# OPERATING EXPERIENCE SUMMARY

## Inside This Issue




**U.S. Department of Energy**

**Office of Environment, Safety and Health**

**OE Summary 2004-23**

**November 29, 2004**

The Office of Environment, Safety and Health, Office of Corporate Performance Assessment publishes the Operating Experience Summary to promote safety throughout the Department of Energy complex by encouraging the exchange of lessons-learned information among DOE facilities.

To issue the Summary in a timely manner, EH relies on preliminary information such as daily operations reports, notification reports, and conversations with cognizant facility or DOE field office staff. If you have additional pertinent information or identify inaccurate statements in the Summary, please bring this to the attention of Frank Russo, 301-903-8008, or Internet address Frank.Russo@eh.doe.gov, so we may issue a correction. If you have difficulty accessing the Summary on the Web (URL http://www.eh.doe.gov/paa), please contact the ES&H Information Center, (800) 473-4375, for assistance. We would like to hear from you regarding how we can make our products better and more useful. Please forward any comments to Frank.Russo@eh.doe.gov.

The process for receiving e-mail notification when a new edition of the OE Summary is published is simple and fast. New subscribers can sign up at the following URL: http://www.eh.doe.gov/paa/oesummary/subscribe.html. If you have any questions or problems signing up for the e-mail notification, please contact Richard Lasky at (301) 903-2916, or e-mail address Richard.Lasky@eh.doe.gov.

## EH Publishes "Just-In-Time" Reports

The Office of Environment, Safety and Health recently began publishing a series of "Just-In-Time" reports. These two-page reports inform work planners and workers about specific safety issues related to work they are about to perform. The format of the Just-In-Time reports was adapted from the highly successful format used by the Institute of Nuclear Power Operations (INPO). Each report presents brief examples of problems and mistakes actually encountered in reported cases, then presents points to consider to help avoid such pitfalls.

1. Deficiencies in identification and control of electrical hazards during excavation have resulted in hazardous working conditions.
2. Deficiencies in work planning and hazards identification have resulted in electrical near misses when performing blind penetrations and core drilling.
3. Working near energized circuits has resulted in electrical near misses.
4. Deficiencies in control and identification of electrical hazards during facility demolition have resulted in hazardous working conditions.
5. Electrical wiring mistakes have resulted in electrical shocks and near misses.
6. Deficiencies in planning and use of spotters contributed to vehicles striking overhead power lines.

The first six Just-in-Time reports were prepared as part of the 2004 Electrical Safety Campaign. In April, the Office of Environment, Safety and Health published a Special Report on Electrical Safety. The purpose of this report is to describe commonly made electrical safety errors and to identify lessons learned and specific actions that should be taken to prevent similar occurrences. This report can be accessed at http://www.eh.doe.gov/paa/reports/Electrical_Safety_Report-Final.pdf.

EH plans to issue more Just-in-Times soon on other safety issues, such as lockout and tagout, fall protection, and freeze protection. All of the Just-in-Times can be accessed at http://www.eh.doe.gov/paa/jit.html.

## EVENTS

### 1. RIGGING ERRORS A FACTOR IN RECENT HOISTING & RIGGING EVENTS

Two hoisting and rigging events occurred at DOE facilities in November. One event involved a failure to rig the load in accordance with the approved lift plan; the other event involved an error in the lift calculation for center of gravity. There were no injuries in either event.

On November 24, 2004, at the Idaho Nuclear Technology and Engineering Center, two lifting slings were damaged during an operation to lift and move a 29-ton fuel shipping cask. Operators were conducting a dry run of procedures to prepare for fuel transfers. They noticed the slings were damaged while removing them at the completion of the lift. (ORPS Report ID--BBWI-FUELRCSTR-2004-0006)

Two operators and an equipment operator/rigger were performing the dry run. They rigged the cask, then used an overhead crane to lift it from a trailer and place it into a transfer cart. The three operators were in close proximity to the cask during the lift so they could remove the cover plates on the transfer car and help guide the cask through the opening.

