

John T. Conway, Chairman  
A.J. Eggenberger, Vice Chairman  
John E. Mansfield  
R. Bruce Matthews

# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004-2901  
(202) 694-7000



August 7, 2003

The Honorable Jessie Hill Roberson  
Assistant Secretary for Environmental Management  
U.S. Department of Energy  
1000 Independence Avenue, SW  
Washington, DC 20585-0113

Dear Ms. Roberson:

The staff of the Defense Nuclear Facilities Safety Board (Board) recently visited the Fernald Closure Project site near Cincinnati, Ohio, to review issues related to worker safety. The Fernald site is currently involved in the demolition of former uranium processing plant buildings, removal of radioactive waste, and environmental remediation of the site. Under the new contract with Fluor Fernald (Fluor), all work at the site is scheduled to be completed by the end of 2006. The results of the staff's review are documented in the enclosed report.

Although significant progress is being made toward cleaning up and remediating the site, there was an increase in the number of worker injuries and near misses in 2002. The site has attributed this rise in the accident rate to an increase in the number of new workers on site and the greater amount of work being performed on most site projects. While Fluor's upper management places a strong emphasis on safety, information from project safety and quality personnel in the field indicates that many project and field managers believe safety is adequate, and meeting the schedule is the top priority. Similar conclusions were reached by an independent review of Fernald sponsored by the Department of Energy's (DOE) Ohio Field Office in May 2003.


The Board believes the safety culture of the contractor's project and field management needs to be improved to increase operational safety at the site. The Board is aware of attempts by DOE and Fluor to reaffirm a commitment to safety by holding meetings and engaging in other communications, but such activities do not appear to have achieved the desired improvements in safety. For example, in an attempt to reduce the number of worker injuries, Fluor is implementing a Safety Recovery Plan that includes additional safety training, safety performance reviews, improvements in training of new employees, and attempts to develop leading safety performance indicators. The plan is too new for its effectiveness to be fully evaluated. However, the plan has many of the same elements as previous plans that have not resulted in the desired improvements in safety.

The Board suggests that other actions—such as additional training that clearly identifies the safety responsibilities and activities of all levels of management, and the development of performance-based safety incentives for the contractor's project and field management—may need to be considered to produce a measurable improvement in safety at the site. Also, in view

of the fact that Fluor has concluded that new workers are involved in a disproportionate share of the site's injuries, a more thorough screening of the qualifications of new workers may be necessary.

Therefore, pursuant to 42 U.S.C. § 2286b(d), the Board requests the responsible DOE and Fluor personnel to brief the Board within 90 days of receipt of this letter regarding further actions that may be undertaken to improve operational safety at the Fernald site.

Sincerely,



John T. Conway  
Chairman

c: Mr. Robert Warther  
Mr. Glenn Griffiths  
Mr. Mark B. Whitaker, Jr.

Enclosure

# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

## Staff Issue Report

July 11, 2003

**MEMORANDUM FOR:** J. K. Fortenberry, Technical Director

**COPIES:** Board Members

**FROM:** L. Zull

The staff of the Defense Nuclear Facilities Safety Board (Board) visited the Fernald Closure Project on June 2–5, 2003, to review issues related to worker safety. The staff also toured the site and conducted a walk-down of the Waste Pits Remedial Action Project (WPRAP) and the Silos project.

**Background.** Fernald produced high-quality uranium metal products for defense nuclear applications between 1951 and 1989. Production operations were suspended in 1989 and ended formally in 1991 with the Department of Energy's (DOE) decision to close the site. Current work involves six major projects to decontaminate and demolish site structures, remove and dispose of nuclear waste, and remediate the site. Four projects (Silos, Waste Management, Soil Disposition, and Aquifer Restoration) are self-managed by the lead contractor, Fluor Fernald (Fluor). The two remaining projects, WPRAP and the Decontamination and Demolition project, are managed by subcontractors—Shaw E&I, Inc. and MACTEC Inc., respectively.

**New Contract and DOE Organization.** A new cost plus incentive fee contract was signed with Fluor on April 30, 2003. The new contract places emphasis on DOE's monitoring of the contractor's schedule. DOE's review and approval of the contractor's work plans have been significantly reduced. The effect of these changes on safety remains to be seen. The target date for completion of the cleanup and remediation work at the site is December 31, 2006. The pace of work is accelerating, but experienced DOE and contractor personnel are gradually leaving as the site moves toward closure. There is currently no plan to retain key DOE or contractor personnel until the site work is completed.

