Los Alamos NATIONAL LABORATORY EST. 1943

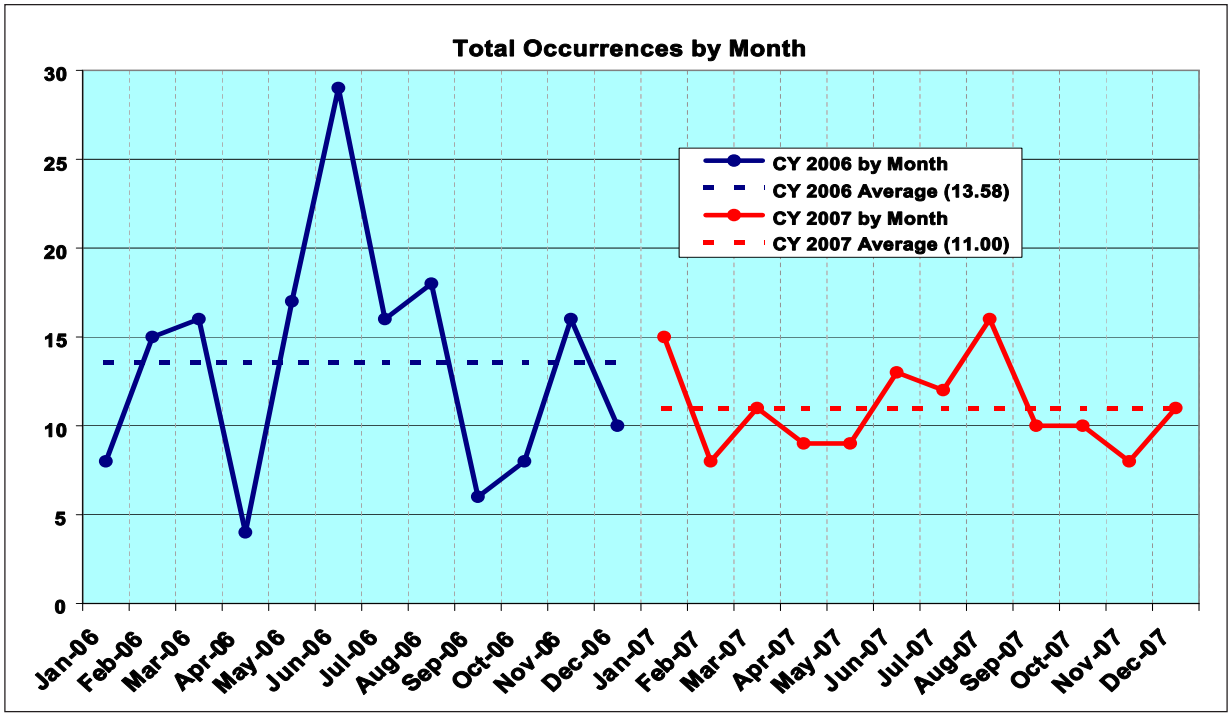
MIRROR

FY 2008

1st Quarter

Reflections on the Trends, Causes, and Lessons Learned from LANL and DOE Occurrence Reports and Other Significant Events

Published by the ESH&Q Integration Office (ESH&Q-IO)



Please see Page 2 for more information about the data represented in this chart.

INSIDE:

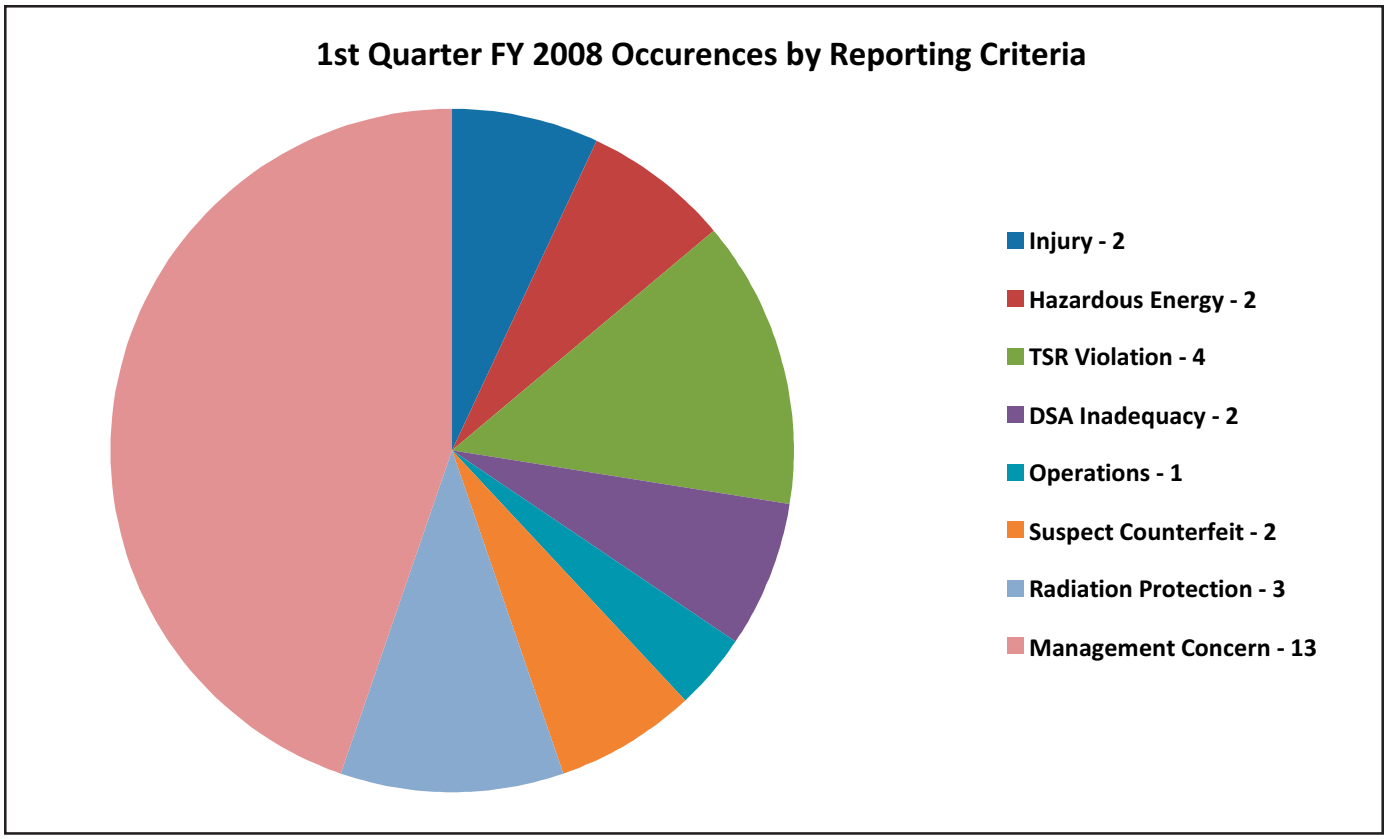
Summaries of New LANL Occurrences.....Page 3
DOE Operating Experience.....Page 10
Final ORPS Report Analysis.....Page 16
LANL Security Feature.....Page 18
News and Announcements.....Page 21

About the cover . . .

The chart on the cover shows the total number of events that have been reported to the Department of Energy through the Occurrence Reporting and Processing System (ORPS) in calendar year (CY) 2007. The program ensures (1) the timely identification, categorization, notification, and reporting of safety, environment, health, or operations events related to DOE-owned and -leased facilities and (2) the processing of event information to identify, as appropriate, causal factors, corrective actions, and lessons learned to prevent similar occurrences.

There were 132 total occurrence reports in CY 2007 as compared to 163 in CY 2006. The average was 11.00 per month for CY 2007 and 13.58 for CY 2006. Although this represents a decrease of 19 percent, the change is not statistically significant.

The chart below shows the distribution of the 29 occurrences during the 1st quarter of FY 2008, by reporting criteria.



The "Mirror" addresses each of these categories in detail with information on the reporting criteria, trending information, and summary descriptions of each event.

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LANL is a Department of Energy Laboratory.

No matter where you are in the DOE Complex, there are lessons to be learned from one another. If you have lessons of interest or situations that were mitigated or prevented by using the lessons learned, please let us know. Contact lcollier@lanl.gov or lujan_clarence_e@lanl.gov.

For more lessons learned information and resources, the LANL Lessons Learned Resources page is located at *http://int.lanl.gov/projects/lessons_learned/*. This provides access to the LANL lessons learned database and to other resources throughout the DOE Complex.

Contact Linda Collier at 667-0604 to request hard copy distribution of the LANL Mirror. The LANL Mirror is available online at *mirror.lanl.gov* or *http://int.lanl.gov/orgs/qa/oa/mirror_archives.shtml*.

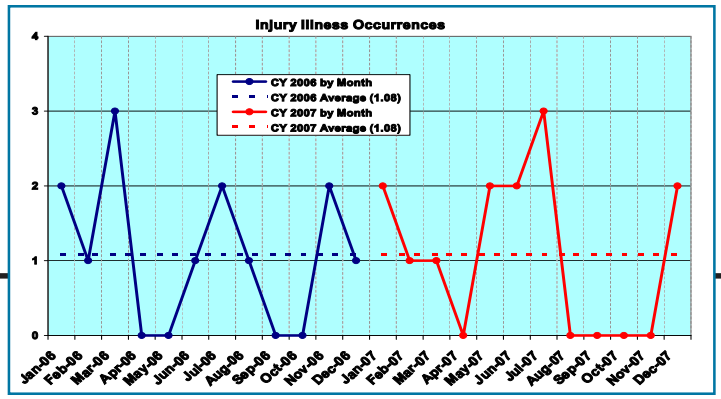
FIRST QUARTER FY 2008 NEW LANL OCCURRENCES

From 10/01/07 to 12/31/07, LANL experienced 29 new events that were reportable according to DOE Order 231.1A "Environment, Safety, and Health Reporting." These events are contained in 29 occurrence reports, which were grouped into 8 categories based on Occurrence Reporting and Processing System (ORPS) reporting criteria: Injury/Illness (3), Uncontrolled Hazardous Energy (2), TSR Violation (4), DSA Inadequacy (2), Operations (1), Counterfeit Item (2), Radiation Protection (3), and Management Concern (13). The following is a description of each category and a summary of each associated report:
(NOTE: The investigations for many of these new occurrences may not have been completed by press time. Consequently, the summaries generally do not include the causes and corrective actions for the event and associated lessons learned. This information is included in final occurrence reports.)

The following generally describes each significance category: **SIGNIFICANCE CATEGORY 1** - Occurrences that have a *significant impact* on safe facility operations, worker or public safety and health, regulatory compliance, or public/business interests. **SIGNIFICANCE CATEGORY 2 -** Occurrences that have a *moderate impact* on safe facility operations, worker or public safety and health, regulatory compliance, or public/business interests. **SIGNIFICANCE CATEGORY 3 -** Occurrences in that have a *minor impact* on safe facility operations, worker or public safety and health, regulatory compliance, or public/business interests. **SIGNIFICANCE CATEGORY 4 -** Occurrences that have *some impact* on safe facility operations, worker or public safety and health, public/business interests. **SIGNIFICANCE CATEGORY R -** Occurrences identified as *recurring*, as determined from the periodic performance analysis of occurrences across a site.