A review of the lifting plan revealed that the nylon slings were improperly attached to a steel lifting attachment, which cut into the slings. The plan directed attaching the slings using a basket arrangement (from the shackles on a spreader bar, through the lifting attachment, and directly back to the shackle). Instead, the rigger attached the slings in a choker arrangement, which was specified in the lift plan for an alternate lifting attachment.

Preliminary information from the investigation shows that a lift of this type had not been performed in approximately 9 months and that the instructions in the lifting plan may not have been well defined. Also, the rigger used blotter paper for sling protection, which proved inadequate to prevent damage to the slings (Figure 1-1). The rigger and the Person-In-Charge signed the lift plan indicating that the rigging had been properly installed; however,

*Figure 1-1. Synthetic web sling damaged by sharp edges of steel lifting attachment*

the Person in Charge did not actually verify that the load was rigged in accordance with the plan.

On November 19, 2004, at the Rocky Flats Environmental Technology Site, a work crew was lifting the top section of a tank when the load pivoted more than expected because the center of gravity was not calculated correctly. A 15-foot buffer area that had been established as a safety precaution ensured that all personnel were clear of the area at the time of the event. The load was lowered and placed in a safe configuration. (ORPS Report RFO--KHLL-371OPS-2004-0028)

A demolition crew was removing an old plenum deluge receiving tank from a sub-basement area. The 8,000-pound tank had been sectioned in half to allow it to pass through a floor opening for placement on cribbing at the basement level. The crew was lifting the top section of the tank when the load pivoted. Riggers were using two reverse-boom cranes with wire rope attached to shackles on the load. They had also attached a chainfall, using a nylon sling. The chainfall was to be used to rotate the tank onto its side allowing it to pass through a floor opening) and set it on the cribbing. After the tank was lifted about 5 feet, the crew started to tip the tank with the chainfall. The tank suddenly accelerated and inverted because it was top heavy.

Investigators determined that the lift engineer, who is a master rigger, made an error in calculating the center of gravity of the load. The engineer relied on engineering drawings of the tank and did not perform a walkdown to visually check the load for any configuration differences. The actual configuration included six blank flanges that were bolted to tank nozzles. The metal flanges and bolts added approximately 250 pounds and were not included on the engineering drawings; therefore, they were not accounted for in the calculations.

A recovery plan was developed and engineering personnel performed a new calculation. Future critical lifts will include walkdowns and independent verification of calculations.

Guidance for proper care and use of slings can be found in Chapter 11, "Wire Rope and Slings," of DOE-STD-1090-2004, *Hoisting and Rigging Standard (Formerly Hoisting and Rigging Manual)*. Section 11.3.5.j states that synthetic web slings can be cut by repeated use around sharp-cornered objects. Chapter 2, "Critical Lifts," provides requirements for conducting critical lifts and defines the responsibilities of the Person-in-Charge. These responsibilities include identifying the item to be moved; providing the weight, dimension, and center of gravity of the load; and identifying operating equipment and below-the-hook lifting devices.

*These events underscore the importance of following the approved lift plan and ensuring that the rigging selection and configuration are correct. The Person-In-Charge should conduct a physical check of the load to verify its configuration during the walkdown of the load movement path. Calculations for weight and center of gravity should be checked for accuracy as part of the lift plan review process.*

***KEYWORDS:*** *Lift plan, sling, critical lift, center of gravity, chafing protection, verification*

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

## *2. NEAR MISS — SECTION OF PIPING UNTHREADS AND BECOMES A MISSILE*

On November 19, 2004, at the Idaho Test Reactor Area, a section of blowdown line for a compressed air receiver tank unthreaded from a pipe nipple and flew approximately 70 feet, striking a dumpster. An operator was bleeding air from the air receiver through the blowdown line at the time of the event. There were no injuries. (ORPS Report ID--BBWI-ATR-2004-0014)

The operator was performing a functional test on the automatic start feature of the air compressor controllers. The test required the operator to bleed air from the air receiver tank through the blowdown line connected to the bottom of the receiver (Figure 2-1) until the pressure lowered to the start setpoint for the compressors. The receiver was pressurized to 130 psig at the start of the test. After the operator partially opened the ball valve on the blowdown line, he saw the piping start to rotate and unthread from the nipple. He immediately vacated the area, exiting just as the line blew off and became a missile.

