OPERATING EXPERIENCE SUMMARY

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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.

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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. GAUGE ON PRESSURIZED PIPING SYSTEM BECOMES A PROJECTILE

On December 8, 2004, at the Savannah River H Tank Farm, a pressure gauge on a piece of breathing air equipment blew off and flew through the air, landing behind the mechanic who was attempting to remove the gauge. The mechanic was not aware that the system was still pressurized as he unthreaded the gauge. Fortunately, the mechanic was not struck when the gauge went airborne, but his hardhat was knocked off. (ORPS Report SR--WSRC-HTANK-2004-0038; final report filed December 20, 2004)

The mechanic was tasked with replacing a broken inlet pressure gauge on a breathing air ice barrel, which is a portable piece of equipment that uses ice to provide cooled air to workers wearing bubble suits. The ice barrel consists of an insulated stainless steel drum with an internal cooling coil. A cooling pipe penetrates the wall of the barrel at opposite sides and consists of an inlet and outlet pressure gauge, isolation valve, air filter, and quick-disconnect fittings. The work was to be performed under a simple maintenance protocol that allowed for less stringent controls (no lockout/tagout) and skill-of-the-craft.

When the mechanic walked down the job the previous day, he noticed the barrel was disconnected from a temporary breathing air compressor. That evening, night shift operators started up the breathing air compressor to get moisture out of the system and prepare it for the next morning's work. When the mechanic went to the job site to replace the gauge, he found the barrel connected to the air compressor but isolated by a valve. The mechanic then made two mistakes. First, he looked at the deficient pressure gauge and saw zero pressure; second, he never positively verified that the system was depressurized by checking the outlet gauge or venting the ice barrel.

DO NOT ASSUME that a system is depressurized. Always verify that stored energy has been relieved and cannot re-accumulate.

Investigators could not conclusively determine whether the isolation valve had leaked and pressurized the piping in the ice barrel or whether the operators had opened the valve when they started up the air compressor and then closed it when they saw no pressure indication on the gauge. A deficiency tag or out-of-service tag would have alerted operators and the mechanic of the deficient gauge. The mechanic stated that he was not aware that the air compressor was running.

Preliminary causal factors include the following primary and contributing causes.

Primary causes:

- There was a lack of communications among the shift manager, operators, and personnel during the pre-job briefing regarding the deficient gauge.
- The mechanic attempted to replace the pressure gauge on a pressurized system without a lockout/tagout.
- The standard work release protocol was not followed. A work request was not issued for the gauge and therefore the job did not move through the work control process, which would have included a hazards screening and lockout screening.

Contributing causes:

- The mechanic failed to verify that the system was depressurized.
- The pressure gauge was not tagged to indicate that it was defective. Because the ice barrel is portable, the inlet and outlet pressure gauges do not have a serial number to allow it to be tracked and tagged as defective.
- A pre-job briefing for replacing the gauge was not conducted.
- The gauge was replaced using a "Fix-It-Now" scope code with no work release.

A search of the ORPS database for similar occurrences identified the following events.

On November 30, 2004, an engineer at the Savannah River Central Laboratory used a pipe wrench to tighten a leaking pipe union on a steam condensate line for an air handling unit without a lockout/tagout in place and with the piping pressurized to 15 psig. Although this is a low-pressure system, the condition of the piping and hazard was not known, and a failed union or broken pipe could have had serious consequences. (ORPS Report SR--WSRC-CLAB-2004-0005)

On June 16, 2004, maintenance workers at the Savannah River H-Tank Farm were removing a level switch from an intercooler on an air compressor. When they applied a lubricant to help loosen pipe unions, the workers saw air bubbles leaking from a union that was downstream of the isolation points, indicating that the system was still pressurized. The automated hazards analysis did not address this hazard or specify a controlled venting method. Also, the lockout/tagout order did not alert the workers to the potential for residual pressure trapped in the system. (ORPS Report SR--WSRC-HTANK-2004-0022)

The following are examples of events where no energy verification was performed or where the system was believed to be depressurized.

