Operating Experience Summary

U.S. Department of Energy
Office of Health, Safety and Security
OE Summary 2011-08
November 4, 2011

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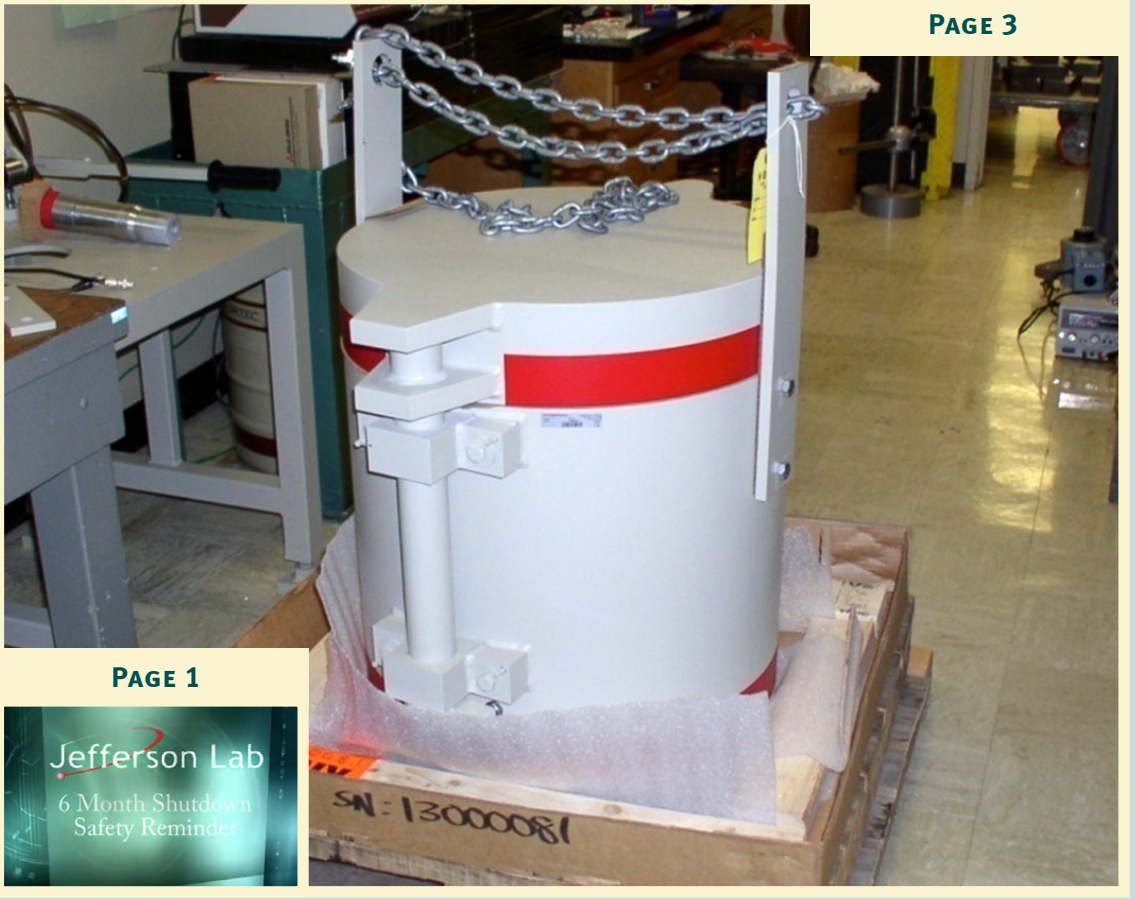

Utilizing Well-known, Credible Co-workers for Site-wide Video Communications

1

The following article, which was written by the Department of Energy's Thomas Jefferson National Accelerator Facility (JLab), describes a good work practice that they recently instituted. In preparation for an upcoming six month, scheduled accelerator shutdown, JLab decided to use well-known, credible site personnel to deliver high priority safety messages in a video, with the belief that delivery and endorsement of safety messages by well-known, exemplary personnel would drive behavior across the site.

After reading the article, we encourage you to visit the Operating Experience Summary *Blog at* http://oesummary.wordpress.com *and rate the article in terms of value to you and provide a comment on the article and/or identify topics that would be of interest to you for future articles.*

We also encourage readers to submit articles of their own for sharing in the Operating Experience Summary. *Please let us know if you have something to share.*

The Thomas Jefferson National Accelerator Facility (also known as Jefferson Lab or JLab) has used many of the traditional approaches for communicating safety information to its workers, such as messages from Senior Management or members of the Environment, Safety, Health and Quality (ESH&Q) Organization. However, during the planning for an upcoming 6 Month Scheduled Accelerator Shutdown (SAD), JLab tried a different approach, specifically enlisting the help of well-known, credible Laboratory co-workers in a short video entitled, "6 Month Shutdown Safety Reminder" (see Figure 1-1).