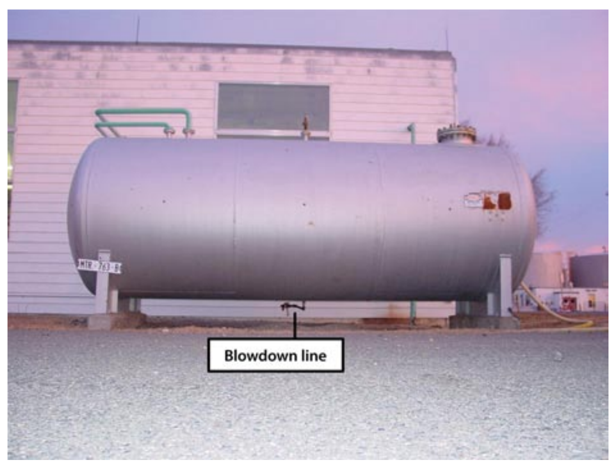


***Figure 2-1. Compressed air receiver tank viewed from the direction of the garbage dumpster***

After the air in the tank completely bled down, workers reattached the pipe and placed a lock and a danger tag on the blowdown valve.

Investigators inspected the tank site and found that the blowdown pipe was not anchored to prevent movement. The blowdown line piping arrangement consists of a nipple at the bottom of the tank, a 4-inch length of pipe, a 90-degree elbow, a 30-inch length of pipe, another 90-degree elbow, a 2-inch length of pipe, a ball valve, and a 4-inch length of pipe. Figure 2-2 shows the blowdown line after it was reattached to the tank.


***Figure 2-2. Configuration of blowdown line with locked and tagged ball valve***

The existing piping configuration allowed the reaction of the escaping air to rotate the pipe in the unthreaded (counter-clockwise) direction. The hole in the ground was produced by air escaping from the nipple after the line blew off.

The blowdown valve is operated each week to check for moisture accumulation in the tank. At some point, the blowdown line had been modified from a short pipe and valve pointing downward from the tank to the current configuration. Apparently the configuration was changed so the operators would not have to go underneath the tank to access the valve, as well as to alter the discharge path away from the dirt to eliminate the hazard of flying debris. However, the modification did not include a support or pipe restraint to prevent movement. A work order was prepared to reconfigure and anchor the piping to prevent recurrence.

*This event underscores the importance of using proper piping supports and restraints. Piping that is subject to jet forces, flow-induced vibration, or equipment-induced vibration should be adequately restrained and supported to prevent movement to ensure the integrity of the system and prevent a missile hazard. Piping system modifications should be reviewed to ensure that adequate pipe supports are considered in the design. In general, all potential hazards should be evaluated when planning facility modifications and these changes should be reviewed for safety, environmental, and mission impacts. Modifications should be approved by the appropriate design authority before implementation.*

***KEYWORDS:*** *Near miss, pipe, missile, compressed air, pipe support, restraint, blowdown*

***ISM CORE FUNCTIONS:*** *Analyze the Hazards, Develop and Implement Hazard Controls*

## 3. NEAR MISS — RUNNING LINE ON BRIDGE CRANE HITS POWER CONDUCTOR

On November 9, 2004, at the Rocky Flats Environmental Technology Site, workers attempted to lift a load, and a crane running line (hoist wire rope) came in contact with one phase of three exposed conductors that supplied 480-volt power to the crane. Power to the crane was immediately interrupted when a fuse blew and a circuit breaker tripped as designed. There were no injuries, and none of the personnel involved in the lift received an electrical shock. (ORPS Report RFO--KHLL-D&DOPS-2004-0013)