A worker at the Sandia National Laboratory was hit in the forehead by a bolt that was expelled from a trigger assembly he was troubleshooting. The worker was removing bolts on a cover plate while the trigger assembly was still pressurized at 20 psi with an insulating gas. Investigators determined that the worker failed to verify zero energy and relieve the pressure. Facility safety personnel concluded that lockout procedures are not always applied to pressurized systems as rigorously as they are to electrical systems and that the verification step of the standard lockout procedure is often left out. (ORPS Report ALO-KO-SNL-9000-1999-0001)

A maintenance mechanic at the Waste Isolation Pilot Plant discovered that a compressed air system he was about to work on was pressurized to the full operating pressure of 120 psi. The mechanic believed the system was depressurized because operators had locked and tagged it out of service; however, the operators failed to vent the system and remove residual pressure in accordance with the lockout procedure. (ORPS Report ALO--WWID-WIPP-1996-0004)

Section 4.2.3.3 of DOE-STD-1030-96, *Guide to Good Practices for Lockouts and Tagouts*, states that systems, portions of systems, and components that operate at temperatures and pressures above ambient should be vented and, if necessary, drained or cooled. Section 4.5.1 states that potentially hazardous stored or residual energy must be relieved, disconnected, restrained, or otherwise rendered safe. If it is possible for stored energy to re-accumulate, a means should be provided for workers to verify that a safe level exists until they complete the work. This guidance is also repeated in DOE Order 5480.19, Change 2, *Conduct of Operations Requirements for DOE Facilities*, chapter IX, "Lockouts and Tagouts," section 6.e, "Stored Energy."

These events illustrate the potential hazards to personnel who knowingly or unknowingly work on pressurized systems or isolated systems that contain stored energy. It is important for workers to verify that proper isolation boundaries have been established and that stored energy has been relieved before starting work. Facility managers should ensure that their expectations for the lockout/tagout program are effectively communicated and enforced. These expectations should include attention to detail, verbatim compliance, effective communications, and defense-in-depth.

KEYWORDS: *Lockout, tagout, pressurized, air, residual, missile, near miss*

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

2. REGULATORY COMPLIANCE ISSUES ASSOCIATED WITH STORING REACTIVE CHEMICALS

The Office of Environment, Safety and Health (EH) published an article in OE Summary 2003-23 on the management and control of

shock-sensitive or reactive (unstable) chemicals. One facet of such management and control that the article did not discuss was that at the time of disposal, such chemicals may be subject to the hazardous waste regulations (40 CFR Parts 260 through 270 or equivalent state regulations), which are implemented by the EPA or authorized States pursuant to Public Law 94-580, the Resource Conservation and Recovery Act (RCRA).

Solid wastes are defined in 40 CFR 261.2(a)(1), as "any discarded material that is not excluded by §261.4(a) [materials which are specifically identified as not being solid wastes] or that is not excluded by §§260.30 and 260.31 [variances from classification as solid wastes]."

Section 261.2 further explains that a discarded material is "any material that is abandoned by being disposed of, burned, or incinerated, or accumulated, stored, or treated (but not recycled) before, or in lieu of, being abandoned by being disposed of, burned, or incinerated."

McCoy and Associates, in *RCRA Unraveled*, explain the definition as follows.

> "…a material is abandoned and is a solid waste if it is accumulated, stored, or treated before or in lieu of being disposed, burned, or incinerated…Such abandoned materials are typically obsolete chemicals or products in facility warehouses or tanks."

The event described in the 2003 OE Summary article occurred at Oak Ridge National Laboratory (ORNL) when a researcher synthesized silver azide in 1994 for an experiment, but did not use all of it. He then placed the 5 grams that were left over into glass vials wrapped with black electrical tape to keep out light and added a top layer of water to stabilize the material.

The OE Summary article explained that, years later, when the researcher decided to dispose of the silver azide, he learned that the vials should have been stored in an explosives magazine due to the shock-sensitive nature of the silver azide. (ORPS Report ORO--ORNL-X10CENTRAL-2003-0006)

The article provided other examples of shock-sensitive chemicals in DOE laboratories (peroxide-forming chemicals and picric acid) that had been improperly managed. References to guidance on the proper procedures for handling and controlling such materials were supplied. However, the article did not describe the steps needed to properly dispose of shock-sensitive chemicals in compliance with applicable RCRA regulations.

As a shock-sensitive chemical, silver azide exhibits one of several attributes listed in 40 CFR 261.23 to define the reactivity characteristic for hazardous wastes. For example, silver azide is readily capable of detonating, explosively decomposing, or reacting at standard temperature and pressure. Accordingly, silver azide, if not excluded from regulation as a hazardous waste, must be transported, treated, stored, and disposed of in compliance with the RCRA hazardous waste regulations applicable to reactive wastes (EPA hazardous waste code D003).