The new manager of DOE's Ohio Field Office, who was appointed earlier this year, has relocated the office from the Mound site in Miamisburg to a commercial office building in the Cincinnati suburb of Springdale, Ohio. The Ohio Field Office has been reorganized, and many personnel from the Mound and Fernald sites have been relocated to the Springdale office. Support and subject matter personnel have been transferred to Springdale, while only associate directors, project managers, and facility representatives remain on site. The Board's staff plans to monitor the impact of these changes on the effectiveness of DOE's safety oversight at the Mound and Fernald sites.

**Current Activities.** The last of more than 200,000 drums of legacy uranium and thorium waste is scheduled to be repackaged and shipped off site by September 2003. The demolition of most former production buildings was scheduled to be completed by September 2003, but is behind schedule and is not estimated to be completed before December 2003. The low-level demolition debris and contaminated soil are being placed in 8 engineered on-site disposal cells. WPRAP has removed and shipped almost 70 percent of the 790,000 tons of uranium and thorium processing wastes and contaminated soils from 6 in-ground waste pits and other locations. The WPRAP waste is placed in gondola cars and shipped in 65-car trains to Envirocare in Utah. All of the WPRAP waste material is scheduled to be shipped off site by September 30, 2004. A nationwide problem with defective railcar bolsters (the castings that connect wheel carriages to the railcars) manufactured in Mexico during 1998–1999 may require that WPRAP replace bolsters on its railcars, which could delay completion of the project.

The Silos project has completed design work for the structures and equipment required to retrieve uranium processing wastes stored in three on-site silos (Silos 1, 2, and 3), treat it, and ship it off site. The Silos project, which is now in the construction phase, is on the critical path to site closure. Silo 3 operations are scheduled between April 2004 and December 2004, while Silo 1 and 2 operations are scheduled between February 2005 and February 2006. The silos and the waste treatment plants will be demolished after waste treatment has been completed. Fluor would like to ship the packaged silos waste to Envirocare in Utah via railcar, rather than to the Nevada Test Site via truck, but must obtain state approvals and congressional legislative changes to do so.

**Worker Safety.** The staff reviewed information on various worker safety programs and DOE and contractor oversight programs. The staff's principal observations are summarized below.

*Accidents and Injuries*—During 2002, the number of accidents, injuries, and near misses at the site increased. Injury statistics indicate that injuries among subcontractor personnel are trending higher than those among Fluor employees. During this period, the number of employees and the amount of work being performed at the site have both increased. While Fluor's upper management places a strong emphasis on safety, information from project safety and quality personnel in the field indicates that many project and field managers believe safety is adequate, and meeting the schedule is the top priority. Also, it did not appear to the Board's staff that the identification and resolution of safety and quality problems is treated consistently as the responsibility of project personnel, rather than safety and quality oversight personnel.

To address the increase in the accident rate, Fluor implemented a Safety Recovery Plan in May 2003 that identifies actions designed to improve worker safety at the site. This plan, which includes additional safety training, safety performance reviews, improvements in new employee training, and attempts to develop leading safety performance indicators, is too new for its effectiveness to be evaluated. However, the staff noted that the plan has many of the same elements as previous plans that have not resulted in the desired improvements in safety. The staff believes the safety culture of the contractor's project and field management personnel needs to be improved to increase operational safety at the site. Other actions—such as additional

training that clearly identifies the safety responsibilities and activities of all levels of management, and the development of performance-based safety incentives for the contractor's project and field management—may be necessary to produce a measurable improvement in safety at the site.

In an attempt to improve safety on the Decontamination and Demolition project, Fluor recently gave formal notice to the demolition project contractor, MACTEC, of the need to develop a corrective action plan to reduce the number of reportable occurrences. MACTEC is also 6 months behind the September 30, 2003, schedule date for the completion of demolition of the former production area buildings and structures.

*New Employees*—The site is in the process of adding more than 850 new employees to the workforce this year. The new workers are primarily equipment operators, trades personnel, and general laborers. As part of the Safety Recovery Plan, Fluor is implementing a Fluor Corporate New Employee Development Safety Orientation program, in addition to a Safety Mentor Program. These programs are being implemented because Fluor has determined that new employees are involved in a disproportionate number of injuries. The Safety Mentor Program uses mentors to serve as positive role models to influence the behaviors and work practices of new workers. Through this program, the work practices of new workers are observed over a 6-month period. In addition to the Safety Mentor Program, however, more thorough screening of prospective employees may be necessary to ensure that new workers are qualified for the work they are to perform.