ORPS CRITERIA 2A SERIOUS INJURY/ ILLNESS EVENTS

Only serious personnel injury or illness events are reported in ORPS. They represent less than 5 percent of the employee injuries and illnesses that are classified as Occupational Safety and Health Administration (OSHA) recordable cases which are reported to DOE through the Computerized Accident/Incident Reporting System (CAIRS). These usually involve broken bones, internal injuries, chemical exposures requiring medical treatment, or hospitalization.



Slip on Ice Results in Broken Ankle

NA-LASO-LANL-WASTEMGT-2007-0014

(Significance Category 3) On December 14, 2007, a worker stepped onto a patch of black ice that was covered with a light dusting of snow and fell and sustained a broken ankle while walking towards the TA-54 Area G Operations Center on a pedestrian walkway. Salt had been applied to the area but the ice had not started to melt. The worker was wearing steel-toed boots with an aggressive tread appropriate for entry into Area G and the weather conditions. All work activities involving outdoor tasks were postponed until weather conditions improved.

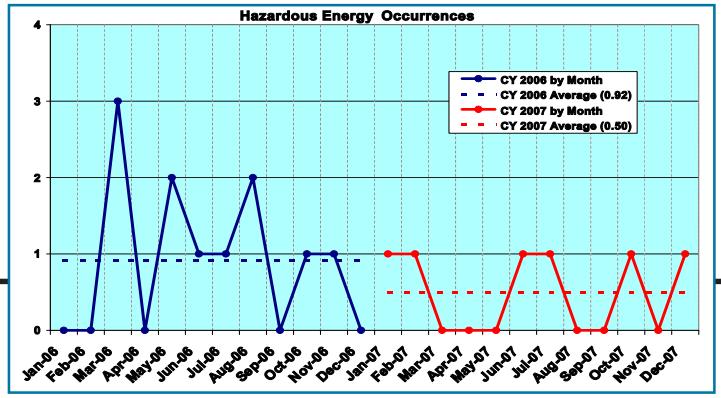
Slip on Ice Results in Shoulder Injury

NA-LASO-LANL-PHYSTECH-2008-0002

(Significance Category 3) On December 19, 2007, an employee slipped on ice in a parking lot at TA-50 and fell, dislocating his shoulder. The employee was transferred to Los Alamos Medical Center via ambulance, treated and released. After the winter closure, the employee returned to work on January 2, 2008, and reported to the LANL occupational medicine facility, where he was evaluated and released to work with restrictions. Because the employee had not been available, all facts pertaining to this event were not available until the employee reported to the LANL occupational medicine facility for evaluation. The Los Alamos area received several inches of snow a few days before the injury. Snow removal crews had plowed the parking lot and adjacent sidewalks. A small pile of snow was placed at a corner of the parking lot, which is located at an incline. The snow had melted on the day before the injury, causing a runoff that flowed into the parking lot and re-froze overnight. The employee was wearing hiking boots with appropriate treading for the weather conditions when he fell.

ORPS CRITERIA 2C — UNCONTROLLED HAZARDOUS ENERGY EVENTS

These events result from a failure to follow a hazardous energy control process that results in either an unanticipated discovery of an unprotected energy source or a person contacting a hazardous energy source. The energy source is typically electrical, but can involve other hazardous energy sources such as natural gas, steam, or pressurized systems. These events are normally associated with excavation or penetration activities.



Lockout/Tagout Verification Discovered as Inadequate

NA-LASO-LANL-CMR-2007-0009

(Significance Category 3) On October 2, 2007, as part of deactivation work in Wing 4 of the CMR facility, an electrician performed a lockout/tagout (LO/TO) operation on a 480-volt electrical breaker without performing a zero energy verification check as required. In addition, the facility operation technician independent verifier of the LO/TO did not identify that the locking device was installed incorrectly. All facility work under lockout/tagouts was paused and the facility manager required verification of all lockout/tagouts before work was allowed to continue.

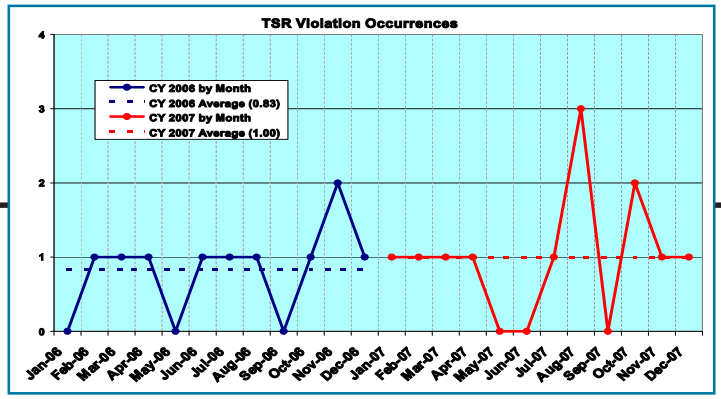
Workers Discover Uncontrolled Hazardous Energy

NA-LASO-LANL-TA55-2007-0043

(Significance Category 3) On December 10, 2007, while identifying wires that needed to be replaced by a wiring upgrade project, workers pulled two energized leads that contacted each other. When the two leads touched, several breakers tripped, causing a loss of power to some of the continuous air monitors (CAMs) in Building PF-4. Personnel in affected area were evacuated. Another circuit breaker tripped during recovery, causing a partial loss of ventilation. Personnel in those affected areas were evacuated. A critique was held and several corrective actions were developed for work control of the rewiring project.

ORPS CRITERIA 3A — TSR VIOLATION EVENTS

These events involve a violation or non-compliance of a nuclear facility's Technical Safety Requirements, violation or non-compliance of a hazard control specified in an approved Documented Safety Analysis, or a surveillance test performed after the prescribed surveillance period.



New Information Regarding Waste Containers Leads to Identification of Positive USQD

NA-LASO-LANL-WASTEMGT-2007-0010

(Significance Category 3) On October 2, 2007, the operations manager for the Transuranic Waste (TRU) program identified a process concern related to new information regarding the unanalyzed potential for hydrogen deflagration in large sealed containers once they are removed from 55-gallon TRU waste containers. Facility safety basis staff identified a potentially inadequate safety analysis because of the potential for hydrogen deflagration inside the large sealed container and its potential effect on worker safety. The bounding hydrogen deflagration from the 55-gallon drum has been fully analyzed.

Receipt of Large Unvented Container Results in TSR Violation

NA-LASO-LANL-WASTEMGT-2007-0012

(Significance Category 2) On October 31, 2007, an unvented 15-gallon inner drum was unpacked at the Waste Characterization, Reduction, and Repackaging facility. Waste generator paperwork indicated the drum was vented and the real time radiography evaluation identified penetrations that appeared to be vents. During the unpacking of the waste container the operators discovered the drum had an unusual configuration in that there were three penetrations through the drum that appeared to be plugged with rubber buttons. In this event, the inner drum was not sampled and it did not have a WIPP-approved filter, which violates the TSR requirements. Drum processing was stopped and the drum placed in a safe configuration.

Cylinder Had Only One Restraint

NA-LASO-LANL-TA55-2007-0041

(Significance Category 2) On November 21, 2007, during a walk-around of the TA-55 tunnel located between Buildings PF-4 and PF-41, the FOD and the DOE facility representative found a temporary gas cylinder on a cart with a regulator installed that had only one restraint. This condition

was non-compliant with the TA-55 TSR administrative control, which requires all gas cylinders within PF-4 to have two restraints. The gas cylinder was removed from the tunnel, properly stored, and tagged. The FOD ceased all work activities on the Interim Radiography Project pending a management review.

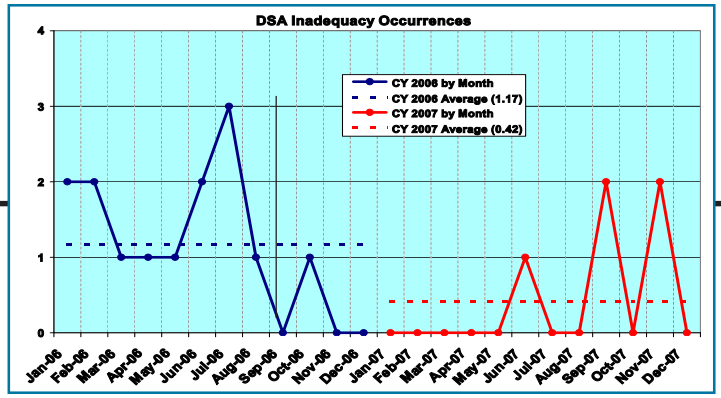
Software Modification Impacts LLW Tracking

NA-LASO-LANL-WASTEMGT-2007-0013

(Significance Category 4) On December 11, 2006, a software modification to the Nuclear Operations (NucOps) module of the Chem/LLW software combined three data tables that are used to indicate the treatment, storage, and disposal location of low level waste (LLW). This modification prevented the NucOps module from pulling data required to complete the LLW Material at Risk surveillance. Consequently, the LLW TSR surveillances were completed using old/incomplete data. The shift operations manager contacted the software programmer to identify the reason for the software error. On December 13, 2007, the TSR surveillance results were provided to senior management for review and questions arose about the LLW MAR surveillance issue. The facility entered the LCO for a missed surveillance and verified the surveillance was completed manually. The current inventory of LLW MAR is less than 1 percent of the MAR limit. The impact of the Chem/LLW modification on the NucOps software was not identified because there was no requirement to cross reference the NucOps data with the logbook data, which had been maintained since 2005, and because LANL has not fully implemented software quality control. The software quality control issue has been identified in previous ORPS reports.

ORPS CRITERIA 3B DSA INADEQUACY EVENTS

These events involve determination of a positive Unreviewed Safety Question (USQ) that reveals a currently existing inadequacy in the Documented Safety Analysis (e.g., Safety Analysis Report [SAR] or Basis for Interim Operation [BIO]).



Fire Sprinkler System Riser Pressure Acceptance Value Does Not Support Requirement

NA-LASO-LANL-TRITFACILS-2007-0003

(Significance Category 3) On November 7, 2007, the Weapons Facility Operations (WFO) FOD was informed that the minimum accepted value of 60 psig in the approved DSA used to verify the availability of an adequate water supply in case of a fire may be lower than required. Fire hydrant flow tests indicate that a minimum value of 63 psig is required to verify that the system meets NFPA 13 sprinkler and hose demands. However, the approved DSA specifies a lower value (60 psig). A Standing Order was initiated which requires a minimum 63 psig as acceptance criteria for a riser check. Actions are required (fire watch patrol and combustible loading inspection) by the facility in the event the 63 psig is not met.