Given the complex nature of the SAD hazards and planning, the relatively large number of people working within the confines of the accelerator tunnel, and the tight schedules associated with the 6 month SAD, the potential for accidents was high. Specifically, the high volume of work included electrical, rigging and material transport tasks that involved up to 100 people per day coordinating work in a relatively small, tightly enclosed area. The timing was right for a new communication method, with Lab Management anticipating that endorsement from credible personnel would increase the efficacy and outreach of the safety message. The video was initially used to supplement the many daily morning work planning and safety meetings, which were held as part of Laboratory operations, but it was later sought out by co-workers who had learned of the video via word-of-mouth. With the video presenters attending these meetings, the new method also fostered an open atmosphere where discussion and improvement ideas were freely shared.

Figure 1-1. Screenshot of the title screen of the video

To prepare for the videotaping, management approached a select group of Subject Matter Experts (SME) and asked them to participate. Each SME was well established at the Laboratory, both on professional and personal levels, and held positions from technical disciplines to management. Given their previous experience with numerous SADs, each selected a topic that they felt was a high priority and which they were comfortable discussing. Briefing plans were then put together and filming locations and taping lengths decided upon. Edits for video length were made, with the selected topics meeting the video objectives. Figures 1-2, 1-3, and 1-4 are screenshots showing the SMEs presenting their selected topics.

Video Presentation

The final video was presented at an Accelerator Division daily meeting, a large "tool box" forum where the integrated work plan for the day is presented and discussed. The video was also

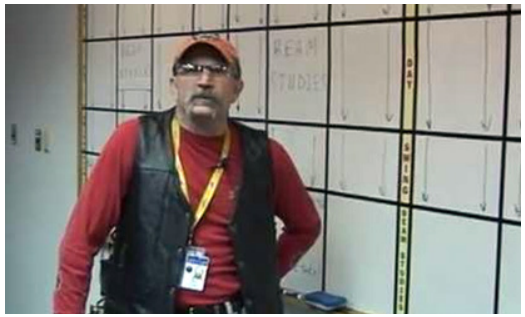

Figure 1-2. Screenshot of the video clip on pre-job planning and situational awareness

Figure 1-3. Screenshot of the video clip on lifting and moving heavy loads

Figure 1-4. Screenshot of the video clip on ladder and tool safety

pushed to the site via targeted, job-specific email lists tied to the Laboratory's Lessons Learned database. The video has now been viewed about 400 times (i.e., by about 50 percent of the affected personnel). Since this viewership is over four times the normal hit rate for any given lesson learned, management deemed the video, or more specifically the production concept, to be very effective in presenting the information to the intended audience and will incorporate similar ideas into future work.

There are several reasons for this success, the most important of which was the endorsement and credibility of the presenters. Other critical factors included the message focus and short video length.

This video has been made available to the DOE Complex as a lesson learned, as well as on the Operating Experience wiki site at http://operatingexperience.doe-hss.wikispaces.net/. Another link to view Jefferson Laboratory's 6 Month Shutdown Safety Message Video in its entirety is http://www.youtube.com/watch?v=Dnuv1g_ForQ.

KEYWORDS: Safety message, video, Subject Matter Expert, SME, 6 Month Shutdown Safety Reminder, Scheduled Accelerator Shutdown, SAD, lessons learned, good work practice

ISM CORE FUNCTIONS: Analyze the Hazards, Provide Feedback and Continuous Improvement

Avoid Lifting Incidents: Use a Crane Rated for the Load

2

The following article describes multiple lifting incidents at different Department of Energy (DOE) sites where there was a mismatch between the capacity of the equipment being used in a lift and the weight of the object being lifted. To ensure the safety of workers, assumptions should never be made about the capability of lifting equipment, and work scopes and work control documents must be complete to ensure that all hazards have been identified and controlled.

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The safety of workers involved in rigging and hoisting operations largely depends upon care and common sense. Two safe practices are essential: (1) know the safe working load capacity of the equipment being used and never exceed its limit and (2) determine the weight of the load before attempting to lift it. Chapter 8 of DOE-STD-1090-2007, *Hoisting and Rigging Standard*, provides safety standards for the safe use of hoisting and rigging equipment at Department of Energy (DOE) sites. The standard can be accessed at http://www.hss.doe.gov/nuclearsafety/techstds/docs/standard/std1090-07_index.html.

The following event is an example where these safe practices were not followed.

