appear to be utilized routinely. Although the use of a single SWP for multiple work scopes is not ideal, the staff's interviews of workers and line management revealed that this process is clearly understood. Given that radiological D&D activities at RFETS will be completed in a relatively short time frame, the staff believes it would be counter productive to change the format of the SWPs and risk confusing the workers and management. However, better implementation of the IWCP is required to ensure worker safety.

Analyze the Hazards—Site directives mandate work site walkdowns by a planning team to assist in identifying potential hazards associated with the planned work. Walkdowns appear to have been completed for the SWPs reviewed by the staff. However, this effort was not well correlated with the Job Hazard Analyses (JHAs) conducted initially for the general scope of the work under the SWP. JHAs for the specific work to be conducted were not always completed, raising doubt as to whether all of the hazards associated with the specific work planned had been identified.

Develop and Implement Hazard Controls—The SWP controls were not always tailored to the specific work planned. The adequacy of the controls identified and provided for work at the activity level could not be assured because of the weaknesses in the processes used to identify and analyze hazards.

Perform Work Within Those Controls—The responsible manager has the responsibility to ensure that work packages are properly prepared. He is assisted by a number of others in this effort, many of whom sign the prepared package certifying their agreement. Although the site directives are clear regarding these responsibilities, the staff's review of scheduled work packages revealed confusion as to the correct order for signing. This raises the question of whether changes to the work procedures could be incorporated without the knowledge or approval of the responsible manager.

Prior to the start of work, packages are released for accomplishment by the Facility Manager or Configuration Control Authority (as appropriate). This individual is responsible for reviewing the work package, preparations, and potential impact on facility operations. The site's conduct-of-operations manual provides for the conduct of pre-evolution briefings (PEBs) prior to work commencement. The evolution supervisor may use either of two formats provided or a project-specific form. Allowing this much latitude in PEBs could weaken their effectiveness. Review of the PEB documentation for the selected work packages revealed that they had not been tailored to the work to be conducted. A work package status log is required to be included in each work package. This log provides the foreman/supervisor with an area in which to record work status, including changes to the package. Site directives provide little detail on how this area is to be used. The logs in the packages reviewed revealed little meaningful data.

Recent events have revealed weaknesses in the implementation of the IWCP at RFETS. Previous reviews by the Board's staff indicated that the significantly deficient implementation of the work control process contributed to the May 6, 2003, fire that occurred in Building 371. More recently, several events revealed additional weaknesses in work planning and execution. One area of particular weakness was proper reaction to the unexpected during the accomplishment of work. This situation led contractor management to take several actions, including a temporary stop-work order for all craft work, a reemphasis on the responsibilities of key personnel, and a discussion of expectations for work planning and execution. Evaluation of the effectiveness of this effort will require time. One positive result was an initiative to include digital photography in the work packages to assist in the definition of work boundaries. No modifications to site-specific manuals and codes of practice are currently planned as part of these actions.

Provide Feedback and Continuous Improvement—The IWCP manual dictates requirements for providing feedback, including independent assessments, post-job reviews, and the like. The RFETS contractor uses these and other systems, both formal and informal, for purposes of feedback and improvement. The success of these efforts has been mixed. The contractor acknowledges weakness in capturing the lessons learned from work and is making an effort to improve in this area. Two informal systems using pre-printed cards have recently been initiated: one is used to examine worker attitudes, while the other is used to identify good and bad work situations immediately at the job site. The contractor believes these systems are providing useful input to improve the work environment. Daily meetings among managers are held to examine the causes and impacts of adverse events that have occurred within the last day. These meetings appear useful for the discussion of causes and preventive measures.

The contractor's processes for independent assessment are not effective. The assessment organization consists of two people. Individuals from the projects are used to conduct assessments under the direction of these two individuals. A review of the assessments conducted within the last year revealed that they were not effective in identifying areas for improvement in the work planning and execution processes. This weakness in effective self-assessment is of concern, especially considering the Department of Energy's (DOE) initiative to reduce its oversight staff. Staffing in the DOE Rocky Flats Field Office group responsible for safety oversight is to be reduced by 50 percent by January 2004.