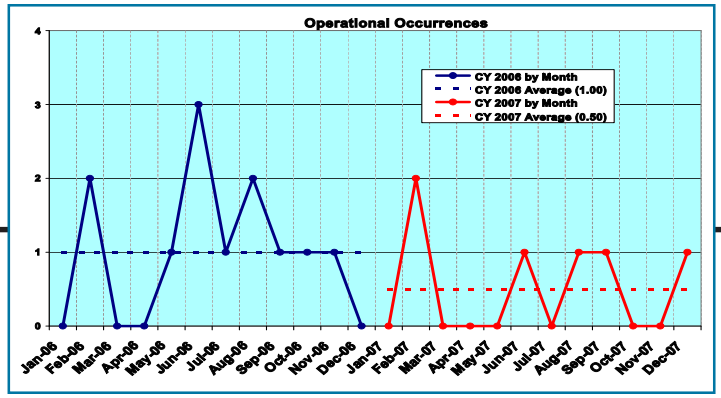
Bubblers May Not Provide Adequate Pressure Protection

NA-LASO-LANL-TRITFACILS-2007-0004

(Significance Category 3) On November 7, 2007, the Weapons Facility Operations (WFO) FOD was notified that the glove box bubblers located in rooms 114 and 120 of the WETF were found to be out of specification with glycol levels that control relief pressure. These bubblers are part of a safety significant system. The bubblers are vented to the heating, ventilation and air conditioning (HVAC) exhaust ducting, which introduced an uncertainty as to the actual differential pressure protection provided to the glove boxes. The original design assumed no pressure differential in the HVAC duct that would affect the bubbler, but there are no engineering calculations that reflect the actual bubbler relief pressures as vented to the HVAC system. Without this data, the WETF staff cannot be certain that the glove box pressures achieved in abnormal conditions would not exceed the pressure ratings of the glove boxes, resulting in a potential inadequacy of the documented safety analysis (PISA). The glove boxes have been placed in "warm standby" mode until the appropriate engineering analysis is complete and required corrective actions have been implemented.

ORPS CRITERIA 4B — OPERATIONS EVENTS

These events have an adverse impact on facility operations and can result from a variety of reasons, including issuance of a stop work by DOE, activation of a safety class or safety significant system, facility evacuation in response to an actual unsafe condition, or a procedure violation resulting in an adverse impact on safety



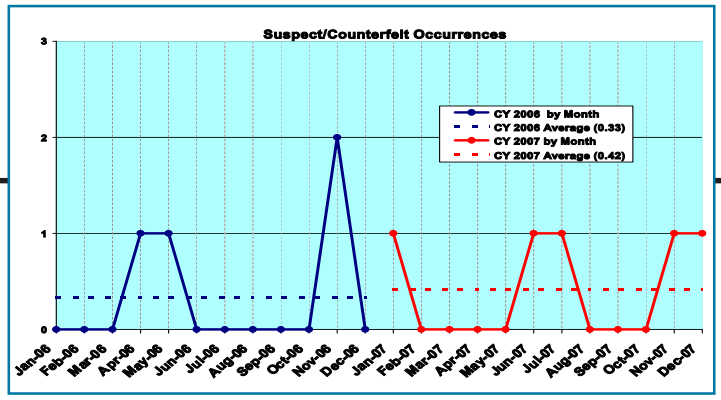
Small Fire Ignites in Microwave Unit

NA-LASO-LANL-BOP-2007-0017

(Significance Category 3) On December 4, 2007, an employee in TA-3, Building SM-261 placed a plastic mug containing coffee in a microwave to re-heat it, and a fire ignited inside the microwave. The employee called 911, advised two other employees to evacuate, and pulled the fire alarm, causing an evacuation of the building. The Los Alamos Fire Department responded and extinguished the fire. Preliminary investigation indicated that the coffee mug is suspected to have melted, igniting the fire. The fire caused damage to the microwave and carpeting, melted two water cooler jugs and a toaster, and there was smoke damage to surrounding cubicles.

ORPS CRITERIA 4C — SUSPECT/COUNTERFEIT EVENTS

These events involve discovery of suspect/counterfeit items or materials, or discovery of a defective item or material whose failure could present or result in a loss of safety function.



Defective Gaskets Discovered

NA-LASO-LANL-TA55-2007-0042

(Significance Category 4) On November 13, 2007, deteriorating filter gaskets on unused empty Standard Nuclear Material Containers (SNMC or Hagan) 12-quart containers were discovered in a storage area during informal surveillance activity. These gaskets were acquired in 2002, and have an expected shelf life of 10 to 20 years. Cracking and crumbling gaskets were noted on 24 out of 100 containers examined. These units were not in use, and were empty. Notifications were made and a critique was held.

Gaskets Found to be Defective

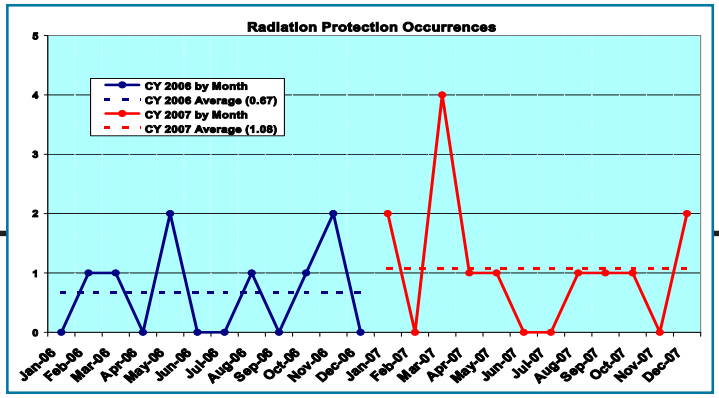
NA-LASO-LANL-CMR-2007-0010

(Significance Category 4) On November 13, 2007, Plutonium Materials & Technology, Nuclear Materials Management (PMT-3) Group personnel at TA-55 discovered crumbling and deteriorating filter gaskets on unused empty Standard Nuclear Material Containers (SNMC or Hagan) 12-quart containers. An ORPS report concerning these defective filter gaskets went out on December 6, 2007. On December 10, 2007, the Chemical & Metallurgical Research (CMR) FOD designee saw an ORPS event notification e-mail concerning deteriorating filter gaskets and initiated an Extent of Condition survey of 12-quart Hagan containers at CMR. A total of 16 containers were surveyed, six of which showed signs of defective filter gaskets. Containers with defective gaskets have been segregated and marked "Do Not Use." CMR was coordinating all actions and activities on this issue with TA-55.

ORPS CRITERIA 6

RADIATION PROTECTION EVENTS

These events involve loss of control of radioactive materials onsite or offsite, spread of radioactive contamination onsite or offsite, radiation exposure to personnel or the public, or personnel or clothing contamination. All events involve quantities that exceed DOE authorized limits or values specified in 10 CFR Part 835.



Two Radioactive Sealed Sources Discovered Missing During Inventory

NA-LASO-LANL-TA18-2007-0002

(Significance Category 3) On October 1, 2007, two radioactive sealed sources were discovered missing during an inventory at TA-18. One of the missing sources is a 140 microcurie Cobalt 60 source and the other one is a 25 microcurie Holmium 166m source. Initial attempts to locate the sources were unsuccessful. The last time the two missing sources were inventoried was in February 2005. A wall-to-wall inventory at TA-18 was planned to attempt to locate the two missing sources.

517,000 dpm Beta Gamma Contamination Found in RCA That Was Not Controlled for Contamination

NA-LASO-LANL-ACCCOMPLEX-2007-0005

(Significance Category 2) On December 20, 2007, while self-surveying to exit an area, a radiological control technician (RCT) detected 2,800 dpm beta/gamma contamination on the right pant cuff and on the heel of the right shoe. The contamination was traced to TA-53, Building 368, which is within a Radiological Controlled Area (RCA). A smear of the area identified 514,000 dpm beta/gamma contamination. During the critique it was determined that the RCA was for volume contamination and external dose and the controls in place did not meet the requirements for an RCA controlled for contamination. Access to the building was key-controlled and the building was posted as a contamination area.

Loss of Accountability of Below-Statistical-Control-Threshold Radioactive Material Sample Discovered

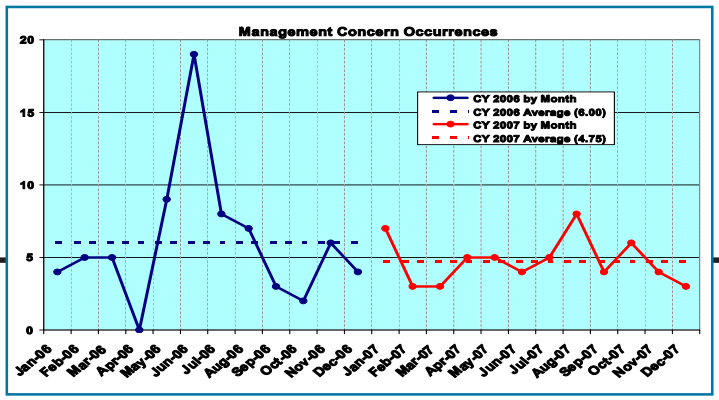
NA-LASO-LANL-TA55-2007-0045

(Significance Category 2) During a 100 percent inventory of radioactive items at TA-55 in December 2007, there was a discrepancy in locating a small item (an archive sample) within a glovebox maintained by the Plutonium Manufacturing and Technology Pu-238 Group. A critique was held and the history of the item was discussed. While no records exist on the final disposition of the item, it was traced to a point where it was determined that the item was either placed into a metal waste stream or it was returned to the parent lot. The sample quantity is sufficiently low that (1) it would not exceed the regulatory limit if placed in a waste drum, and (2) would fall below the statistical error margin if the sample were returned to the parent lot. The sample material remains within a regulated radiation controlled area for either of these two possibilities,. Archive samples are kept for years for quality assurance purposes after a project is completed. Records going back to 2003 for this archive sample were researched. Accountability of the sample is solid until after the hard shutdown of LANL on July 14, 2004. This shutdown required all workers to immediately step away from their work, without placing work in a safe or stable condition/configuration. The records after PMT-5 resumed work in November 2004 do not account for the archive sample in question. This was the first 100 percent inventory since before the shut down.

ORPS CRITERIA 10

MANAGEMENT CONCERN EVENTS

These events do not meet the other reporting criteria and are generally considered to be less serious, precursor events. These are events that the FOD or line management determines to be of safety significance/ concern, that involve a near miss to a reportable consequence, that are of significant concern outside the Laboratory, or that are of such immediate interest that they warrant prompt notification to the DOE.



Removal of Gauge Unauthorized

NA-LASO-LANL-TA55-2007-0037

(Significance Category 4) On October 2, 2007, a magnehelic gauge was discovered missing in the Actinide Research and Technology Instructional Complex (ARTIC) building during daily rounds. The reason for its removal is not known. The removal of the gauge should have been performed in accordance with established work control processes. In this

instance, the facility safety was not put at risk, but equipment was left in an unsafe configuration. The daily rounds are set out in an administrative procedure (AP) that is driven by the Facility Safety Plan, which makes up part of the Safety Basis for the facility. The requirements in the rounds states that negative flow be verified and recorded. It was later confirmed that negative flow was maintained. All such work needs to follow the TA-55 Work Control Process, which would require checking in with the TA-50 ARTIC Operations Center.

Inadvertent Transfer of Tritium Gas Mixture Occurs

NA-LASO-LANL-TRITFACILS-2007-0002

(Significance Category 3) On October 15, 2007, a Weapons Engineering Tritium Facility (WETF) operator inadvertently transferred a tritium gas mixture to a hydride transport vessel (HTV). At the time of the event, the HTV was being conditioned for loading under a heat and vacuum process. Concurrently, the operating staff had transferred the gas, to be subsequently loaded, to a sample manifold for sampling. When the operator configured the system to return the sample gas to the source tank, he failed to notice an interference with the HTV conditioning configuration, causing the inadvertent transfer. Tritium gas transfers were to be paused until the associated controls have been improved.

