



Department of Energy
Washington, DC 20585

September 3, 2009

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Peter Kelly
Vice President
Western Allied Mechanical, Inc.
1180 O'Brien Drive
Menlo Park, California 94025

WEA-2009-03 (FNOV)

Dear Mr. Kelly:

Pursuant to section 234C of the Atomic Energy Act, as amended, 42 U.S.C. § 2282c, and the Department of Energy's (DOE) regulations at 10 C.F.R. Part 851, *Worker Safety and Health Program*, DOE is issuing this Final Notice of Violation (FNOV) to Western Allied Mechanical, Inc. (Western Allied). The FNOV finds Western Allied liable for violating DOE's worker safety and health requirements. The FNOV is based upon the Office of Enforcement's July 23, 2008, Investigation Report and a careful and thorough review of all evidence presented to DOE by Western Allied, including your response to the Preliminary Notice of Violation (PNOV). For reasons set forth in the enclosed FNOV, DOE finds no basis for modification of the PNOV.

Pursuant to 10 C.F.R. § 851.44(a), Western Allied may petition DOE's Office of Hearings and Appeals for review of the enclosed FNOV. Western Allied's petition must adhere to the procedural requirements established in Subpart G of 10 C.F.R. Part 1003, *Office of Hearings and Appeals Procedural Regulations*. If Western Allied does not petition the Office of Hearings and Appeals for review within 30 calendar days of receipt of this FNOV, Western Allied relinquishes any right to appeal any matter therein, and the FNOV will become a final order as provided by 10 C.F.R. § 851.43(c).

Sincerely,

A handwritten signature in black ink that reads "John S. Boulden III". The signature is written in a cursive style with a horizontal line extending to the right.

John S. Boulden III
Acting Director
Office of Enforcement
Office of Health, Safety and Security

Enclosure



cc: William Brinkman, SC-1
Paul Golan, SSO
Richard Azzaro, DNFSB

Enclosure

Final Notice of Violation

Western Allied Mechanical, Inc.
SLAC National Accelerator Laboratory

WEA-2009-03

The Department of Energy (DOE) conducted an investigation into the facts and circumstances surrounding the September 13, 2007, polyvinyl chloride (PVC) pipe explosion that occurred in Sector 30 of the linear accelerator facility at the SLAC National Accelerator Laboratory (SLAC). The investigation identified multiple violations of DOE worker safety and health requirements by Western Allied Mechanical, Inc. (Western Allied).

On April 3, 2009, DOE issued a Preliminary Notice of Violation (PNOV) to Western Allied with a proposed civil penalty of \$56,000 for one Severity Level violation of 10 C.F.R. Part 851, *Worker Safety and Health Program*. DOE received Western Allied's reply to the PNOV on May 4, 2009. In the reply, Western Allied did not deny the violation and acknowledged responsibility for the deficiencies that contributed to the event. Western Allied asserted, however, that the proposed civil penalty was excessive and should be reduced to \$25,000, because: (1) SLAC did not convey safety-related documentation at the time of the project bid and award; (2) limitations were placed upon Western Allied by deficient construction documents; and (3) limitations were placed by SLAC on the process of pressure testing on the piping systems. Western Allied further objected to the proposed penalty on the belief that DOE chose to use this event "to enforce steep financial penalties in an effort to prevent similar events in the future" because a previous pipe explosion event had occurred at another DOE site. Western Allied also questioned DOE's "unprecedented move" to impose financial penalties on lower-tier subcontractors.

DOE thoroughly considered Western Allied's reply and finds that none of the reasons stated justify a reduction of the proposed penalty. The prime contractor, Stanford University, entered into a first-tier subcontract with Pacific Underground Construction Inc. (PUC). The Stanford University-PUC contract specifies PUC's responsibility to ensure that any lower-tier subcontractors are informed of the obligation to comply with all applicable laws and regulations, including Part 851 requirements. Furthermore, Western Allied certified and attested on the "Sub Contractor Site Specific Health & Safety Plan Form" submitted to Stanford University before the underground utilities upgrade work began that it had read and would comply with the requirements of Part 851 and the SLAC worker safety and health program. With regard to "deficient construction documents" and pressure testing process limitations imposed on Western Allied by Stanford University, DOE reiterates that it is the responsibility of employers and

workers, in accordance with 10 C.F.R. § 851.20, to stop work or decline to perform an assigned task if there is a reasonable belief that the task poses a serious hazard to workers.