On December 9, 2010, at the Lawrence Livermore National Laboratory (LLNL) Physical and Life Science Directorate (PLS), two workers threaded a chain through the lifting arm anchor holes of a 2,600-pound lead shielding cover and attempted to lift it with a portable shop crane that was undersized for the weight of the shielding. Figure 2-1 shows the shielding cover, and Figure 2-2 shows the undersized shop crane. The workers had placed approximately 18, 25-pound lead bricks at the rear of the hoist to provide stability and a counterbalance, but once they began the lift, they realized that they could not reach the desired height because of the weight of the cover and the configuration of the lifting operation. When the cover was approximately 1.5 feet off the ground, a Health and Safety Technician came into the area and told the workers to lower the load because of safety concerns. (ORPS Report NA--LSO-LLNL-LLNL-2010-0061; final report issued January 24, 2011)

After work was stopped, an Industrial Safety Engineer determined that the crane was not suitable for the lift. The metal plate on the unit, which lists the model number and capacity, was unreadable, but it was clear that the crane was not rated for the 2,600-pound lead shielding cover and that using an unrated chain threaded through the lifting arm anchor holes instead of a spreader bar was not an appropriate lift configuration. PLS Management identified this event as a near miss and initiated a management review to determine what led to the event.

Opportunities for Work Control and Training Improvements

In addition to the issues with the lifting operation and lift configuration, the management review team determined that work control issues contributed to this event. For example, both workers relied more on their previous experience than on work control documents. Each reviewed a different work control document that he believed was applicable to the hoisting operation, but neither realized that the hoist they used was not covered in

Figure 2-1. 2,600-pound lead shielding cover (note chain threaded through lifting arms)

Figure 2-2. Shop crane used in the attempted lift

either document. Both workers indicated that they were not aware of any special institutional guidance or procedures governing shop cranes, which led to problems with a lack of awareness about controls (e.g., crane inspections and certifications) and the general hazard identification process. Both also believed that using a hoist was a fairly routine operation. They had routinely performed similar operations in previous jobs, often with little or no documented safety requirements, and had used similar "hoists" at home.

A lack of training also contributed to this event. Neither worker received required training to operate the crane because of an assumption made when developing their training plans that hoists were not cranes and thus specific training was not required. Neither worker had the knowledge required to make a proper decision given the environment, equipment, and hoisting requirements. These and other issues led the management review team to identify opportunities for organizational improvements.

Opportunities for Organizational Improvement

The management team identified several latent organizational weaknesses that contributed to the event, including the availability of an aged shop crane that had not been identified, inspected, and labeled as required. In addition, both work control documents the workers reviewed had incomplete work scopes that did not include all tasks. Lifting a pre-manufactured shield, for example, was not a consideration under the scope of work, so no controls existed to manage the hazards that might be involved. Management oversight issues also contributed to this event. One of the workers had no experience making requests for hoisting and rigging services at LLNL, but, because his supervisor was unavailable due to medical problems, he attempted to figure out the process by himself and therefore made independent decisions that he believed would facilitate more timely installation of the equipment.

Corrective Actions

Following this event, the shop crane was tagged out of service to ensure that it would not be used for any lifting activities in the future. Management also developed a number of corrective actions to address the identified organizational weaknesses. Because neither worker was properly trained or qualified to perform the lift, they will be appropriately trained and qualified for performing similar future tasks. In addition, management will have all work supervisors review their Integration Work Sheets to ensure that the training requirements for lifting are identified and all affected employees are current with their training.

Both workers had based their action on previous experience where controls were not as rigorous and hazards were not

emphasized. In addition to discussing this issue with the two workers, management will ensure that supervisors clearly flow down expectations to workers and information will be disseminated about the potential hazards of applying previous work experience to new tasks. The hazards of lifting will also be clarified in applicable documentation and expectations for pre-job briefings will be standardized throughout the workers' division. Confusing oversight roles had also contributed to this event, and steps will be taken to improve communications, as well as an adequate level of management oversight.

The impact of this event provided management with a new perspective about handling "historic or rarely occurring" work tasks. The event demonstrated that when initiating or reviewing work control (or other safety) documentation, aspects related to these historic or rarely occurring activities should be an important part of discussions among workers, supervisors, and other knowledgeable staff members. Managers will now proactively look at authorized work in the organization to see if there are other potential historic or rarely-occurring activities that have not been recognized as such and will ensure they are addressed in the applicable documentation.