Small Fire Results in Burn to Researcher

NA-LASO-LANL-SIGMA-2007-0004

(Significance Category 3) On October 16, 2007, a researcher received a thermal burn through his right glove when a small amount of the powder he was drying came out of the drying vessel and ignited. The powder is flammable under the right conditions. A second researcher used a fire extinguisher to put out the small fire on the oven sill and unplugged the oven. The laboratory was placed in a safe configuration. The researcher was transported to Occupational Medicine, where he was treated for a second-degree burn to about a 2-square-centimeter area of skin. The researcher returned to work the same day.

Criticality Limits Potentially Exceeded

NA-LASO-LANL-WASTEMGT-2007-0011

(Significance Category 3) On October 25, 2007, a DOE facility representative observed a 55-gallon TRU waste drum tagged as containing >325 fissile gram equivalent (FGE) Pu-239 in TA-54 Area G, where 55-gallon TRU waste drums containing >200 FGE must be stored in a specified arrays for criticality safety. The drum was not stored in that array. LANL Safety Basis staff determined the issue did not represent a nuclear safety issue; however, they did identify it as a potential criticality issue. A search of the TRU Waste Tracking database identified six drums in Area G that waste generators identified as containing >200 FGE. These drums were being researched, although it was believed they were legacy drums (pre-1988) that were accepted prior to the 200 FGE limit.

Glock Handgun Discharged During Holstering Process

NA-LASO-LANL-BOP-2007-0015

(Significance Category 3) On October 27, 2007, a loaded 40-caliber handgun discharged while a security police officer was putting it into its holster. The discharged bullet exited through the side of the holster, through the pant leg of another officer, and lodged in the floor. No injuries resulted. Preliminary investigation indicated that the handgun with a flashlight attached below the barrel apparently hung up on the holster. The Laboratory director appointed an investigation team to review the event. The team's investigation report can be found online at *http://int.lanl.gov/orgs/qa/oa/docs/la_ur_07_8038.pdf*. A "Final Take" lessons learned document is also available online at *http://dominoapp.lanl.gov/lln/lldocs.nsf/main*.

Miscommunications Lead to Entry into Red-Lit Room

NA-LASO-LANL-TA55-2007-0038

(Significance Category 4) On October 31, 2007, a custodian entered Room 401 of Building PF-4 to mop the floors even though the room had tape across the door and a lit red light above the door. The room had been decontaminated and needed to be mopped before access to the room would be released by the Radiological Protection (RP-1) group. A PMT-2 first line manager (FLM) had spoken with the custodian foreman to request the room be mopped, but the room had not yet been released by RP-1. This was not communicated to the foreman or custodian, but visual indicators were still in place (tape across the door and a lit red light above the door). The custodian performed her duties without her or her foreman checking in with a RCT or the room controller as required. The custodian was monitored for contamination and nasal swipes were taken, which were Non-Detectable Activity.

Contact Between Two Cranes Occurs at Construction Site

NA-LASO-LANL-BOP-2007-0016

(Significance Category 4) On November 5, 2007, at the Radiological Laboratory/Utility/Office Building (RLUOB) construction site, the crane jib wind indicator (flag pole) of a Linkbelt 248 crane that was moving a 20-foot by 6-foot concrete form panel came in contact with a Manitowoc 777 crane jib. No workers were injured and neither crane was damaged in this event. The operator of Mantowoc 777 had locked out his crane and was working as the flagman for the Linkbelt 248. Prior to performing the flagman duties, the Manitowoc 777 operator failed to position the crane jib in the opposing direction from the operating radius of the Linkbelt 248. In addition, an insufficient number of flagmen supported the activity. All the cranes at the RLUOB site were to be inspected for safety and the superintendent was to ensure that enough flagmen are working.

Employees Did Not Use Correct Configuration Management Tools for Switchgear Upgrade Project

NA-LASO-LANL-TA55-2007-0039

(Significance Category 4) On November 13, 2007, during an upgrade of two main power feeds to the main facility, project personnel temporarily switched power for the main facility to one feed that had been successfully upgraded, while waiting for parts for the second feed. When preparing to make this switch, the expected under-voltage relay signal for EA-9 was not received at the TA-55 Operations Center, indicating that something was not connected correctly. Work was paused and a critique was held. During the critique, it was determined that on-site project personnel did not use the correct configuration management tools to document their deviation from the accepted Design Change Plan for the upgrade project.

Unusual Extremity Dosimetry Readings Examined

NA-LASO-LANL-TA55-2007-0040

(Significance Category 3) On November 19, 2007, the TA-55 FOD held a critique to discuss unusual extremity dosimetry readings

on two personnel with the Plutonium Manufacturing and Technology, Actinide Process Chemistry (PMT-2) Group. Within the past three months, process through-put had increased and operations had changed. Whole-body dosimetry readings in September and October of 2007 for increased radioactive material handling showed a reasonable increase but the extremity dosimetry readings showed a very large increase that was not expected. The apparent October extremity dose for the highest exposed Actinide Process Chemistry Group individual is the largest monthly dose observed in the previous 10 years and over five times the average of the highest monthly extremity doses for this organization. The Health Physics Measurements Group was to continue to evaluate the dose calculations and was to prepare an official dose report.

Execution of Project Work Not Within Scope

NA-LASO-LANL-HEMACHPRES-2007-0004

(Significance Category 3) On November 20, 2007, the FOD for Weapons Facility Operations Division declared a management concern related to the execution of project work performed by two separate, third-tier, subcontractors who deviated from the scope of work without a discussion with Project Management regarding changing situations or the potential for additional hazards. In the first case, a roofing subcontractor relocated a waste container from firm, level ground to soft earth for convenience, resulting in the container overturning and spilling. The waste container was righted and spilled roofing material placed back in the container. In the second case, an electrical subcontractor changed the core drilling location on a wall for convenience but failed to transfer the survey markings and drilled through rebar. A structural engineer was to determine the wall's structural integrity.

Work Control Issues Arise in Two Events

NA-LASO-LANL-TA55-2007-0046

(Significance Category 4) On the week of December 10, 2007, during a document review of a close-out package concerning work performed in the IR Tunnel, the Design Authority raised questions regarding work controls for the repair of a T1 line, which was not captured through the unreviewed safety question process. Issues also arose over the installation of the wrong type of wiring from the IR Tunnel to the Facility Control System (FCS) in Building PF-4. A team was to have been assembled to develop a prescriptive quality assurance process for TA-55.

Damage to Gas Regulator Causes Gas Leak

NA-LASO-LANL-TA55-2007-0044

(Significance Category 4) On December 11, 2007, during snow removal duties at TA-55, a laborer smelled a natural gas leak and then located the area of the leak by sound. He promptly called the TA-55 Operations Center. It was discovered that a vehicle had backed up to the east side of Building PF-66, damaging 2-inch diameter pipe for a gas regulator. The gas leak was isolated and repaired. A Jersey bouncer or similar temporary physical protection was to have been placed in front of the PF-66 regulator until more permanent protection can be installed.

Potential Personnel Contamination Due to Pipe Cutting Activities Associated with CMR Hazard Reduction Project

NA-LASO-LANL-CMR-2007-0011

(Significance Category 3) On December 14, 2007, three workers in Room 4121 were cutting sections of copper piping containing solder joints for waste segregation and waste packaging without wearing respiratory protection. After the workers left the room to retrieve tools, a continuous air monitor (CAM) alarmed. Nasal swabs taken from the three workers were positive for uranium-234 and they were issued bioassay kits to provide further analysis for a final dose assessment. Analysis of the CAM filter showed 5.3 DAC-h for U-234. Work was stopped on the job pending Radiological Operations review.

Human Performance Improvement Principles

The following are the five basic principles of human performance, as outlined in LANL LA-UR-07-0176, *Human Performance Improvement Concept Guide* (October 2006):

- People are fallible, and even the best make mistakes.
- Error-likely situations are predictable, manageable, and preventable.
- Individual behavior is influenced by organizational processes and values.
- People achieve high levels of performance based largely on the encouragement and reinforcement received from peers, leaders, and subordinates.
- Events can be avoided by understanding the reasons mistakes occur and applying the lessons learned from past event.

Interested in learning more about Human Performance Improvement? The "*HPI 8 Hour, Human Performance for Workers*," (LANL Course: 43428; CT-PPI), is an 8-hour course that provides a foundation of information for managers on the philosophy of human performance improvement (HPI) and how to implement this philosophy to achieve continuous improvement in the organization.

Information about HPI is also available at the Department of Energy's Human Performance Center website at *http://www.hss.energy.gov/csa/csp/hpc/index.html*.

FIRST QUARTER FY 2008

DOE-COMPLEX OCCURRENCES

The following is a (condensed) collection of articles that were published in the 1st Quarter of FY 2008 in the DOE Office of Environment, Safety and Health (EH) "Operating Experience Summaries." The Operating Experience Summaries are intended to promote safety throughout the DOE Complex by encouraging the exchange of lessons learned information among DOE facilities. The following reports are only summaries of articles contained in the publications, which are available online at http://www.hss.energy.gov/CSA/analysis/oesummary/index.html. New subscribers can sign up at: http://www.hss.energy.gov/InfoMgt/dns/ehdns.html.

OSHA Issues New Instruction on Combustible Dust

OSHA Directive CPL 03-00-006

On October 18, 2007, OSHA issued a new safety and health instruction detailing OSHA policies and procedures for inspections of workplaces where combustible dusts are created or handled. Combustible dusts are organic or metal dusts that are finely ground into very small particles, fibers, fines, chips, chunks, flakes, or a mixture of these. Such dusts can come from metal, wood, plastic, and textile materials, as well as from grain, flour, sugar, and paper, among others, and can be the cause of fires and explosions. (OSHA Directive CPL 03-00-006)

Chemical dust deflagration occurs when the right concentration of finely divided chemical dust suspended in air is exposed to a sufficient source of ignition to cause combustion of the dust. If the deflagration is in a confined area, the potential for an explosion exists. Dust deflagrations, as well as other fire and explosion hazards in industry, are covered by several OSHA standards and the general duty clause. However the new safety and health instruction specifically addresses these hazards as they apply to combustible dusts. Assistant Secretary of Labor for OSHA, Edwin G. Foulke, who announced the National Emphasis Program (NEP) and issued the new instruction, stated that "A combustible dust fire or explosion is a potential hazard to America's working men and women. This instruction will be a valuable resource for those who inspect industrial facilities in the United States."

A combustible dust hazard study conducted by the U.S. Chemical Safety and Hazard Investigation Board (CSB) found that nearly 280 dust fires and explosions have occurred in U.S. industrial facilities over the past 25 years, resulting in 119 fatalities and over 700 injuries. Some of the industries in which combustible dusts are particularly prevalent are agriculture, chemical, textile, tire and rubber manufacturing, and waste water treatment. The following accidents traced to combustible dust occurred in 2003 and resulted in deaths and serious burn injuries.