Subcontractor Oversight. The site's IWCP manual includes a provision that permits the use of commercial approaches for the contracting and performance of D&D activities. A subcontractor is allowed to utilize either the site's or its own work procedures to accomplish assigned tasks. The subcontractor's approach must meet the requirements of ISM and must be approved by the site contractor. This process was reviewed for one current site subcontractor. The subcontractor's procedures for work planning and control had been approved by the site contractor. These procedures did not incorporate all of the principles of ISM. For example, JHAs were completed for general tasks instead of for the specific work to be accomplished. Worker safety at the activity level could not be assured. Control of subcontractor work planning and execution processes needs to be improved.

Defense Nuclear Facilities Safety Board
Review of Conduct of Operations, Work Control, and Safety Oversight
at Rocky Flats Environmental Technology Site

This document summarizes the issues from the Defense Nuclear Facilities Safety Board's staff October 20–23, 2003, review of the Conduct of Operations, Work Control, and Safety Oversight at the Rocky Flats Environmental Technology Site.

1. Areas that are weak and/or have worsened:

    a. Rocky Flats Field Office (RFFO)

        i. With the exception of the assistant manager, no other safety & health staffer appeared on the automated radiation work permit (RWP) entry list in 2003, and project staff had few entries. New manager's plans for improving field presence are vague and ill-defined.

        ii. While facility representatives (FR) have a respectable track record of resolving issues directly with the facility management, RFFO has among the weakest processes for formally communicating issues to Kaiser-Hill (K-H) for resolution, and there is questionable senior management support for FR issues.

        iii. RFFO senior management has a very hands off attitude toward safety oversight of K-H.

        iv. There is little apparent commitment by RFFO for assessing K-H's performance, especially the effectiveness of the K-H self-assessment program.

        v. RFFO has not reviewed K-H's Integrated Safety Management (ISM) System for nearly a year and has no definite plans in the future for conducting an ISM annual review.

    b. Presence by K-H central safety personnel in field is erratic and unacceptable for several radiation protection and occupational safety personnel.

    c. Pre-Evolutionary Briefs (PEBs) suffered from poor conduct of operations (e.g., use of old forms, workers reading magazines, high background noise, filling out forms ahead of time,

signing items as complete that were not discussed) and were not conducted in accordance with the Conduct of Operations manual.

d. Standing Orders are poorly maintained (e.g., address systems that no longer exist or moot issues, not incorporated into procedures despite several years).

e. K-H exhibited a strong reluctance to utilize more formal causal analysis processes, even when warranted, and relied heavily on apparent causes.

f. There were complaints that K-H was not always reporting FR-identified issues and was sometimes rewriting them so that they no longer represented the FR's position.

g. Very poor use of the Building 371 accountability board and poor location for Building 707's board.

h. Procedure requirements for post-job reviews are not known or followed.

i. Staff review of work packages identified cases of task instructions that did not address the main task, inadequate post-maintenance testing, missing forms, and Job Hazards Analyses with non-applicable hazards identified.

j. Building emergency drills/exercise scenarios are limited and emphasize facility hazards that are less relevant today (i.e., criticality) rather than activity hazards (e.g., a contaminated, injured worker) related to the current mission. Too much use was made of tabletop exercises and actual events as substitutes for planned and evaluated drills.

k. Plans-of-the-Day provided little value and did not examine integration issues.

l. General RWPs were modified in lieu of generating a job-specific RWP. Personnel are frequently not exiting the RWP (i.e., signing out) when leaving the work area. Potential High Contamination Areas (HCA) would have been better protected if Radiation Control Technicians (RCTs) had posted HCA signs and used radiological control tape versus construction tape. RCTs were performing non-RCT tasks that could distract them from their RCT duties.

m. Wooden equipment was labeled "fire retardant" with a black marker rather than with a formal operator aid or tag.

n. Not requiring permission to enter Configuration Control Authority office can lead to congestion when responding to an emergency.

o. K-H is no longer requiring oral boards for Configuration Control Authority requalifications or building transfers.

p. Draft standing order for resumption of hot work in contamination areas was vague enough that it may not result in adequate worker protection.