*Safety Performance Indicators*—Part of the Safety Recovery Plan involves an attempt to develop meaningful safety performance indicators for early identification of those projects or program areas that need additional attention. The staff commented that predictive, rather than reactive, indicators are more useful, but more difficult to identify. One source of predictive information is input from first-line managers. In the past, first-line management has tried to fix problems, but has not always informed upper levels of management of the problems. Precursor information is often not recognized and reported. The staff believes it is important to develop a plan for encouraging first-line managers to report trends promptly and request assistance from upper-level management when necessary. Currently, the best predictive safety information appears to be feedback from the various project safety and quality personnel in the field.

*Respiratory Protection Programs*—An average of 2,000 respirators are used weekly in the respiratory protection programs (RPPs) operated by Fluor, Shaw, and MACTEC at the site. The site uses 19 different models of respirators. Fluor operates the RPP for the Silos and Soil Disposition projects, Shaw for WPRAP, and MACTEC for the Decontamination and Demolition project. Fluor administers the site RPP and uses MACTEC's laundering facilities for some respirators, but the contractors supply their own equipment and support services. Shaw has its own RPP and procedures, whereas MACTEC follows the RPP and procedures of Fluor.

A discussion with Fluor personnel administering the RPP indicated a lack of familiarity with some of the details of the implementing procedures. Fluor personnel conduct scheduled quality assurance/quality control assessments of the RPPs of all site contractors. In reviewing

the assessment reports, the staff noted that the reviews were mainly reactive (verifying completion of corrective actions) during 2000–2001, but have been more proactive in identifying problems since 2002.

Recent contaminations and uptakes due to chemical and radiological exposures indicate the need for increased attention to the condition of personal protective equipment, including respirators. The staff was told that lessons-learned information has been fed back into the respirator training program, and that the lessons learned will be formally documented. However, recent feedback from project safety and quality personnel has called into question the adequacy of pre-use inspections by workers. Although respirators are inspected by trained personnel after cleaning, recent occurrences indicate the need for increased worker attention to personal inspections of personal protective equipment, including respirators. The staff toured the respirator and worker dress-out facilities at WPRAP, which appeared to be operating in compliance with procedures.

*DOE and Contractor Oversight*—Both DOE and Fluor conduct various types of safety oversight reviews. Fluor has quality assurance/quality control programs that perform programmatic and field audits, inspections, and surveillances. Fluor also has a Safety and Health Program that conducts reviews of safety and health programs and project operations. Approximately 17 percent of Fluor personnel are involved in performing safety reviews. Although Fluor conducts numerous safety reviews, it has apparently been slow to react to safety problems with its subcontractors. DOE has also been slow to request officially that Fluor pay more attention to working with subcontractors to improve safety. DOE conducts a much smaller number of quality and safety audits than does Fluor.

DOE and Fluor have conducted some joint reviews (not joint readiness assessments or Operational Readiness Reviews). Fluor representatives told the Board's staff that more findings tend to be identified in the joint reviews, and DOE said that findings of joint reviews are written up by Fluor as nonconformances and corrected more quickly than findings of separate Fluor reviews. However, the staff is concerned that some independence may be lost, and that the contractor may not be as willing to discuss potential problem areas or concerns openly with DOE present. The joint reviews have both advantages and disadvantages. DOE and Fluor plan to continue such reviews in the future as projects work toward completion; the staff plans to monitor the effectiveness of such joint reviews.

The DOE Ohio Field Office manager chartered an independent team to conduct a safety review of the Fernald Closure Project in May 2003. The report of this review, issued on June 6, 2003, reaches conclusions similar to those reached by the Board's staff. The DOE Fernald Site Office issued a corrective action plan on June 24, 2003, that includes commitments to conduct further meetings and communications on safety, increase oversight of the Decontamination and Demolition project, evaluate the manner in which operational events are analyzed and reported, improve the distribution of lessons learned, and develop a staffing plan that shows how DOE will support closure of the site by 2006. The Board's staff believes that these actions should improve safety at Fernald; however, the additional actions identified by the staff—training all levels of management on their safety responsibilities, defining performance-based incentives related to safety performance, and ensuring new workers are appropriately qualified—may be needed to address the observed weaknesses in safety culture and safety performance.