- On October 29, 2003, at the Hayes Lemmerz manufacturing plant in Huntington, Indiana, a series of explosions resulted in severe burns to three employees, one of whom died. The plant manufactured cast aluminum automotive wheels, and the explosions were fueled by accumulated aluminum dust.
- On February 20, 2003, an explosion and fire damaged the CTA Acoustics manufacturing plant in Corbin, Kentucky, killing seven employees. The facility produced fiberglass insulation for the automotive industry. The resin involved was a phenolic binder used in producing fiberglass mats.
- On January 29, 2003, an explosion and fire destroyed the West Pharmaceutical Services plant in Kingston, North Carolina, causing six deaths and dozens of injuries. The facility produced rubber stoppers and other products for medical use. The fuel for the explosion was a fine plastic powder that accumulated above a suspended ceiling and ignited.

OSHA initiated the "National Emphasis Program" (NEP) and issued the new safety and health instruction in response to recommendations by the CSB urging the agency to conduct a special emphasis program targeting industries at risk for dust explosions. The instruction, which includes applicable OSHA requirements, as well as

Damaged production floor at CTA Acoustics manufacturing plant (DOE Photo)

NFPA standards and codes relevant to combustible dust hazard controls (Appendix A of the instruction), can be accessed from the OSHA website.

These events illustrate the dangers of explosive dust and the hazards posed when dust unknowingly accumulates. Housekeeping is an effective method of identifying and removing potential hazards. Accumulation of dust, lint, flammable liquids, and oil residues in a facility allows for easy ignition and the possibility of a flash or fast-spreading fire or explosion.

Are Proper Cold Weather Protection Measures in Place?

NA-LASO-LANL-LANL-2006-0008

During the weeks of November 27, 2006, and December 4, 2006, at Los Alamos National Laboratory, a significant drop in outside temperatures, ranging from a low of 12°F to a high of 45°F, resulted in at least five occurrences of frozen heating, ventilation, and air conditioning (HVAC) coils, causing significant equipment damage and flooding in multiple areas of one facility. (NA-LASO-LANL-LANL-2006-0008)

Investigators found deficiencies in seasonal protection measures that ranged from taking no freeze protection measures at all to taking inappropriate actions or not completing necessary actions. They also identified one area where protective actions were not documented and found weaknesses in implementing freeze protection procedures. Freeze protection issues had been identified previously, but apparently the corrective actions implemented to address them were ineffective.

Another event at LANL traced to freezing temperatures occurred on December 2, 2006. Fire department personnel, who responded to an alarm, found a sprinkler had broken and a gasket on the inlet to a collection tank had ruptured, resulting in the discharge of about 34,000 gallons of water that contained approximately 3,100 pico curies per liter of tritium. An RCT surveyed the firemen and found no evidence of contamination, and there was no water damage to the facility or equipment, as the water spilled onto the ground. Investigators determined that the spill, which was reported to the New Mexico Environmental Department, was a direct result of severe weather conditions.

On January 15, 2007, at Pacific Northwest National Laboratory, a water leak from a 1-inch fire sprinkler line activated a fire alarm at the Radiochemical Processing Laboratory, when freezing temperatures resulted in a break in the fire suppression piping for a laboratory. Water spread to several rooms, leaked into the basement, and about 100 gallons of water poured out of the building. Surveys indicated there was no contamination either inside or outside the building. Employees were evacuated, but there were no injuries. (SC-PNSO-PNNL-PNNLNUCL-2007-0001)

These events serve as a reminder that now that winter has arrived, freeze protection measures should be in place to protect piping, water lines, sprinkler heads, and other essential systems from damage.

Freeze Protection Advice

- Increase surveillance of building pipelines, flowlines, and safety-related equipment during periods of extreme cold. Provide sufficient watch service to ensure that all plant areas can be visited each hour.
- Check heating systems to ensure sufficient heat is delivered to keep sprinkler piping from freezing, especially during idle periods when temperatures are extremely cold. Install temperature alarms or automatic backup heat sources on vulnerable systems that require special protection because of hazards or costs associated with freeze damage.
- Develop procedures that detail when and how personnel are informed of cold weather problems and the appropriate steps for repairing, replacing, and safely restoring damaged equipment to service.

Slips and Falls

Winter can also be a hazardous time for workers, who can slip and fall on icy sidewalks and parking lots, so it is also time to investigate methods for dealing with these hazards and for reminding workers that they need to be wary when traversing ice- or snow-covered walking surfaces. Last winter numerous slips and falls on icy walkways resulted in workers being badly injured.

Because there were multiple worker injuries from slips and falls on ice at LANL during the winter of 2006, an unusual winter during which there were two major snowfalls in the area, management requested that the injury data be collected and analyzed to determine trends and appropriate corrective actions. From November 1, 2006, through January 8, 2007, there were 13 weather-related injuries, nine of which occurred in Laboratory parking lots. (NA-LASO-LANL-LANL-2007-0002)

Interestingly, analysts found that none of the workers involved in the 13 slip and fall incidents had been wary of changes in the walking surfaces from morning to evening. To address this issue, management took actions to increase worker awareness through all-employee memos and postings on the LANL safety website.

Because the majority of worker injuries occurred in parking lots, snow removal operations were investigated to identify deficiencies. Roads and Grounds managers indicated that when snow is removed, snow piles are left in parking lots until they can be moved to a disposal site. When the snow melts and refreezes overnight, it can result in slipping hazards in the parking lots. They also indicated that the parking lots were only plowed, not sanded, and that the process normally took two days to complete. The use of sand for parking lots and procedures for addressing snow piles had not been incorporated into the Laboratory's snow removal plan. Another factor that contributed to ice and snow in parking lots was that employees did not remove their private vehicles from the lots to permit plowing, even though they had been asked to do so.

Near Miss — Roll Bar on Riding Mower Knocks Down Window Air Conditioner

SC-BHSO-BNL-PE-2007-0004

On September 27, 2007, at Brookhaven National Laboratory (BNL), the roll bar of a lawn mower struck a window air conditioning unit, which fell out of its window mount, hit the top of the mower's steering wheel, rolled onto the cutting deck, and landed on the grass. The operator was not injured, and the mower was not damaged, but the air conditioning unit was unsalvageable. (SC-BHSO-BNL-PE-2007-0004)

Mower next to similar window AC installation (DOE Photo)

The operator had just maneuvered the mower around the corner of the building and was traveling about 2 to 3 mph when the roll bar hit the air conditioning unit. The 150-pound unit protruded 28 inches from the wall of the building and was hard to see because it was painted the same color as the building and blended in with it.

The Toro Model 328-D mower with a rear-mounted roll bar was newly purchased, and the operator was driving it for the first time. He had driven similar-sized Toro mowers that were not equipped with roll bars for many years in his job as a grounds worker at BNL. Although the roll bar was in plain sight of the operator, he said his vision was fixed on the ground in front of him. He also said that he did not realize how high the roll bar was (55 inches) or how far it protruded to the side. The need for the roll bar on Toro lawnmowers will be reassessed, and operators will receive awareness training to emphasize the operating height of the machine and remind them that they need to be aware of low lying branches or protruding objects.

In this event, the mower operator escaped injury when the heavy air conditioning unit fell forward and away from him. However, on August 19, 2006, a ground equipment operator at the Y-12 Site was less fortunate when his mower went under a steam distribution line that was 45 inches above the ground and he suffered bruises and contusions. A Type B-like investigation was performed following the incident. (NA-YSO-BWXT-Y12SITE-2006-0013)

The operator at Y-12 was mowing grass across an inclined area with a zero-turn- radius riding mower when the left drive wheel went into a wet depression and lost traction at a ground discharge area for a steam trap. The right drive wheel continued to pull, causing the mower to quickly turn 90 degrees left (downhill), forcing the mower and operator under an adjacent steam line. The operator's torso hit the steam line as he was pushed under the low clearance by the moving mower, resulting in contusions, bruising, and a topical elbow injury. The operator was transported by ambulance to an area hospital.

These events underscore the need to ensure that mowing equipment operators are trained on the equipment; are familiar with the area, its terrain, and potential hazards; and are focused on the task at hand.

Near Miss — Excavator Windshield Broken by Flying Debris

EM-RP-BNRP-RPPWTP-2007-0017

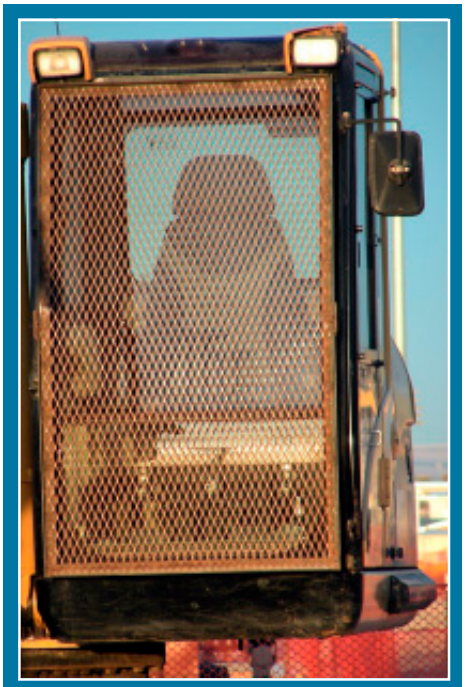
On September 26, 2007, at the Hanford River Protection Project, an operator was using an excavator bucket to pick up a section of concrete and rebar when a piece of entangled rebar dislodged, sprang backwards toward the excavator, and struck the windshield in two locations. The rebar penetrated the windshield approximately 1 inch near the excavator operator's foot. Fortunately, the operator was not struck by the rebar or debris.

Workers were using two excavators to demolish a reinforced concrete slab. One excavator had a hydraulic hammer attachment to break up the slab; the other had a bucket attachment to remove debris. The excavator with the hammer had an expanded metal windshield guard, but the one with the bucket had no guard. As the excavator with the bucket attachment was relocating a 3-foot-diameter piece of concrete and rebar, it was dislodged, and the windshield was damaged.

A review of occurrence reports from January 2005 through October 2007 identified five additional events in which industrial equipment windshields or windows were broken by flying debris during equipment operations. The following is a summary of these events.