Because State and Federal hazardous waste regulations are complex and because the risks of personnel injury, environmental harm, or incurring penalties for noncompliance are significant, laboratory personnel planning to dispose of shock-sensitive or reactive chemicals should consult a qualified environmental or waste management expert to ensure that they are following proper waste characterization and management procedures.

The DOE Environmental Policy and Guidance web page provides guidance at the following URL: http://www.eh.doe.gov/oepa/index.html (select "Policy & Guidance," then "Resource Conservation and Recovery Act" from the *Regulatory Area* dropdown list). This web page also contains guidance on other environmental issues that may pertain to managing shock-sensitive or reactive chemicals, such as pollution prevention and reporting onsite storage of certain hazardous substances in quantities that exceed specified threshold limits.

A search of the ORPS database for events involving shock-sensitive and reactive chemicals disclosed 13 events over the past 13 years, which are briefly summarized below.

- An ORNL laboratory technician found a leaking lecture bottle of hydrogen fluoride

in a metal cabinet. Investigators concluded that the hydrogen fluoride had slowly reacted with iron in the storage bottle wall over time, causing hydrogen gas to build up and leak through the main seal of the bottle. The root cause of this event was researchers' lack of knowledge about storing hazardous chemicals. (ORPS Report ORO--ORNL-X10CENTRAL-2003-0010)

- Waste characterization workers at Savannah River found over 100 bottles of p-dioxane, a known peroxide-forming liquid that had been stored in seventeen 55-gallon drums in 1985 (Figure 2-1). The hazardous chemical content was not identified on the waste manifest. (ORPS Report SR--WSRC-SW&I-2003-0002; OE Summary 2003-03)

- At the Pacific Northwest National Laboratory (PNNL), workers cleaning out a laboratory before renovation found crystallized perchloric acid forming around the top of a 100-ml glass-stoppered reagent bottle. Investigators concluded that the acid was stored for several months in a cabinet containing ammonium hydroxide, with which it apparently reacted. Subject matter experts, working with a recovery team, developed a recovery plan to hydrolyze the crystals, which was completed safely. (ORPS Report RL--PNNL-PNNLBOPER-1998-0017)

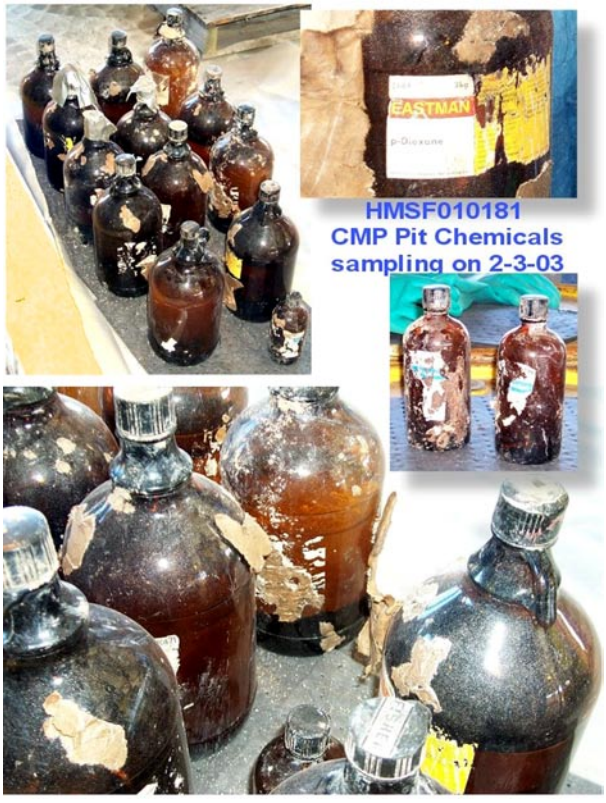

Figure 2-1. Bottles of p-dioxane

- Two bottles of perchloric acid that had begun to crystallize were found at LANL during a project for identifying and dispositioning legacy materials at the Laboratory. The bottles were safely transported to an appropriate facility and destroyed. (ORPS Report ALO-LA-LANL-CMR-1998-0022)