Similar Hoisting and Rigging Events

Hanford High Level Waste Facility

The most recent hoisting event where lifting capacity was exceeded occurred on March 31, 2011, at the Hanford High Level Waste Facility. After carpenters flipped and lowered a 5,637-pound formwork panel, they discovered one of the two wedge clips securing a double duty lift bracket had failed. Facility event investigators found that each of the double-duty lift brackets had a maximum lifting capacity of 2,000 pounds and that the lift configuration exceeded the rated capacity of the brackets. (ORPS Report EM-RP--BNRP-RPPWTP-2011-0006; final report issued May 25, 2011, revised on July 13, 2011)

Investigators learned that the carpenters had previous success using this lift configuration and incorrectly assumed that they could complete the lift using only two lift brackets and save time. Investigators also determined that the manufacturer's installation instructions for the formwork panels indicated that the panels are assembled with three double-duty lift brackets installed. Further, investigators found that the crew should have realized that, because the formwork had three lift brackets, using a lift configuration with only two brackets was not appropriate. Supervisory issues also contributed to this event. Investigators determined that supervisors did not adequately assess the lifting task to decide where interaction with the carpenters might be needed and, therefore, did not appoint a Person in Charge as the procedure required. Had they followed the procedure, the Person in Charge likely would have intervened and prevented the event.

The following hoisting and rigging events that occurred in 2009 also resulted from a mismatch between the weight of the load and the capacity of the lifting device.

Paducah Gaseous Diffusion Plant

On April 30, 2009, at the Paducah Gaseous Diffusion Plant, a subcontractor drilling crew was hoisting a drill stem off the floor of a box truck when the cable to the air-actuated hoist broke, allowing the drill stem to fall to the floor. Investigators determined that the capacity of the hoist and cable assembly was 300 pounds and the drill stem weighed approximately 800 pounds. Investigators learned that the inspectors and operators did not compare the equipment rating with the weights of the tooling to be lifted. Inspections were performed as required, but they were not function-specific, and inspectors did not recognize that the equipment was being loaded in excess of its recommended safe working load. Although the subcontractor operators were not formally trained in hoisting and rigging, they had sufficient knowledge and experience to inspect and

use the hoisting equipment in accordance with the manufacturer instructions, which were readily available, stated the hoist capacity, and directed users not to exceed the capacity limit for safe operation. Investigators learned that when a contractor Hoisting and Rigging Subject Matter Expert inspected the lifting assembly, he apparently ascertained only the condition of the equipment and did not evaluate its use for the intended application. (ORPS Report EM--PPPO-PRS-PGDPENVRES-2009-0004; final report submitted June 24, 2009)

Waste Isolation Pilot Plant

On January 22, 2009, at the Waste Isolation Pilot Plant, waste handling personnel were using a forklift to lift a shield bell from the top of a telescoping port shield when the forklift tilted forward and damaged waste handling equipment. The shield bell weighed 7,510 pounds, and the rated capacity of the forklift was 7,100 pounds. A critique revealed that personnel assigned to perform the task did not know the exact weight of the shield bell or where the forklift's weight identification tag was located. Also, workers had developed a common "shorthand" method of identifying the capacity ratings of site forklifts that did not reflect the correct lifting capacity. In this event, for example, workers referred to the forklift they used as a "4-ton" forklift, but the actual rating capacity was 7,100 pounds, not 8,000 pounds (4 tons). In addition, pre-job briefings about reinstalling the shield bell involved using a 6-ton forklift, but when one was not available, the operator assumed that a 4-ton forklift was adequate for the task. The operator based his assumption on having previously used a 4-ton forklift to remove the shield bell successfully. Investigators also determined that management hoisting and rigging policies, guidance, and expectations were not well-defined, understood, or enforced. (ORPS Report EM-CAFO--WTS-WIPP-2009-0001; final report issued July 29, 2010)

Recommendations

All of these events had at least one thing in common: the mismatch between the capacity of the equipment being used in the lift and the weight of the object being lifted. Both the inspectors and the workers involved in lifting operations must be aware of the exact weight of the load and the rated load capacity of the equipment being used before a lift is attempted. Manufacturers' operating instructions should be reviewed and the faceplate on the equipment should be checked to ensure the weight of the load and load capacity are compatible. Most importantly, assumptions should not be made about the capability of lifting equipment based on previous experience with similar equipment or lifting operations, and work scopes and work control documents must include all tasks to ensure that hazards are identified and controlled.

Management policies, guidance, and expectations should be well defined and enforced, as well as understood by workers. It is important to develop training plans that provide workers with training specific to all tasks that they will perform and will ensure that they have the knowledge required to make decisions that take into account the equipment they will be using and the requirements that must be met. All workers, but especially new workers, should be made aware of actions to take and whom to contact if their primary supervisor is unavailable, so that they are not in a position of making independent decisions that may lead to unsafe behaviors.

KEYWORDS: Shop crane, shielding cover, lift, hoist capacity, undersized, near miss

ISM CORE FUNCTIONS: Analyze the Hazards, Develop and Implement Controls, Perform Work within Controls

The Office of Health, Safety and Security (HSS), Office of Analysis publishes the *Operating Experience Summary* to promote safety throughout the Department of Energy (DOE) complex by encouraging the exchange of lessons-learned information among DOE facilities.

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