- On July 7, 2006, at Paducah, while an operator was using an excavator bucket to crush 24-foot lengths of PVC half-pipe, the pipe shattered, and a shard broke the excavator windshield. The safety glass windshield fell out of the frame, and about 10 percent of the glass fell inside the cab. The excavator was not equipped with a metal guard over the windshield. The equipment operator assumed that the PVC piping could be safely compacted because the hazard analysis process did not identify the potential for shattering. Corrective actions included adding a screen to the windshield and precluding the receipt of waste greater than 10 feet in length. (EM-PPPO-PRS-PGDPENVRES-2006-0006)

- On April 28, 2006, at the Y-12 Waste Site, the left side door window of a bulldozer was struck and broken out by a piece of debris. The operator had just placed and spread building debris material and was backing out of the work area when the object was kicked up by the dozer track and struck the window. Small pieces of glass entered the cab and landed on the operator's lap and legs and on the floor board. As a corrective action, a polycarbonate material (Macrolon®) was ordered to replace the safety glass installed on bulldozers. (EM-ORO-BJC-Y12WASTE-2006-0002)



Metal screen over excavator windshield at Hanford Site (DOE Photo)

- On July 18, 2005, at the East Tennessee Technology Park, a piece of metal (1½ feet by 1 foot by ½ foot) struck and broke the windshield of a trackhoe being used to size-reduce a motor housing for waste disposal. The safety glass windshield shattered as designed, and a few pieces of glass fell onto the operator's legs. (EM-ORO-BJCK25ENVRES-2005-0018)

- On July 11, 2005, at the Hanford Site, a trackhoe with a hydraulic hammer attachment was being used to resize vitrified rock when a small piece of vitrified debris went through the windshield safety screen and broke the windshield. The safety screen consisted of metal rods that formed 1-inch squares. As a corrective action, a ½-inch-thick Lexan® shield was installed in conjunction with the metal screen for additional operator protection. (EM-RL-BHI-REMACT-2005-0008)

- On February 28, 2005, at Rocky Flats, an operator was size-reducing a 6-inch by 25-foot-long piece of steel pipe debris, using a processor with an articulating head, when the pipe hit and penetrated the lower Lexan® window shield and the underlying, tempered glass windshield of the processor cab. While the pipe was being bent to reduce its size for disposal, the stored energy in the pipe caused it to spring toward the processor cab. The pipe came into contact with the operator's leg causing a minor abrasion. Requirements were

established to add cab protection, such as Lexan® shielding and metal cages. (EM-RFO-KHLLD&DOPS-2005-00060

These events underscore the unpredictability of such hazards associated with demolition and the need to provide additional defense in depth, (e.g., enhanced cab protection) to protect against flying debris. This may prevent similar incidents from resulting in severe consequences. Supervisors and foremen need to ensure that equipment operators wear appropriate PPE (e.g., hardhat, safety glasses, and work shoes) while operating the equipment and that enhanced cab protection is properly used. When operating heavy equipment in an environment that can produce flying debris, three worker protection areas should be considered: hazard recognition; barrier analysis; and work planning.

NRC Operating Experience on Electrical Circuit Breaker Problems

(NRC Information Notice 2007-34)

On October 22, 2007, the Nuclear Regulatory Commission (NRC) issued Information Notice 2007-34, *Operating Experience Regarding Electrical Circuit Breakers*, to inform operating license holders about problems associated with maintenance and operation of low-, medium-, and high-voltage circuit breakers. Circuit breakers are relied upon to provide electrical power to equipment credited in nuclear plant accident analysis. Because licensees often use circuit breakers of the same type and from the same manufacturer in their redundant safety systems, certain breaker problems raise the possibility of a commonmode failure. In particular, several licensees have experienced problems following installation of replacement breakers of a different manufacturer into their existing switchgear.

The Office of Nuclear Reactor Regulation reviewed circuit breaker operating experience and found that the following often were the cause of problems:

- Deficient fit of replacement circuit breakers within cubicles;
- Inadequate or excessive tolerances and gaps;
- Worn or misadjusted operating linkages;
- Inadequate or inappropriate maintenance practices;
- Configuration control errors;
- Deficiencies from original design and refurbishment; and
- Design changes.

The NRC archive of information notices can be obtained at http://www.nrc.gov/reading-rm/doc-collections/gen-comm/ info-notices/.

NRC Information Notice 2007-34 identifies deficiencies and issues that could be applicable throughout the DOE Complex. A review of DOE lessons learned and the ORPS database for electrical circuit breaker problems identified similar issues, many of which occurred in the 1990s, as aging circuit breakers were starting to fail and replacements were being installed in existing switchgear.

The electrical circuit breaker problems identified in the NRC information notice underscore the importance of a strong circuit breaker maintenance program. Preventive and corrective maintenance can quickly identify and resolve electrical circuit breaker problems to ensure safe and reliable power delivery and equipment operation.

Near Misses — Shelving Units Collapse

EM-RL-PHMC-General-2007-0004

On July 19, 2007, at Hanford, a storekeeper placed a box of soil samples on the top shelf of a shelving unit, and the entire unit collapsed. As the unit collapsed, it fell into another shelving unit, which also collapsed. The storekeeper was able to move out of the path of the falling shelves and was not injured, but the shelving and some soil samples were damaged. (EM-RL-PHMC-General-2007-0004)

The storekeeper was relocating boxes of soil samples from a pallet to the free-standing shelving where they were stored. As he was pushing a box from the front of a shelf to the rear of it, the bottom part of the shelf wall gave way, and the entire unit began to collapse and fall. Had the shelving fallen in the opposite direction, the storekeeper could have been badly injured.

Investigators determined that the manufacturer's instructions were not followed when the shelves were assembled. They also determined that the shelves were poorly braced. In addition, the fasteners used to connect individual sections of shelving were not checked after assembly to ensure that all of them were installed and had been properly tightened.

Shelving in other site facilities had cross-bracing installed between the shelves and the wall, but cross-bracing had not been installed on these units because it would have to be positioned too low to allow a fork truck to move between the units. More manual labor would have been required to load the heavy soil samples on the shelves without the fork truck, so the decision was made to install the cross-bracing after the shelves were loaded. The shelving was vulnerable to failure when it was carrying a normal vertical load because neither the bottom nor top tier of shelves was cross-braced.

On June 29, 2006, at the Nevada Test Site (NTS), wall-mounted cabinets in an office fell to the floor. The shelving had been mounted to drywall with self-drilling drywall anchors and weighed about 250 to 350 pounds. No one was in the room when the shelving fell, but the employee who worked in the office could have been injured, perhaps seriously. Investigators determined that only 7 of the 12

Aftermath of shelving collapse at Hanford (DOE Photo)

manufacturer-required anchors had been installed. When several anchors pulled through the drywall, the remaining anchors could not support the weight of the cabinet and shelves. *A Lessons Learned Bulletin* (2006-LANL-NTS-001) on the event states that "not following manufacturer's instructions for wall-mounted cabinets can result in catastrophic failure."

A shelf in a flammable materials cabinet collapsed at Lawrence Berkley National Laboratory in 2006. As a result, a bottle of toluene fell, broke, and splashed a researcher's legs and feet. Because the researcher quickly removed his clothing and washed his legs and feet in an emergency eyewash/shower, he was not injured, but the room was evacuated until firefighters and hazardous waste technicians cleaned up the spill. Post-incident inspection indicated that there were several deficiencies in the cabinet shelving.

It is important to understand the impact of even subtle changes in configuration, design, or assembly, especially when dealing with structural components. Equipment, such as shelving, is designed to be installed and used in a specific manner and in accordance with manufacturers' instructions. It is also important to ensure that shelving is properly braced, adequate for the load it will hold, and attached to the facility structure or a bracing system to ensure that it does not collapse under load. Shelving should also be inspected regularly to ensure that it is still in good condition and that all fasteners are properly installed and intact.

Type A Accident Investigation of Mixed Waste Spill at Hanford Tank Farms — Part 1: Engineering Design Factors

EM-RP-CHG-TANKFARM-2007-0009

(***OE Summary 2007-08***) On July 27, 2007, at the Hanford Tank Farms, a health physics technician performing a tank waste transfer shutdown radiological survey identified unexpected high radiation levels (about 200 mrem/hr) in an area 8 to 12 feet from a transfer pump. An entry team responded, took initial radiation readings, and measured 25 rem/hr (beta window open) and 1 rem/hr (beta window closed) within a foot of the liquid. The entry team also found a dark stain and standing liquid around the pump pit. Access to the area was immediately restricted, and the spill area was stabilized. Subsequent analysis indicated that as much as 85 gallons of tank waste, including suspended solids and vapors, were released in a short period of time from a ruptured dilution hose near the pump.

When the accident occurred, there were no workers in the area of the spill. However, in the hours and days following the spill, a number of Hanford workers identified odors, experienced symptoms or health effects, or expressed concerns about their potential exposure to waste chemicals from the spill. Because the potential for worker exposures was not fully considered either during or shortly after the accident, the chief health, safety and security officer established a Type A Accident Investigation Board to conduct an independent investigation of the accident.

The board identified deficiencies in five program areas: engineering design; work control; industrial hygiene/medical; emergency management; and management and oversight. The Hanford Tank Farms are designated as a Category 2 nuclear facility. The tanks, pumps, and related safety systems are covered by a documented safety analysis (DSA) and by technical safety requirements (TSRs). The pump that was involved in this accident was installed in mid-July 2007, and was operated for only a few days before the accident occurred.

On the day before the spill, the pump stopped or was shut down several times because of issues such as high discharge pressures and high electrical current indications.

The board concluded that the direct cause of the spill was an overpressure of a hose connected to a dilution line on the retrieval pump system. The overpressurization and spill resulted from the lack of an isolation device (e.g., a backflow preventer) between the dilution water system (a non-waste transfer system) and the waste transfer route. Both the DSA and TSRs require such a device. The board also determined that the sparging water system met the DSA definition of a "non-waste transfer system not physically connected" to the waste transfer route and, thus, also required an isolation device. However, there was no isolation device in place. They identified the root cause of the event as the failure to implement the DSA requirement to provide isolation of the hose from the waste transfer route as prescribed in the TSRs.

Engineering design factors that contributed to the incident include the following.

- The design process failed to verify proper implementation of required DSA and TSR safety significant design features for the retrieval pump system and the associated dilution and sparge lines.
- The dilution and sparge lines were not classified as safety significant; specifically, the portions of the lines within the pump housing to the incorrectly located backflow preventers were not classified as safety significant.
- The retrieval pump system design specifications were not fully incorporated into operating procedures.

The following JONs address these engineering design factors.

1. Improve incorporation of the design features, testing, and operating limits and specifications into operating procedures associated with the tank and the pump to ensure its ability to move waste without becoming fouled.
2. Revise the design review processes, procedures, and implementation to ensure approved designs are technically correct and satisfy the requirements of the DSA.
3. Perform an engineering analysis to determine whether the pump can continue to be operated safely following the deformation that occurred when excessive shaft torquing was applied during maintenance.
4. Change the safety basis to require that new primary pressure boundaries for the tank be classified as safety significant, and treat existing installed systems, structures, and components as if they were safety significant to the extent practical.

The Accident Investigation Board concluded that this accident could have been prevented if a backflow prevention device had been installed, as required by the DSA and TSRs for the tank farms. They also concluded that, although several workers reported symptoms, it is unlikely that the accident resulted in significant radiation or chemical exposures to workers. However, the event could have been significantly worse if individuals had been in the immediate vicinity of the spill at the time of the release.

This event illustrates the importance of conducting detailed design reviews and engineering analyses of equipment and systems in order to guarantee that their design, installation, and function meet the requirements set forth in the documented safety analysis and the technical safety requirements.