Contrary to Western Allied's assertion, the imposition of civil penalties against DOE subcontractors is not unprecedented. Since 1996, subcontractors have been the recipients of enforcement actions that include civil penalties and, in 2003, DOE assessed civil penalties against two tiers of subcontractors for nuclear safety violations.

DOE's decision to impose a civil penalty in this case is based solely on the facts of the case at hand and is completely unrelated to the previous pipe explosion at DOE's Hanford site. DOE determined that a significant penalty was warranted in this case in recognition of the serious physical harm that could have resulted from Western Allied's failure to comply with Part 851 requirements. In weighing the imposition of a penalty, DOE considered the role of the other contractors involved, including SLAC's role in designing, planning, and overseeing the project; the size of Western Allied's company; the economic impact of a civil penalty; and Western Allied's corrective actions to prevent recurrence. Based on evaluation of these factors, DOE consolidated Western Allied's multiple violations into one Severity Level I violation and then reduced the base civil penalty value of \$70,000 accordingly.

For the foregoing reasons, DOE believes that the enforcement action against Western Allied should remain unchanged. Pursuant to 10 C.F.R. § 851.43(b), DOE now issues this Final Notice of Violation (FNOV) to Western Allied with a civil penalty of \$56,000 for one Severity Level I violation of DOE's worker safety and health regulations for the reasons set forth below.

Final Violation

I. Construction Safety

Title 10 C.F.R. § 851.24, *Functional areas*, requires that “[c]ontractors must have a structured approach to their worker safety and health program which at a minimum, include provisions for ... construction safety” and that “[c]ontractors must comply with the applicable standards and provisions in Appendix A of this part, entitled ‘Worker Safety and Health Functional Areas.’”

Appendix A, Section 1, *Construction Safety*, states that “[f]or each separately definable construction activity (e.g., excavations, foundations, structural steel, roofing), the construction contractor must: [p]repare and have approved by the construction manager an activity hazard analysis prior to commencement of affected work. Such analyses must: [i]dentify foreseeable hazards and planned protective measures....” It further states that the construction contractor must “[e]nsure workers are aware of foreseeable hazards and the protective measures described within the activity analysis prior to beginning work on the affected activity.”

Appendix A, section 1(d) states that “[t]he construction contractor must prepare a written construction project safety and health plan to implement the requirements of this section and obtain approval of the plan by the construction manager prior to commencement of any work covered by the plan. In the plan, the contractor must designate the individual(s) responsible for

on-site implementation of the plan, specify qualifications for those individuals, and provide a list of those project activities for which subsequent hazard analyses are to be performed.”

Contrary to these requirements, Western Allied failed to develop a construction project safety and health plan and activity hazard analysis to effectively implement the requirements of appendix A, section 1. The site-specific safety plan (SSSP) and job safety analysis (JSA) prepared by Western Allied did not adequately identify and assess the hazards associated with the piping replacement work being conducted in Sector 30 or establish controls necessary to eliminate or abate those hazards to protect workers. Specific examples are listed below:

- A. The “Sub Contractor Site Specific Health & Safety Plan Form” for the “SLAC Underground Utilities Upgrade” project that was prepared by Western Allied as its SSSP did not identify any project activities for which subsequent hazard analyses would be performed. The form contained only generic information regarding the scope of work to be performed by Western Allied and the associated hazards and hazard controls that would be implemented relative to the work. The form also did not specify the qualifications of the individual designated as responsible for oversight and implementation of daily operations conducted under the plan.
- B. The JSA prepared by Western Allied for the piping replacement work, “CTW Piping Replacement – Sectors 21 thru 30,” dated September 4, 2007, did not identify foreseeable hazards and appropriate protective measures associated with the work to be performed.
 1. The JSA identified “solvents & cements” as potential hazards and “PVC solvent/cement” as a hazardous material that would be used at the job site. However, the JSA failed to identify the following properties and precautions for use of those materials as identified on (1) the material safety data sheet (MSDS) for IPS Weld-On solvent cement for PVC plastic pipe, dated April 2007; (2) the MSDS for IPS Weld-On adhesive primer for plastic, dated June 2007; and (3) the IPS Weld-On PVC 2711 plastic pipe cement product label:
 - A flammability rating of 3
 - Keep away from heat, sparks, open flame, and other sources of ignition
 - Vapors may ignite explosively
 - Use with adequate ventilation.
 2. The JSA listed “cutting and torching of bolts” as a phase of work/job step and “static electricity and sparks” as potential hazards. The analysis failed to consider the potentially explosive conditions created by the combination of ignitable vapors from the PVC primer and cement, an enclosed space (i.e., sealed piping system), and the application of heat to the carbon steel piping attached to the PVC piping. The work documents and SSSP for the project did not identify the need to install a pressure gauge in the piping system so that required pressure testing could be performed. The JSA did not identify the task of cutting into and welding on the newly installed carbon steel piping to install a pressure gauge.

II. Fire Protection

Title 10 C.F.R. § 851.23, *Safety and health standards*, requires compliance with 29 C.F.R. Part 1926, *Safety and Health Regulations for Construction*. Section 1926.352(i) states that “[d]rums, containers, or hollow structures which have contained toxic or flammable substances shall, before welding, cutting, or heating is undertaken on them, either be filled with water or thoroughly cleaned of such substances and ventilated and tested.”

Section 1910.1200(h)(1) of 29 C.F.R. Part 1910, *Occupational Safety and Health Standards*, which is adopted by Part 1926, states that “[e]mployers shall provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new physical or health hazard the employees have not previously been trained about is introduced into their work area.”

Title 10 C.F.R. § 851.24, *Functional areas*, requires that “[c]ontractors must have a structured approach to their worker safety and health program which at a minimum, include provisions for ...fire protection” and that “[c]ontractors must comply with the applicable standards and provisions in Appendix A of this part, entitled ‘Worker Safety and Health Functional Areas’.” Appendix A, Section 2, *Fire Protection*, states that “[c]ontractors must implement a comprehensive fire safety and emergency response program to protect workers commensurate with the nature of the work that is performed,” and that “[a]n acceptable fire protection program ... includes meeting applicable building codes and National Fire Protection Association [NFPA] codes and standards.”

National Fire Protection Association (NFPA) 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, 2003 edition, establishes the following provisions:

- Section 4.1.6 states that “[m]anagement shall ensure that all individuals involved in the hot work operations, including contractors, are familiar with the provisions of [NFPA 51B].”
- Section 4.1.6.2 states that “[i]ndividuals involved in hot work operations shall have an awareness of the inherent risks involved....”
- Section 5.1.1 states that “[h]ot work shall be permitted only in areas that are or have been made fire safe.”
- Section 5.2(4) states that “[h]ot work shall not be permitted...[i]n the presence of uncleaned or improperly prepared drums, tanks, or other containers and equipment that have previously contained materials that could develop explosive atmospheres.”

Section 1.1.2 of NFPA 51B requires compliance with American National Standards Institute (ANSI) Z49.1, *Safety in Welding, Cutting, and Allied Processes*. ANSI Z49.1, 2005 edition, establishes the following provisions:

- Section 3.2.1.2 states that “[m]anagement shall assure that hazards and safety precautions are communicated to and understood by workers prior to the start of work.”