As part of ongoing equipment dismantlement, workers were removing a splitter gearbox from a rolling mill. The workers had already rigged and removed the gearbox cover and an intermediate shaft and were in the process of lifting another shaft. A yellow nylon sling attached one end of the shaft to the hook, and a chainfall and blue nylon sling attached the other end to the hook. The chainfall was to be used to level the load as it was lifted because the gearbox was located adjacent to a wall. Figure 3-1 shows the rigged shaft.

The crane was positioned against the east stop; the operator's cab was on the west rail, approximately 40 feet away. The running line was at about a 5-degree angle from the crane to the east and in close proximity to the power conductors. When the master rigger directed


*Figure 3-1. Gearbox shaft and rigging*

the crane operator to "bump up" to put tension on the crane, one of the running lines arced to the B phase power conductor and they fused together (Figure 3-2).

The crane is a 35-ton, overslung, bridge crane, manufactured by Moffett and installed in 1955. The conductors are bare copper and are attached to the crane rail by insulators that stand off approximately 4 inches, with 8 inches of separation between phases. The B phase is the lowest of the three conductors and the closest to the running lines.

Although the investigation is not complete, the following causal factors have been identified.

- Although the Job Hazard Analysis (JHA) for the dismantlement work mentioned overhead hazards from a generic perspective, there was no specific discussion in the JHA regarding the proximity of energized conductors when the crane was operated with the trolley full to the stops.

- The work crew was aware of the energized conductors and believed there was sufficient clearance to make the lift without additional barriers (e.g., rubber mats or lockout/tagout) or considering other lifting options.

- Having the load block at 5 degrees off vertical (towards the conductors) resulted in one of the running lines being within 4 inches of the bottom conductor.

- This model crane hoist has only one speed, making fine movement control difficult. When the operator bumped up on the control to take the slack out of the running lines, contact was made with the energized conductor, tripping power to the crane and to lights in the building.

Corrective actions will include reviewing the JHA for working with cranes to ensure that it addresses safe working distances around electrical conductors and any controls that would be required. Work crews will be briefed on this event and on any JHA changes. Inspectors will check other onsite cranes for similar construction.

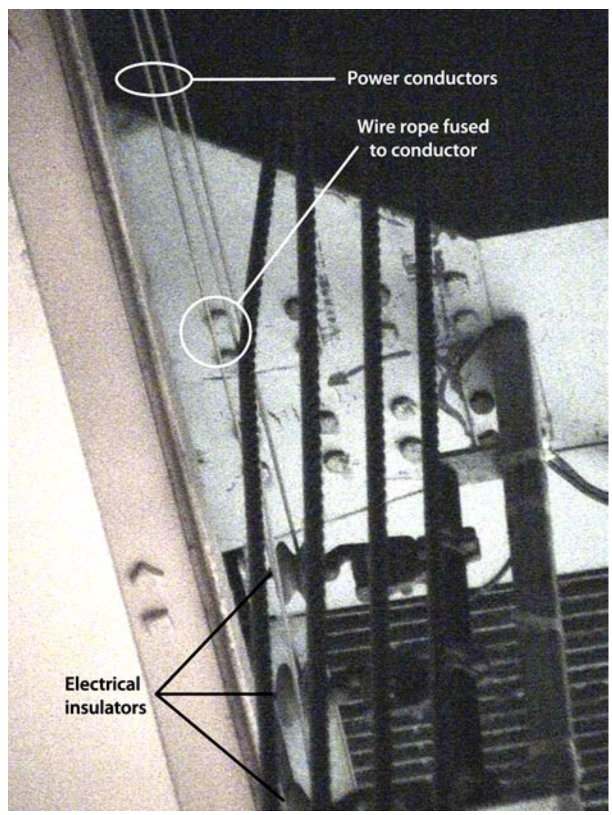


*Figure 3-2. Looking at the hoist cables from below the crane*

*This event illustrates the importance of ensuring that JHAs identify hazards associated with a specific activity and identify, evaluate, and implement effective barriers to protect workers from these hazards. Workers also need to consider the "what if" associated with their actions, decisions, and consequences. If an overarching JHA is not specific enough to address risks associated with the hazards of a given task, work should stop until it can proceed safely.*