- A researcher at ORNL discovered a broken glass container that was identified as lithium perchlorate, which is potentially explosive in solid form. The bottle had been left in a chemical cabinet after the researcher who had previously used it retired. (ORO--ORNL-X10WEST-1997-0010)

- At Rocky Flats, an industrial hygienist evaluating chemicals for reactivity discovered a five-gallon container of methyl isobutyl ketone (MIBK) that tested positive for reactive peroxides at about 50 ppm. Ferrous ammonium sulfate was added to the container to neutralize the peroxides and an antioxidant was added to prevent further peroxide formation. (ORPS Report RFO--KHLL-371OPS-1996-0037)

- Because of the thousands of chemicals that have been stored at Rocky Flats Building 779 over the years, facility management recognized the potential for unsafe storage and began a rigorous identification and management process. Chemical inventorying found phosphorus pentoxide, (violently reactive with water), metallic potassium (highly reactive and peroxide-forming) stored in oil that had evaporated, 2-diphenyl-1-picrylhydrazyl (shock-sensitive), and 2-butoxyethanol (peroxide-forming). (ORPS Report RFO--KHLL-779OPS-1996-0039, -0045, -0055, -0070)

- Site personnel at Oak Ridge Institute for Science and Education found two 2½-liter bottles containing perchloric acid that had begun to crystallize. The bottles were found

during a facility walkthrough in a waste storage building. The acid was neutralized by a professional team working on site. (ORPS Report ORO--ORAU-ORISE-1995-0005)

- A small container containing less than 200 grams of picric acid that had crystallized around the cap was found in a building at the Lovelace Biomedical and Environmental Research Institute on the Kirtland Air Force Base. An Explosive Ordnance Disposal unit removed the container and successfully detonated it. Investigators concluded that at some time in the past, the picric acid container was moved to a chemical warehouse where it was not properly maintained. (ORPS Report ALO-KO-ITRI-LOVELACE-1995-0001)

- At Rocky Flats, two members of a corporate operational readiness review inspection team found two one-liter cans of isopropyl ether (a peroxide-former) in a storage cabinet. One can was clearly labeled with a manufacturer's expiration date of 3/77. The inspection was terminated and management notified. (ORPS Report RFO--EGGR-ANALYTOPS-1991-1003)

DOE Handbook DOE-HDBK-1139/1-2000, *Chemical Management* (Change 1, September 2004) describes shock-sensitive and reactive chemicals and their management. Although each chemical has different properties and requires handling appropriate to those properties, the Handbook makes clear that facilities must inventory and manage every chemical they hold. An important part of chemical management is regularly inspecting containers for signs of deformation, bulging, or degradation. A suggested practice when synthesizing unstable chemicals is to produce only as much as needed, and immediately destroy the rest. When a hazardous material no longer has an identified use, it must be evaluated to determine its regulatory status (i.e., determine if it is subject to hazardous waste management requirements).

The U.S. Chemical Safety and Hazard Investigation Board published a report in 2002 (*Hazard Investigation – Improving Reactive Hazard Management*, Report No. 2001-01-H, October 2002) in which it analyzed 167 accidents involving reactive chemicals that occurred between January 1980 and June 2001. In 48 of those accidents, a total of 108 people were killed. Causes and lessons learned were reported in only 20 percent of the accidents. However, more than 60 percent of those accidents that did include causal information reported inadequate hazard identification and analysis. More significantly, nearly half involved inadequate procedures for storing, handling, or processing chemicals. The report recommends that OSHA, the National Fire Protection Association (NFPA), and EPA take steps to more clearly define, record, and manage reactive chemical hazards.

These events illustrate the importance of adhering to environmental regulations as well as to safety regulations. Personnel who synthesize or prepare chemicals or materials should consult a subject matter expert to discuss disposing of the remainder. These personnel also need to recognize that hazardous materials for which no specific planned use has been identified may be hazardous waste. Recognizing and complying with our regulatory responsibilities can help prevent adverse events by ensuring that we properly inventory, maintain, and dispose of shock-sensitive and reactive chemicals.

KEYWORDS: *RCRA, regulatory, hazardous waste, shock-sensitive, reactive, time-sensitive, chemical management*

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

3. GOOD PRACTICES: PREVENT SLIP-AND-FALL INJURIES ON ICE

The Office of Environment, Safety and Health has identified 15 accidents resulting in significant injuries that were reported in ORPS since January 2003 that occurred when workers slipped and fell on icy surfaces. An article in OE Summary 2004-19, entitled *Reminder: Seasonal Weather Changes are on the Way*, warned workers to be aware of icy conditions and advised facilities to take steps to make sure walkways are kept as clear as possible.