Type A Accident Investigation Mixed Waste Spill at Hanford Tank Farms — Part 2: Work Control Factors

EM-RP-CHG-TANKFARM-2007-0009)

(***OE Summary 2007-09***) On July 27, 2007, at the Hanford Tank Farms, a spill of about 85 gallons of tank waste from a ruptured dilution hose resulted in high radiation levels in an area surrounding a transfer pump. A Type A

Accident Investigation Board conducted an independent accident investigation of the event and determined that, although the cause of the spill was overpressure of the hose due to the lack of a required backflow device, deficiencies in five program areas contributed to the accident. *OE Summary 2007-08* reported on deficiencies in engineering design that contributed to the spill. The focus of this article is on deficient work control factors that contributed to the event. (EM-RP-CHG-TANKFARM-2007-0009)

The Accident Investigation Board evaluated work control processes in three areas (operations, maintenance, and radiation protection activities) and reviewed them against core Integrated Safety Management (ISM) functions. The board reviewed activities that were important to the accident and sampled the performance of other activities supporting waste retrieval. Among the activities the board reviewed were troubleshooting, operations and maintenance activities to free the clogged pump (manual pump rotation combined with electrical pump bumping), waste retrieval pumping operations, and radiological controls associated with retrieval operations and during event response.

The board determined that some aspects of operations and maintenance activities were performed in accordance with procedures and ISM core values; however, they also identified numerous deficiencies in the procedures and in conformance with procedures. For example, although the operations procedure defined the scope of work for normal operations adequately, it did not address off-normal activities, such as reverse pumping or recovering from a clogged pump, and there were errors and ambiguities in the procedure (e.g., a valve re-opening step was omitted).

The board found that there was no operating or maintenance procedure defining the scope, hazards, controls, and coordination required to rotate the waste retrieval pump manually and "bump" it electrically. Troubleshooting the stalled pump and clearing the clog were performed in accordance with a standing minor maintenance instruction, and the requirements were not consistent with the facility-level work control procedure. The board also learned that procedures were not always followed, some logs were not properly maintained, some controls were informally communicated (e.g., via email) and were not passed on to workers, and some operating instructions were not incorporated into the operations procedure.

The board identified a number of deficiencies in processes and performance in the area of radiation protection controls. The waste retrieval pumping procedures, the abnormal operating procedures, and the radiation work permits did not adequately define the scope of radiological work conducted during the event, and there were weaknesses in radiological hazard analysis. The board reviewed the retrieval pumping procedure and found that it lacked a documented technical basis associated with the radiological criteria of 75 mrem and 100 mrem, which were used as the trigger/action level. They also determined that an informal entry plan, rather than a formal procedure, was used when entry was made into the high radiation area to conduct a survey to investigate the high radiation condition. This approach resulted in incomplete hazard analysis, lack of required work reviews, and potentially deficient controls.

Several controls for ensuring proper recognition of waste transfer leaks were in place, but incomplete procedural guidance for radiological surveys, radiological criteria, and response actions, as well as weak implementation of survey protocols, rendered them ineffective. Also, using Abnormal Operating Procedures as standalone procedures without regard to other procedures and protocols resulted in potentially unsafe working conditions, a delay in recognizing the leak, and unclear specification of personal protective equipment needed during the response.

The supervisor, operating crew, and responders all incorrectly believed that an above-ground waste leak that was not detected by the Transfer Leak Detection System was not credible, so they did not aggressively investigate that possibility when they investigated the high radiation level condition. The board reviewed operations and radiation survey actions and identified a number of opportunities to identify the spill condition.

The board reviewed the work control processes associated with this accident against ISM core functions. Their analysis of work control processes in regard to operations, maintenance, and radiological control indicated that many ISM areas require attention. Importantly, lessons learned from previous damage to the original pump, including procurement of an air motor to turn a stopped pump versus turning it by hand and special tools and torque limits for turning the pump by hand if needed, were not implemented effectively. In addition, several of the deficiencies identified by the board during the accident investigation are very similar to noncompliant conditions included in a Price-Anderson enforcement action issued on March 10, 2005.

The contributing work control causes identified by the board during the accident investigation are addressed by the following judgments of need (JONs):

1. Management needs to define and implement an effective method for identifying Tank Farm small quantity waste leaks.
2. Management needs to clarify technical safety requirements with regards to radiological measurements as indicators of waste transfer leaks.
3. Management needs to address radiological conduct of operations deficiencies that were evident during the response to abnormal operating conditions.
4. Workers, supervisors and management need to improve implementation of the required conduct of operations program.

The detailed two-volume accident board report is available on the DOE Office of Health, Safety and Security website at http://www.hss.energy.gov/csa/csp/aip/HanfordTankFarm.html. The board's conclusions and JONs in the area of emergency management will be the topic of an upcoming article in the *DOE "OE Summary."*

This event illustrates the importance of developing accurate procedures, communicating them properly, and following them precisely. The event also shows the importance of not making assumptions about equipment or data, but rather investigating all possibilities to accurately identify the source of any problems. It is also essential to effectively implement previous lessons learned to avoid similar, future occurrences.

FIRST QUARTER FY 2008

FINAL LANL ORPS REPORTS

From 10/01/07 to 12/31/07, the Department of Energy approved 26 final LANL Occurrence Reports (listed on Page 17). The following narrative provides details for one of these events, including event description, causal analysis, and corrective actions.

Criticality Safety Posting Violations Identified During Walk-Down

NA-LASO-LANL-TA55-2007-0031

SYNOPSIS: On August 15, 2007, during a walk-down at Technical Area 55, Building 4, two different criticality safety postings were found on a glovebox that was non-compliant with the current Criticality Safety Limit Approval (CSLA). Upon further examination it was determined that there was more material in the box than allowed by the posting. The criticality tag boards are used to alert operators to fissile material considerations, and only one tag board per workstation is allowed, per procedure. Criticality tags are hung on pegs on the board so that operators can see at a glance how much fissile material is in the workstation compared to the limit. In this case, the glovebox had two tag boards and two postings. While each had the same tag, this configuration potentially implied there were two Material Accountability Safeguards System (MASS) locations instead of one. Notifications were made, and personnel re-located an item to another MASS location, tagged out the glovebox, and removed the outdated posting. Weapons Component Manufacturing Group (WCM-1) management walked down area gloveboxes for similar conditions. No other similar conditions were found.

BACKGROUND: Prior to May 2007, the glovebox had two MASS locations. In May 2007, WCM-1 personnel re-evaluated the glovebox and eliminated one of the MASS locations. A new CSLA was developed and a new criticality safety posting was placed on the glovebox. It was then up to WCM-1 to assure that proper postings were used. WCM-1 personnel were briefed on the new CSLA, new postings, and re-configuration of the glovebox, and WCM-1 personnel discussed the change for that glovebox so everyone was aware that a MASS location was being dropped from the glovebox. The criticality safety space identification tag for the soon-to-be-deleted MASS location was removed to indicate there was only one space in the glovebox. The remaining MASS location was re-tagged, but the old identification tag was left up. While both tags read the same location, it could appear that two MASS locations existed in the glovebox due to the presence of two space identification tags. In addition, the MASS database was not updated to delete one of the locations electronically. Computerized MASS transactions precede physical material transfers. Thus, it was believed by operators, despite the briefings, that two MASS locations within the glovebox were active.

ANALYSIS: Investigators identified a failure in "ISM Step 3. Develop and Implement Hazard Controls" in that the procedure (*TA55-AP-522*) did not provide details on de-posting and re-posting workstations. Investigators also found a failure involving ISM "Step 4 Perform Work Within Controls" in that work was done outside of MASS location controls. Investigators determined that procedures/policies were a factor in this event in that the procedure stated that criticality limit postings should be placed on the workstation, but did not provide more specific guidance on how or where to place the postings, or on de-posting a MASS location. Investigators found that the workstation had two tag boards with space identification tags. Even though both tags showed the same identification number, it provided the appearance that two MASS locations physically existed at the workstation. Investigators also found that the dual MASS locations for this workstation both still existed in the computerized MASS database, which led to further confusion because material could be electronically moved into the location as if there was a second location.

CORRECTIVE ACTIONS: (1) A walk-down of all gloveboxes with CSLA was conducted to ensure compliance with criticality safety requirements. (2) A criticality safety posting protocol with specific roles and responsibilities was to be developed to address re-posting and de-posting requirements and included in *TA55-AP-522*, which was to be reviewed and revised accordingly. (3) Criticality safety operational readiness criteria were to be established via a *Lessons Learned Bulletin*. (4) After this event, it was decided to remove the locations from the MASS database first and then drop the postings, tag boards, and identification tags from the gloveboxes.

DOE Approves 26 Final LANL ORPS Reports

From 10/01/07 to 12/31/07, DOE approved 26 final LANL Occurrence Reports. The following is a listing of the reports:

- Two Workers Experience Mild Shock from Touching Dishwasher
NA-LASO-LANL-BOP-2007-0013
- Contact Between Two Cranes
NA-LASO-LANL-BOP-2007-0016
- Unauthorized Modification to Wing 9 Hot Cell Door Interlock System
NA-LASO-LANL-CMR-2007-0006
- Defective Filter Gaskets Discovered
NA-LASO-LANL-CMR-2007-0010
- Transport of a Forklift Results in a Collision with a Security Gate Monorail
NA-LASO-LANL-HEMACHPRES-2007-0003
- Determination of Positive USQ Related to Seismic Hazards Assessment
NA-LASO-LANL-LANL-2007-0006
- Notification to Violation of the Hazardous Waste Act (HWA)
NA-LASO-LANL-LANL-2007-0008
- Transportation Cask from TA-48 Found Contaminated Upon Receipt Inspection at TA-54 Area G
NA-LASO-LANL-MATWAREHS-2007-0005
- Worker Exposed to Tungsten-Hexafluoride During Vacuum Pump Replacement
NA-LASO-LANL-NUCSAFGRDS-2007-0003
- A Small Fire Results in a Burn to a Researcher
NA-LASO-LANL-SIGMA-2007-0004
- Loss of Off-Site Power Results in Partial Performance Degradation of Safety Significant Support System
NA-LASO-LANL-TA55-2007-0019
- Inappropriate Use of UPS Causes a Performance Degradation of the FCS
NA-LASO-LANL-TA55-2007-0024
- Management Concern: SCBA Equipment Faulty
NA-LASO-LANL-TA55-2007-0025
- Safety Significant Pressure Relief Valve Discovered to Inadvertently Exceed Pressure Limit
NA-LASO-LANL-TA55-2007-0027
- TSR Violation: Fissionable Material Handlers and Supervisors Training and Qualification Process Non-Compliant with SAC
NA-LASO-LANL-TA55-2007-0030
- Management Concern: Criticality Safety Posting Violation Identified During Walk-Down
NA-LASO-LANL-TA55-2007-0031
- Management Concern: Change in Portal Functionality Test Procedure Not Formalized
NA-LASO-LANL-TA55-2007-0033
- Management Concern: Pipe Threader Maintenance
NA-LASO-LANL-TA55-2007-0036
- Management Concern: Unauthorized Removal of Gauge
NA-LASO-LANL-TA55-2007-0037
- Management Concern: Miscommunications Led to Entry into Red-Lit Room
NA-LASO-LANL-TA55-2007-0038
- Management Concern: Configuration Management of Switchgear Upgrade Project
NA-LASO-LANL-TA55-2007-0039
- Defective Gaskets Discovered on Empty Containers
NA-LASO-LANL-TA55-2007-0042
- Management Concern: Damage to Gas Regulator Causes Gas Leak
NA-LASO-LANL-TA55-2007-0044
- Management Concern: Work Control Issues Characterized by Two Events
NA-LASO-LANL-TA55-2007-0046
- Management Concern: Preparation of the Hydride Transport Vessel
NA-LASO-LANL-TRITFACILS-2007-0002
- Software Modification Impacts LLW Tracking
NA-LASO-LANL-WASTEMGT-2007-0013

Lessons Learned Corrective Actions

"Lessons learned are an important component of the feedback and continuous improvement function within the Integrated Safety Management System. Developing and tracking corrective actions to closure may help institutionalize a lessons learned. Corrective actions can take many forms and may be used to verifiably document a change in the affected process. Developing and managing corrective actions associated with a lessons learned proactively reduces known risks, improves effectiveness and efficiency, and helps prevent recurrence of undesirable events. . . . Ideally, a facility will initiate actions to prevent recurrence of an event at some other facility. In that sense, those actions are technically 'preventive' but will be considered corrective for this discussion. Such actions are routinely tracked in a site-level system. Corrective actions may include but should not necessarily be limited to the 'Recommended Actions' in the lessons learned document."