***KEYWORDS:*** *Electrical safety, arc, crane, wire rope, hoisting and rigging, near miss, job hazard analysis*

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

## *4. SOME MSA FALL PROTECTION PRODUCTS MAY BE DEFECTIVE*

On October 28, 2004, Mine Safety Appliances (MSA) issued a Stop Use and Return Notice, as well as a Stop Use and Inspect Notice, for some of their Self-retracting Lanyards (SRLs) and Rescuers. The products involved are Dyna-Lock® SRLs and Dynevac®, Dynevac II, and Lynx® Rescuers.

The Stop Use and Return Notice stemmed from an MSA investigation that revealed that housing subassemblies in some 70-foot SRLs and 95-foot Rescuers were improperly manufactured by a supplier. Although the units will lock in the event of a fall, MSA discovered that the line extension (deceleration distance) exceeds the MSA-specified distance of 40 inches. This condition occurs in only a small percentage of the units, and there have been no incidents or injuries related to the problem. However, MSA must open and examine the units to identify any problems and fix them.

The following MSA fall protection products (manufactured between January 1, 2001, and October 8, 2004) are included in the Stop Use and Return Notice.

- MSA 22 M (70 ft) and 30 M (95-ft) Dyna-Lock SRLs—part numbers 506206 through 209, 506332 and 33, 10006463 through 446, 10036240, 10038662, 10040501 through 504, and 10042287, 10051447 through 49
- MSA 30 M (95 ft) Dynevac Rescuer—part numbers 506606, 506218, 506444, 10006448, 10006462, and 10040549
- MSA 30M (95 ft) Dynevac II Rescuer—Part numbers 10007789, 10021517, 10053024, and 10040549
- MSA 30M (95 ft) Lynx Rescuer—part numbers 10011745, 10023017, 10038475, 10044389, and 10060977

Units manufactured outside the specified time periods may continue to be used, as no problem has been identified in any of these units. In addition, all units with a green torque seal on the torque nut may continue to be used, as they have already been inspected.

Users of the affected SRLs and Rescuers should immediately remove them from service and inspect them to identify the date of manufacture and to determine whether a green torque seal is present. Figure 4-1 shows the location of the date label and the green torque seal.

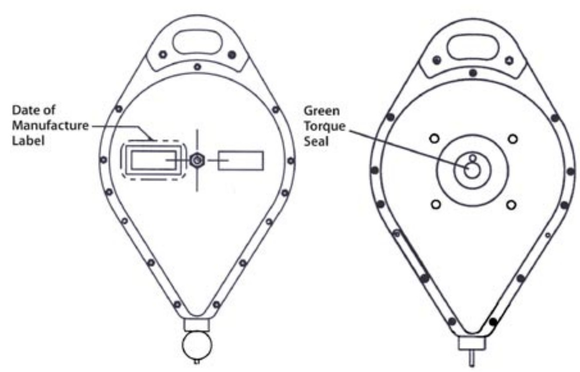


***Figure 4-1. Location of date label and torque seal***

MSA customer service will make arrangements for the return and service of all affected units. They will be inspected and repaired, and the original unit or a replacement will be returned to the customer within 4 working days.

MSA customer service will make arrangements for the return and service of all affected units. They will be inspected and repaired, and the original unit or a replacement will be returned to the customer within 4 working days.