The predominant contributing cause of these accidents was the failure of facilities or injured workers to identify the hazardous condition and take steps to correct it. For example, workers fell because they took shortcuts or were distracted by carrying objects that affected their balance and their ability to break their fall or catch themselves.

Significantly, one-third of these accidents occurred at the Kansas City Plant (KCP) in a 6-week period in January and February 2004. KCP safety personnel immediately formed a Six Sigma Team of about 15 individuals from a variety of disciplines, such as safety, security, maintenance, and purchasing, to examine the accidents and discover ways to prevent future accidents. The following are some of the corrective actions that KCP has devised and undertaken.

- Installed heat trace wire under main sidewalks and ramps.
- Formalized snow and ice removal and treatment procedures that specify material (water-based ice melt) and equipment to be used.
- Developed detailed instructions for all personnel before, during, and after snow events.
- Strengthened and clarified the subcontractor scope of work for clearing walkways and increased subcontractor responsibility for monitoring walkway and parking lot conditions. The subcontractor was required to provide its work and safety plan for KCP approval and satisfactorily conduct a performance test before selection.
- As a priority, sidewalks are cleared during shift changes and all piled snow is removed from parking lots to prevent melt and re-freeze issues.
- Installed about 20-30 signs around the plant that turn blue at 39°F and become bluer as the temperature drops (illustrated in Figure 3-1).
- Developed annual online training with tips on staying safe during winter weather conditions (e.g., being prepared and wearing proper winter attire including footwear).

Figure 3-1. Visual temperature indicator

- Established personnel at entry routes to provide assistance.
- Established the ICEY Hot Line for reporting concerns.
- Encouraged personnel safety intervention; for example, ice melt is available at all gates for anyone to use.
- Used a subcontractor's meteorologist to alert them to approaching bad weather.

Although wintry precipitation can cause hazardous conditions, most slips and falls can be prevented or mitigated by taking a few simple precautions. The Office of Environment, Safety and Health encourages both site management and workers to take all possible safety measures so that accidents can be avoided. (See tips for walking safely in icy conditions on the following page.)

DOE Safety Advisory from the Assistant Secretary for Environment, Safety and Health

John Spitaleri Shaw

Protect Yourself in Icy and Inclement Weather

Wear boots or overshoes with gripping soles.

Do not walk with your hands in your pockets. This reduces the ability to use your arms for balance if you slip.

Take short deliberate shuffling steps in very icy areas.

Don't walk on uneven surfaces. Avoid ice-covered curbs.

Try to walk on snow rather than on ice.

Don't talk on a cellular phone while walking on snow or ice. Give your full attention to walking.

Report any unsafe conditions to facilities personnel (e.g., the need for salt or snow removal).

Be extra careful when getting out of your vehicle. Steady yourself on the doorframe until you have gained your balance.

Don't take shortcuts. Always use sidewalks and the cleared paths in parking lots.

When walking after dark or in shadowed areas, be alert for black ice.

Use handrails for balance wherever available.

If you must walk in the street, walk against traffic.

4. PROPER PROCUREMENT AND USE OF CHEMICALS

On October 19, 2004, at the River Protection Project, a painter working for a subcontractor at the Waste Treatment Plant construction site was over-exposed to methylene chloride, which he brought onsite without authorization from the subcontractor safety representative. The painter was using the solvent to clean painting equipment parts in a closed shop. (ORPS Report RP--BNRP-RPPWTP-2004-0022; final report filed December 1, 2004)

The painter spent approximately 2 hours in the closed shop (with end doors open) cleaning the equipment. A safety representative conducted industrial hygiene monitoring in the painter's breathing zone during this time. Two days later the monitoring results came back and showed a work shift (10 hours) time-weighted average (TWA) exposure of 62 parts per million (ppm), which exceeds the Federal limit. The painter was informed of the monitoring results.

Methylene chloride (CH_2CL_2), also known as dichloromethane, is a volatile, colorless liquid with a chloroform-like odor. The most common means of exposure is inhalation and skin exposure. OSHA (29 CFR 1910.1052) considers methylene chloride a potential carcinogen. The Standard requires employers to ensure that no employee is exposed to an airborne concentration in excess of 25 ppm as an 8-hour TWA or 125 ppm short-term. Employers are also required to supply a respirator to each person whenever an exposure is likely to exceed these limits.