- Section 3.2.1.3 states that “[m]anagement shall designate approved areas, and establish procedures for safe welding and cutting” and “[m]anagement shall assure that the individual is aware of the hazards involved and familiar with the provisions of [ANSI Z49.1].”
- Section 3.2.3.1 states that “[w]elders shall understand the hazards of the operation to be performed and the procedures being used to control hazardous conditions.”
- Section 3.2.3.3 states that “[w]elders shall cut or weld only where all safety precautions have been met.”
- Section 6.4 states that “[w]elding or cutting work shall not be started until the container has been prepared for hot work.”

Contrary to these requirements, Western Allied failed to implement appropriate welding and cutting fire safety control measures during the replacement of the old transite piping system in Sector 30 of the linear accelerator facility and failed to provide adequate safety hazard training and information to its employees. Specific examples are listed below:

- A. Western Allied failed to ensure employee protection from flammable and explosion hazards through work control measures such as purging or cleaning the pipes and monitoring for vapor buildup to verify the absence of a potentially explosive atmosphere. Western Allied employees completed the assembly of a PVC pipe configuration inside a trench outside Sector 30 of the linear accelerator facility using IPS Weld-On adhesive primer and solvent cement for PVC plastic pipe. The PVC pipe segment was connected to a cooling water main and an eight-inch carbon steel pipe using flanged connections and the segment was blanked in preparation for testing. Inside the Sector 30 mechanical alcove, a company welder subsequently initiated cutting operations on the carbon steel pipe to prepare the pipe for installation of a pressure gauge without recognizing the flammable and explosive hazards of trapped ignitable vapors inside the closed-pipe system.
- B. Western Allied did not establish procedures to ensure that welding and cutting would be performed safely. Western Allied provided Stanford University with a set of safety rules for different types of welding (e.g., “Oxyfuel Cutting and Welding Safety Rules”) as part of the required safety documentation for review and approval. The rules did not identify any requirements or precautions relating to the need to ensure that, before performing hot work, containers and equipment are free from substances that could explode, ignite, or produce toxic vapors.
- C. Western Allied employees did not receive effective training on the physical hazards associated with performing hot work on piping systems containing potentially explosive vapors or the implementation of appropriate hazard controls. Western Allied also did not ensure that its employees were trained in the provisions of NFPA 51B and ANSI Z49.1. Western Allied employees interviewed during the Office of Enforcement’s investigation were not familiar with these standards or the requirements contained therein.

- D. Western Allied failed to ensure that its employees were properly informed of the potential hazards and protective measures associated with replacing the old transite piping system with a combination of carbon steel and PVC piping, and the assembly of a PVC pipe system using PVC primer and cement. Western Allied employees have performed pipefitting work with carbon steel at SLAC previously; however, the welder performing the hot work on September 13, 2007, had no experience working with a piping configuration comprised of different materials (ductile iron, PVC, and steel), such as the one used in the underground utilities upgrade in Sector 30 of the linear accelerator facility. The welder did not consider the potential flammable and explosion hazards associated with the use of the primer and cement in a closed-pipe system based on a review of the applicable MSDSs and product labels before welding.

III. General Requirements

Title 10 C.F.R. § 851.10, *General requirements*, states that “the contractor must: [e]nsure that work is performed in accordance with: (i) [a]ll applicable requirements of [Part 851]; and (ii) [w]ith [sic] the worker safety and health program for that workplace.”

The *SLAC Worker Safety and Health Program Description* (SLAC-I-720-0A21B-001-R000), dated February 2007, is applicable to all subcontractors at SLAC except those hired directly by DOE. That program description incorporates by reference the latest version of Chapter 42, *Subcontractor Construction Safety*, of the *SLAC Environment, Safety, and Health Manual*. The following refers to requirements in chapter 42 dated June 1, 2007.