The Stop Use and Inspect Notice applies to 30-foot Dyna-Lock SRLs and to 50-foot Dynevac, Dynavac II, and Lynx Rescuers manufactured between June 1, 2004, and September 30, 2004. Some of these units may have the same problem with the housing subassemblies as those included in the recall. Units with a green torque seal have already been inspected and are not subject to the Notice. (Refer to Figure 4-1 for the location of the date label and torque seal.)

MSA has provided two inspection options, either of which is acceptable. The options are as follows.

**Self-Inspection** – Request an inspection kit from MSA Customer Service. The kit will allow you to perform an in-field inspection to determine whether the condition is present. The kit includes a special tool to check the unit, as well as detailed instructions (including a video CD) for performing the inspection.

**Service Center Inspection** – Contact MSA Customer Service and arrange to return the unit to MSA or to an authorized service center. The unit will be inspected, repaired (if necessary), and returned within 3 days of receipt.

The following units are subject to the Stop Use and Inspect Notice.

- MSA 30-ft and 50-ft Dyna-Lock SRLs — part numbers 506202 through 05, 506330 and 31; 10006467 through 70; 10038856; 10040477 through79; 10040500, 10044348, 10051445, 10051446, 10051450, and 10052661
- MSA 50-ft Dynevac Rescuer — part numbers 506605, 506558, 0006449, and 10006460
- MSA 50-ft Dynevac II Rescuer — part numbers 10007782 and 10048523
- MSA 50-ft Lynx Rescuer — part numbers 10011744 and 10023016

Both the Stop Use and Return and Stop Use and Inspect Notices can be accessed on the MSA web site. The DOE Office of Environment, Safety and Health has also issued Data Collection Sheet (DCSs) 821, 822, and 829 on these issues.

To return a unit for inspection or replacement, contact MSA Customer Service. In the United States and Mexico, call (303) 975-2314; in Canada call (888) 396-1067.

*Managers and supervisors should review the MSA notices carefully and take the appropriate steps if these fall protection products are currently in use or available for use.*

***KEYWORDS:*** *Self-retracting lanyards, rescuers, fall protection*

***ISM CORE FUNCTION:*** *Provide Feedback and Continuous Improvement*

This page is intentionally blank.

## Commonly Used Acronyms and Initialisms

| Agencies/Organizations | |
|---|---|
| ACGIH | American Conference of Governmental Industrial Hygienists |
| ANSI | American National Standards Institute |
| DOE | Department of Energy |
| DOT | Department of Transportation |
| EPA | Environmental Protection Agency |
| INPO | Institute for Nuclear Power Operations |
| NIOSH | National Institute for Occupational Safety and Health |
| NNSA | National Nuclear Security Administration |
| NRC | Nuclear Regulatory Commission |
| OSHA | Occupational Safety and Health Administration |
| SELLS | Society for Effective Lessons Learned |

| Units of Measure | |
|---|---|
| AC | alternating current |
| DC | direct current |
| psi (a)(d)(g) | pounds per square inch (absolute) (differential) (gauge) |
| RAD | Radiation Absorbed Dose |
| REM | Roentgen Equivalent Man |
| v/kv | volt/kilovolt |

| Job Titles/Positions | |
|---|---|
| RCT | Radiological Control Technician |

| Authorization Basis/Documents | |
|---|---|
| JHA | Job Hazards Analysis |
| NOV | Notice of Violation |
| SAR | Safety Analysis Report |
| TSR | Technical Safety Requirement |
| USQ | Unreviewed Safety Question |

| Regulations/Acts | |
|---|---|
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| RCRA | Resource Conservation and Recovery Act |
| D&D | Decontamination and Decommissioning |
| DD&D | Decontamination, Decommissioning, and Dismantlement |

| Miscellaneous | |
|---|---|
| ALARA | As low as reasonably achievable |
| HVAC | Heating, Ventilation, and Air Conditioning |
| ISM | Integrated Safety Management |
| ORPS | Occurrence Reporting and Processing System |
| PPE | Personal Protective Equipment |
| QA/QC | Quality Assurance/Quality Control |