Investigators determined that the painter went to a local auto supply store and procured the cleaning product and brought it to the construction site to test it out. He used the product without following the subcontractor's established safety rules and procedures. The painter did not wear a respirator, active ventilation was not provided, and other engineering controls were not used.

The event exposed a weakness in the procurement process whereby an off-the-shelf product was purchased by an individual and brought onsite for use. Site and project safety, health, and environmental procedures require a review of the Material Safety Data Sheet (MSDS) before chemicals are brought onto the site.

As a corrective action, the subcontractor will develop and establish a procurement requisition procedure. The procedure will include a chain of control that must be signed by the construction superintendent, safety manager, QC manager, and project manager before materials can be purchased and brought to the construction site.

On May 27, 2004, at the Portsmouth Gaseous Diffusion Plant, a subcontractor employee brought a small plastic dropper bottle filled with bleach from his home to sanitize a drinking water dispenser. He confused the bottle of bleach with a bottle of saline solution he uses to moisten his eyes, and accidentally dropped bleach in his right eye. (ORPS Report ORO--BJC-PORTENVRES-2004-0010; final report filed August 16, 2004)

Investigators learned that the employee needed only a small amount of bleach to sanitize the drinking water dispenser, so he decided to bring bleach from home rather than go through the procurement process and obtain a larger-than-needed quantity that would have to be included in the hazardous material inventory. As a corrective action, the subcontractor will procure a small container of liquid bleach (and its MSDS) for the water dispensers. The subcontractor will also ensure that the bleach is properly inventoried and stored.

These events underscore the importance of properly procuring chemicals and hazardous materials for use onsite. The procurement and use of hazardous materials should be authorized. An MSDS, which provides information about chemical ingredients, reactivity, transportation, disposal, health hazards, control measures, and fire and explosion data, should be reviewed and maintained on file. Also, the use of secondary containers should be limited and controlled. Secondary containers should be correctly labeled as to their contents and properly disposed of when no longer needed.

KEYWORDS: *Methylene chloride, exposure, MSDS, procurement, chemicals, industrial hygiene*

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

OE SUMMARY 2004-23 (Published 11/29/04)

Title	OR Number
Rigging Errors a Factor in Recent Hoisting & Rigging Events	ID--BBWI-FUELRCSTR-2004-0006
Near Miss—Section of Piping Unthreads and Becomes a Missile	ID--BBWI-ATR-2004-0014
Near Miss—Running Line on Bridge Crane Hits Power Conductor	RFO--KHLL-D&DOPS-2004-0013
Some MSA Fall Protection Products May Be Defective	N/A

OE SUMMARY 2004-22 (Published 11/15/04)

Title	OR Number
Rebar Curtain Collapse Results in Near-Miss Event	RP--BNRP-RPPWTP-2004-0009
Type A Accident Investigation of Subcontractor Fatality	SR--WSRC-CMD-2004-0003
Dangers of Airborne (Respirable) Silica	N/A
Confined Space Can Kill	N/A

OE SUMMARY 2004-21 (Published 11/01/04)

Title	OR Number
Lead Exposure—A Continuing Danger	N/A
Work Planning and Communication Issues Identified in Type B Accident Investigation	ALO--WTS-WIPP-2004-0011
Induced Voltage Fatal to Electrical Lineman	N/A
Unsafe Ladder Usage Continues to Cause Fall Injuries	N/A

OE SUMMARY 2004-20 (Published 10/18/04)

Title	OR Number
Worker Struck in Face by Ejected Dewar Plug	SR--WSRC-FSSBU-2004-0005
Lockout/Tagout Violation—Locking Device Defeated	ORO--BNFL-K33-2004-0003
Performing Work within Controls Enhances Safety	N/A
Safety Tips for Heating with Electrical Space Heaters	N/A

OE SUMMARY 2004-19 (Published 10/04/04)

Title	OR Number
Inadequate Equipment Isolation Results in Electrical Shock	CH-BH-BNL-NSLS-2004-0002
Recent Trend Involving Decoupled Fifth Wheels	N/A
OSHA Issues Safety and Health Bulletin on Wire Form Anchorage Connectors	N/A
Reminder: Seasonal Weather Changes Are on the Way	N/A