- Section 5.1.2.4 states that “[s]ubcontractors are required to submit a site-specific safety plan (SSSP)” and that “[t]he SSSP is intended to provide specific information on the hazards, contact people, and emergency response for a particular project.” This section further states that “[t]he SSSP must describe the work to be performed, outline the hazards anticipated to be encountered with each task, and the specific mitigation.” The SSSP must also “[d]escribe the system used to ensure that personnel will comply with safe and healthy work practices including [s]afety indoctrination and safety meetings, [w]orker training in hazard recognition, [d]isciplinary policy, and [d]escribe the system used to communicate with personnel, including notification of hazards.” This section also states that “[s]ubcontractor employees must be trained in the contents of the SSSP and the training documented.”
- Section 5.1.2.5 states that “JSAs must be prepared and reviewed at the start of any on-site work and any new phase or task and will be reviewed daily.”
- Section 5.1.3.3 requires that “subcontractors must perform daily inspections of activities and work sites relevant to the work being performed that day to ensure that the subcontractor is working within identified controls and has effectively controlled identified hazards....” This section further states that “[a]ll inspections, findings, and corrective measures must be documented and be available for review....” and that “[t]he daily inspection records must be kept at the job site.” This section also states that “[t]he subcontractor’s competent person will conduct regular inspections of the work place and maintain a log certifying compliance with accepted safe work conditions.”

Contrary to these requirements, Western Allied failed to perform work in accordance with SLAC's approved worker safety and health program and associated implementing procedures. Specific examples are listed below:

- A. Western Allied did not document the results of safety inspections for the work performed in Sector 30 of the linear accelerator facility and Western Allied's competent person did not maintain a log certifying compliance with project safety and health requirements. There is no evidence to indicate that Western Allied's competent person conducted regular inspections of the workplace.
- B. Western Allied's SSSP did not address the task of fabricating a new piping system using mixed materials, usage of PVC adhesive primer and cement in assembling the piping, or identify the hazards associated with those activities and materials. The SSSP also did not describe the system that would be used by Western Allied to ensure worker compliance with safe and healthy work practices.
- C. There is no documentation of training for Western Allied employees on the SSSP applicable to their work.
- D. The JSA applicable to the utilities upgrade work performed by Western Allied did not identify the task of installing a pressure gauge in the carbon steel pipe. Although this task was reportedly discussed during a tailgate meeting on the day of the explosion, Western Allied did not prepare a new JSA or modify the existing JSA to reflect this new task.

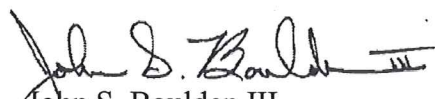
Collectively, these violations constitute a Severity Level I violation. As explained in 10 C.F.R. Part 851, appendix B, section VI(b)(1), "[a] Severity Level I violation is a serious violation. A serious violation shall be deemed to exist in a place of employment if there is a potential that death or serious physical harm could result from a condition which exists, or from one or more practices, means, methods, operations, or processes which have been adopted or are in use, in such place of employment."

Administrative Appeal

Pursuant to 10 C.F.R. §§ 851.43(b) and 851.44(a), Western Allied may petition DOE's Office of Hearings and Appeals for review of this FNOV within 30 calendar days of receipt of this FNOV. Western Allied's petition must conform with the procedural requirements set forth in 10 C.F.R. Part 1003, *Office of Hearings and Appeals Procedural Regulations*, Subpart G, 10 C.F.R. § 1003.70, *et seq.* If Western Allied does not petition the Office of Hearings and Appeals for review within 30 calendar days of receipt of this FNOV, Western Allied relinquishes any right to appeal any matter in the FNOV, and the FNOV, including the civil penalty assessed, will constitute a final order.

Civil Penalty Remittance

If Western Allied decides not to contest the FNOV, the penalty of \$56,000 must be paid within 30 calendar days after receipt of this FNOV by check, draft, or money order payable to the Treasurer of the United States (Account 891099) and mailed to the Acting Director, Office of Enforcement, Attention: Office of the Docketing Clerk, U.S. Department of Energy, 19901 Germantown Road, Germantown MD 20874-1290. This FNOV will constitute a final order upon the payment of the civil penalty.



John S. Boulden III
Acting Director
Office of Enforcement
Office of Health, Safety and Security

Washington, DC
this 3rd day of September 2009