2. Areas that are strong and/or have improved:

a. Presence in field and cognizance of changing field conditions by facility operations management, facility safety oversight, and Configuration Control Authorities have greatly improved and is among the best seen.
b. Union relationship with K-H appears to have greatly improved and is now among the better that the staff has observed, as the result of a number of good initiatives by both parties.

c. Deployment of large numbers of work crews into field was very efficient.

d. Timely discussions of safety events among facilities and to K-H and Department of Energy (DOE) management has significantly improved. While the identification of issues improved, the value added in resolving issues by the Safety Assessment Center was uncertain.

e. K-H management has cracked down on the use of verbal craft work packages for deactivation and decommissioning work despite allowances in the work control procedure.

f. The investigation into how a worker caught his fire retardant hood on fire during plasma arc torch work has been proactive.

g. Critiques were well run and had good, open discussions.

h. Safety and conduct of operations information is provided to supervisors in the form of safety flashes, safety bulletins, and toolboxes for discussion with crews.

i. Program to solicit worker observation of good/bad work practices in the field is a positive initiative toward improving operational safety.

j. Number of FR in upcoming RFFO reorganization appears adequate.

k. Process for overseeing subcontractor work has improved.

3. Areas that were average/mixed:

a. Communication of recent safety issues at PEBs had mixed success.

b. Housekeeping was mostly reasonable for an active decommissioning facility. No problems with glovebox combustible loads or excessive migration of junk into other rooms was observed. However, a roll of plastic sheeting was stored next to a wooden crate, and accumulated equipment blocked access to parts of the facility cold side.

c. Corrective action process is mediocre, but typical.

d. Shift manager office operations, logs, and records were acceptable. Some minor issues identified while observing stationary operating engineer rounds.

e. Facility self, targeted, manager-directed, and ongoing assessment programs are limited in scope, but not unreasonable considering facility status. K-H independent assessment program has very limited resources.

4. Review Conclusions:

a. With the exception of the FR, RFFO's safety oversight performance has decreased considerably over the last few years. It is hard not to conclude that nearly all project and safety staffers are out of touch with field conditions. This is very troubling considering the hazardous work and changing work conditions. The oversight model that RFFO management is advocating requires a strong contractor self-assessment program, but RFFO is making little attempt to assess its effectiveness. While the FR seem to be more field-oriented than in the past, they cannot be solely relied on to oversee the contractor's performance.

b. Despite sheer work volume, the review team could not discern any widespread evidence that work was overly rushed, that preparations were incomplete, or that management was ignoring worker safety concerns. Compared to many other projects, there were surprisingly few reminders of schedule and progress directed at supervisors and work crews.

c. Conduct of operations had degraded in several observed areas, but was not at an unacceptable level of performance.

d. The type of work being performed is complex, hazardous work where surprises are common. It is much more challenging than performing the same stabilization work day after day inside a glovebox. Overall, the K-H operations and safety management is more engaged with day-to-day work activities and cognizant of changing field conditions than most other projects.

e. Facility management's approach for addressing safety issues and ensuring proper conduct of operations appeared sound. No evidence of malicious disregard for safety was evident.

f. However, safety performance is not satisfactory. The number and type of events that have occurred in September and October are troubling. A review of significant events indicates a mixture of events that are very hard to predict and prevent and those which are easily preventable. There is no excuse for the two recent cases of unauthorized work being performed, one of which led to several uptakes in Building 707. There has been a rash of sloppy accidents involving fork lifts. Other preventable events include tags being removed in Building 559 and an inadequate fire sprinkler isolation in Building 440. Management is still trying to resolve the various Building 371 Premaire® suit equipment issues and the excessive number of skin contaminations (17 skin contaminations > 1000 dpm/cm^2 thus far in 2003).

g. The staff is concerned that K-H's informal causal analysis and heavy reliance on worker input for corrective actions may result in corrective actions that are not addressing the root causes or are not as effective as management would hope. For example, despite the fact that skin contaminations are still occurring, K-H was about ready to declare that its corrective actions had been effective.