OE SUMMARY 2004-18 (Published 09/20/04)

Title	OR Number
Type A Accident Investigation Following Fatal Fall from Ladder	RL--PHMC-GENREAL-2004-0005
Energized Wire Cut During Demolition	RFO--KHLL371OPS-2004-0022
Unexpected Excavator Bucket Releases Result in Fatalities	N/A
Near Miss—Lead-Acid Battery Failure	SR--WSRC-FBLINE-2004-0004

OE SUMMARY 2004-17 (Published 09/07/04)

Title	OR Number
Near Miss—Carpenter Cuts Pressurized Nitrogen Line	SR--WSRC-HTANK-2004-0029
Expect Asbestos in Renovation and D&D Activities	ALO-KO-SNL-NMFAC-2004-0005 SR--WSIS-SECFOR-2004-0002
Helicopter Accident Prompts Investigation	N/A
PNNL Re-Examines Laboratory Safety Performance Following Near Miss	RL--PNNL-PNNLNUCL-2004-0004

OE SUMMARY 2004-16 (Published 08/09/04)

Title	OR Number
Failure to Inspect Piping System Results in Fatal Steam Accident in Japan	N/A
Electrical Arc Results in Minor Flash Burns	ALO-AO-BWXP-PANTEX-2004-0046
Excavation Workers Breach Water Pipe with Heavy Equipment	RL--PHMC-PFP-2004-0012
Cut Power Cords Can Result in Severe Electrical Shocks	N/A

OE SUMMARY 2004-15 (Published 07/26/04)

Title	OR Number
Good Practice: Wear a Seat Belt When Operating Forklifts and Heavy Equipment	ORO--BJC-PGDPENVRES-2004-0010 ALO-LA-LANL-2004-0009
Unsafe Crane Operation Results in Failed Sling	ALO-KO-SNL-NMFAC-2004-0003
Inadequate Work Planning Results in Heavy Equipment Accidents	N/A
Improper Grounding During Welding Results in Electrical Shock	CH-AA-ANLE-ANLEPFS-2004-0002

OE SUMMARY 2004-14 (Published 07/12/04)

Title	OR Number
Set the Parking Brake to Prevent Runaway Vehicles	OH-FN-FFI-FEMP-2004-0020
Modified Radiological Check Sources May Leak	SR--WSRC-HPIH-2004-0001
Near Miss—Crane Cable Unwraps from Hoist Drum	CH-AA-ITSI-ANLEITSI-2004-0001
Using Multimeters Safely on Energized Circuits	N/A

OE SUMMARY 2004-13 (Published 06/28/04)

Title	OR Number
Near Miss—Explosive Squib Fires While Being Connected	SR--WSRC-SS&ES-2004-0001
Lesson Learned: Dislodged Air Purifying Respirator Filter	N/A
Hoisting and Rigging Events Continue to Occur	N/A
Good Practice: Conducting Drills Helps Workers Respond to Adverse Events	N/A

OE SUMMARY 2004-12 (Published 06/14/04)

Title	OR Number
Non-Compliant Scaffold Results in Worker Injury	ID--BBWI-TAN-2004-0002
Unauthorized Safety System Modifications	ORO--SURA-TJNAF-2004-0003
Field-Modified Equipment Overturn	SR--WSRC-CMD-2004-0002
Compressed Gas Cylinder Safety	N/A

OE SUMMARY 2004-11 (Published 05/31/04)

Title	OR Number
Worker Injured When Personnel Hoist Falls	OH-FN-FFI-FEMP-2004-001
Lack of Configuration Management Results in Near Misses	N/A
Suspect/Counterfeit Items Awareness	N/A
Inadequate Planning Led to Exposure and Illness	ALO-LA-LANL-TA55-2003-22

OE SUMMARY 2004-10 (Published 05/17/04)

Title	OR Number
Falling Objects Can Be Dangerous to Workers	N/A
Roll-Up Door Failures Result in Near Misses	N/A
Use Care to Avoid Hand Injuries	OAK--LLNL-LLNL-2004-0020 ORO--ORNL-X10NUCLEAR-2004-0001
Beryllium Can Be Found Anywhere	N/A

OE SUMMARY 2004-09 (Published 05/03/04)

Title	OR Number
Careless Forklift Operation Can Be Hazardous and Result in Damage	RFO--KHLL-WSTMGTOPS-2004-0005
Following Procedures Is Essential to Safety	N/A
Worker Injury from Unsafe Ladder Use	OAK--SU-SLAC-2004-0003
Take Steps to Prevent Acetylene Leaks	ID--BBWI-SMC-2004-0003

OE SUMMARY 2004-08 (Published 04/19/04)

Title	OR Number
Unusual Valve Handle Configuration Leads to Valve Position Errors	RL--PHMC-SNF-2004-0016
OSHA Standard for Trench Shoring/Sloping Not Followed	OAK--SU-SLAC-2004-0001
Accumulation of Oil in Compressed Air System Results in Fire	ALO-AO-BWXP-Pantex-2003-0043

OE SUMMARY 2004-07 (Published 04/05/04)

Title	OR Number
Expect the Unexpected During D&D Work	OH-MB-BWO-BWO04-2004-0004
Near Miss—Buried 13.8-kV Cable Struck by Drilling Rig Bit	ALO-KC-AS-KCP-2004-0013
Take Action to Change Safety Performance	ALO-KO-SNL-1000-2004-0001
Improperly Applied Foaming Agent Causes Excessive Heat Buildup	RFO--KHLL-D&DOPS-2004-0003

OE SUMMARY 2004-06 (Published 03/22/04)

Title	OR Number
AZTEC Battery Chargers May Apply Voltage to Metal Cases	RL--PHMC-PFP-2004-0006
Personnel Error Causes Laser Eye Injuries	N/A
Lack of Ground Fault Protection Leads to Failure of Heat Trace Junction Box	Y-2004-OR-BJCOP-0301
DOE Joins Nation in Declaring May Electrical Safety Month	N/A

OE SUMMARY 2004-05 (Published 03/08/04)

Title	OR Number
Wiring Error Results in Electrical Shock	RP--BNRP-RPPWTP-2003-0006
Near Miss to Scalding When Steam Leaks from Pipe Flange	SR--WSRC-HCAN-2003-0030
Fall Protection Near Miss	RP--BNRP-RPPWTP-2004-0004
Pipefitter's Foot Injury Results in Type B Accident Investigation	ORO--BNFL-K31-2003-0003

OE SUMMARY 2004-04 (Published 02/23/04)

Title	OR Number
Electrician Violates Electrical Work Safety Controls	RL--PHMC-SOLIDWASTE-2003-0008
Lack of Eye Protection Results in Serious Eye Injury	RP--CHG-TANKFARM-2004-0006
Use of Inappropriate Tools Leads to Injuries	CH-BH-BNL-PE-2003-0017 ORO--ORNL-X10CENTRAL-2003-0009
First-Aid Procedures Not Followed after Acid Burn	SELLS Identifier 2004-SR-WSRC-004

OE SUMMARY 2004-03 (Published 02/09/04)

Title	OR Number
Mishandling Smear Samples Results in Spread of Radioactive Contamination	ORO--BJC-X10ENVRES-2003-0016
Valve Lineup Errors Cause Near Misses	N/A
New Furnace is Probable Cause of Carbon Monoxide Exposure	ALO-LA-LANL-FIRNGHELAB-2003-0013
Recent Hoisting and Rigging Events Result in Near Misses	N/A

OE SUMMARY 2004-02 (Published 01/26/04)

Title	OR Number
Gas Line Punctured During Unscheduled Excavation Work	ALO-LA-LANL-ADOADMIN-2003-0005
Good Practice: Impound Salvaged Suspect/Counterfeit Bolts to Prevent Reuse	N/A
Near Misses and Adverse Events Are Precursors to Severe Accidents	NVOO--BN-NLV-2003-0001
Pressurized Air Line Cut During D&D Activities	RFO--KHLL-PUFAB-2003-0019

OE SUMMARY 2004-01 (Published 01/12/04)

Title	OR Number
Sealed Drum Pressurized by Change in Altitude	CH-AA-ANLW-2004-0002
Multiple Fall Protection Violations at Demolition Project	OH-FN-FFI-FEMP-2003-0018
Improper Eye Protection Results in a Near Miss	ALO-LA-LANL-RADIOCHEM-2003-0015
Lockout/Tagout Problems Traced to Need for a Common Procedure	RL--PHMC-SNF-2003-0019

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