-- Excerpt from the the DOE Society for Effective Lessons Learned Sharing (SELLS) *Lessons Learned Corrective Actions Fact Sheet*. For more information about this fact sheet or the lessons learned process, visit the DOE LL website at: http://www.hss.energy.gov/CSA/Analysis/ll/.

Defense Nuclear Security Lessons Learned Center

The Office of Defense Nuclear Security established the Defense Nuclear Security Lessons Learned Center (DNS-LLC) at Los Alamos National Laboratory to encourage and facilitate the sharing of lessons-learned data on physical security-related issues. This center will help users from across the NNSA Complex identify and implement effective solutions to various security issues.

The center provides a repository and forum for sharing innovative new tools and practices to address common security issues, improve the efficiency of the security program, and help prevent security incidents. To better develop and implement policies, procedures, and systems that will better manage security risk, the center provides security experts with access to information about real-world security successes.

Integrating Security with Projects and Mission Changes

LANL's Safeguards and Security (S&S) Requirements Integration Team (RIT) promotes Integrated Safeguards and Security Management (ISSM) by incorporating S&S planning into construction, facility modifications, facility upgrades, decommissioning, demolition, operational projects, or mission changes that impact LANL operations. Since its inception in 2001, the S&S RIT has applied ISSM to more than 600 LANL projects.

The S&S RIT identifies and addresses security interests that must be included in project planning and project execution. Security interests include Laboratory-controlled classified and sensitive unclassified matter, nuclear materials, critical mission assets, select biological agents and toxins, and other government resources associated with accomplishing the Laboratory's mission.

The S&S RIT ensures that appropriate S&S subject matter experts (SMEs) engage project managers and the organization that controls the project, or the responsible project authority, in designing, developing, and implementing cost-effective and sustainable security controls.

Process

The S&S RIT identifies security SMEs for the major functional areas usually present in a project: cyber security, physical security, material control and accountability, the protective force, and security systems. After they are assigned to the project, the security SMEs help to resolve security issues and to support project managers in applying ISSM principles to their activities.

The project template for S&S deliverables follows the general project management process used at the Laboratory. The S&S RIT is connected to a major computer network that provides current information on project and mission change activities throughout the Laboratory. The team also employs informal networks and methods to gather project information, attends monthly LANL/DOE Los Alamos Site Office project reviews, develops the security input to the 10-Year Comprehensive Site Plan, and works with institutional planning committees.

For each major project, the S&S RIT creates and maintains a project file in a

centralized database. Each file is updated throughout the life of the project. Project files may include preliminary S&S questionnaires, which can be used to collect security requirements information from project personnel. The data gathered from projects is used to develop and improve Laboratory S&S standards.

The S&S RIT meets weekly to evaluate new and ongoing activities. Activities are evaluated on the basis of security importance and complexity. A security representative is then assigned to each project.

The S&S RIT uses three graded levels of S&S importance and complexity: low, medium, and high. Projects with low-level S&S assets receive basic communications from the S&S RIT and an S&S point of contact. For these projects, the security program lead or division security officer deployed to the organization that controls the project handles most of the coordination and resolution of security issues.

Projects with medium- or high-level S&S assets usually require an S&S team that includes an S&S RIT representative and several security SMEs. Security program managers designate SMEs from their departments or groups. The S&S RIT creates and coordinates security SME teams that provide expert input at appropriate project junctures.

The S&S team provides support throughout the project to ensure effective security integration and participates in the project until the project is turned over to operations. At that time, the S&S team is dissolved.

Benefits of the S&S RIT Process

Integrating S&S in the project planning stage has helped eliminate rework and costly retrofits that were sometimes necessary because security needs were not recognized until a project was under way.

Including realistic security-related needs in project baselines has reduced unplanned scope, schedule, and cost impacts. Additionally, more consistent S&S delivery improved negative customer perceptions of S&S that resulted from unfulfilled obligations, inconsistent products, and inconsistent policy implementation.

Integrating S&S in the project planning stage has helped eliminate rework and costly retrofits that were sometimes necessary because security needs were not recognized until a project was under way.

Integrating the S&S RIT at the start of project planning enhances efficiencies at the institutional level by standardizing S&S approaches and identifying risks on a broader level.

The S&S RIT approach also provides Laboratory-wide perspectives on security needs and controls, allowing S&S staff to identify interdependencies among projects and functions. For example, several major projects contained within a relatively small area are concurrently modifying Technical Area 55 (TA-55). This creates a high number of interdependencies from a logistical standpoint.

Any change to a facility as important as TA¬55 must be reviewed by security, using sophisticated methods. Any change to any facility space configuration or function requires an adjustment to compensate for the corresponding change to the security envelope. Presently, many of these changes are occurring to the TA¬55 security envelope.

This systematic approach to S&S integration has improved the Laboratory's ability to plan and manage security vulnerability analysis (VA) work conducted for projects. The Site Safeguards and Security Plan Team conducts this work. Thus, S&S staff is better able to proactively identify and negotiate deliverables such as VA reports for projects.

Based on its experience, the S&S RIT provides input to institutional site planning and project management procedures. The S&S RIT has also undertaken process improvement efforts, including providing clearer guidance to project managers.

Process Development Problems

When the S&S RIT was first established, ensuring that the S&S RIT was notified of projects as they were being initiated was a major challenge.

For example, when a parking structure was planned next to a nuclear facility, security considerations were not raised until the project required approval from LANL's Infrastructure and Facilities Committee. Cost and schedule impacts would have been substantially reduced if initial project discussions had included security considerations. Eventually, the parking structure project was canceled in order to conform to site protection strategies.

Success of the S&S RIT

The S&S RIT has developed a systematic method to ensure that S&S requirements are addressed at various stages in project activities. The process has helped standardize security input and ensure timely, project-specific security input. As a result, the Laboratory has reduced the number of unplanned S&S impacts to projects, applied more standardized S&S approaches, and used limited S&S human resources more efficiently.

Hazardous Waste Management at the Laboratory –

An Opportunity for Improvement

A wide variety of wastes generated as a byproduct of the Laboratory's mission must be managed and disposed of properly. Annually, the Laboratory generates approximately 2,600 tons of solid and hazardous wastes and 5,000 cubic meters of radioactive waste. Of these three general waste types, hazardous waste continues to be a significant vulnerability. The Laboratory generates hazardous waste, usually in small volumes and in frequently changing compositions, reflecting the varied nature of R&D type activities. Management and disposal of hazardous waste is very expensive and poses a safety and compliance vulnerability.

At the Laboratory, hazardous waste is regulated primarily by the New Mexico Environment Department (NMED) as authorized by the federal Environmental Protection Agency (EPA). Because of the threat to human health, safety and the environment, hazardous waste is subject to stringent management standards that apply from the first moment of generation to ultimate disposal: "cradle-to-grave." Violations resulting from annual compliance inspections conducted by the NMED are usually accompanied by substantial monetary penalties, which are non-allowable costs under our contract.

Currently, the Laboratory's compliance performance is not what it should be. In Fiscal Year 2007, the Laboratory's internal assessments of waste management sites recorded more than 1,200 non-compliance findings. The majority were due to failure to meet the simplest requirements — incomplete or missing labels, open containers, poor or missing documentation, and failure to make a hazardous waste determination (i.e., identify it as hazardous waste).

Most waste management failures, and attendant compliance and safety problems, occur while managing the waste prior to actual disposal. Every Laboratory employee can help prevent violations of the law and avoid potentially unsafe situations from developing. Here are a few simple steps to reduce your vulnerability:

Most waste management failures, and attendant compliance and safety problems, occur while managing the waste prior to actual disposal. Every Laboratory employee can help prevent violations of the law and avoid potentially unsafe situations from developing.

MANAGERS — Be aware of your responsibilities for proper and safe management of wastes. Devote at least some of your walk-arounds to waste management and other environmental issues, perhaps accompanied by your waste management coordinator (WMC) or a member of Environmental Protection Division (ENV). Communicate to your employees the importance of proper waste management and waste minimization. You might also monitor your organizations' performance by logging on to the ENV Resource Conservation and Recovery Act (RCRA) online Hazardous Waste Self-Assessment Database: *http://hsr-web2.lanl.gov/cgibin/esh19/swrc_dbsummary.pl?table=HWTS_SASHA.*

WASTE MANAGEMENT COORDINATORS — Work with your clients up front to ensure they know how to properly manage their wastes and how you can help. Constantly monitor your areas for waste management problems and help resolve those issues (facilitate waste characterization, documentation, shipping, and disposal).

WASTE GENERATORS — First, implementing a waste minimization plan will minimize or even eliminate hazardous waste generation, thus reducing future risks and costs. Ensure that proper waste management and waste minimization is part of your work planning. Once generated, hazardous waste must be stored in containers that are in good condition, appropriate for the type of waste, and properly closed. The containers must be labeled with the words "hazardous waste," and they must be managed "at or near the point of generation." Take advantage of assistance and support from ENV. For more information or to request help, contact your WMC (http://int.lanl.gov/orgs/wes/wa/org.shtml) or ENV RCRA at 667-0666. Contact the Pollution Prevention Program at 667-4348 to identify waste minimization opportunities.

Additional requirements exist for generators who accumulate more than 55 gallons, such as regular documented inspections, disposal within 90 days of generation, mandatory training, contingency planning, and reporting. Although these requirements are important, they often get lost in the mix of day-to-day deliverables, cutting-edge science, and other priorities.

The bottom line is that repeated violations of hazardous waste laws erode the confidence of the Laboratory's sponsors, representatives, and the general public in the Laboratory's ability to carry out the mission in an environmentally responsible manner. This is an easy opportunity to prevent problems before they occur.

NEWS & ANNOUNCEMENTS

DOE News and Other Items of Interest

"Avoiding Unwanted Chemical Reactions"

The Department of Energy's Office of Health, Safety and Security published Safety Bulletin No. 2007-06 in August 2007 to provide information on the avoidance of unwanted chemical reactions during laboratory and other work activities. The DOE ESH bulletins are issued to provide information to the DOE Complex on safety concerns that may impact operations at DOE facilities.

This bulletin, titled "Avoiding Unwanted Chemical Reactions," revisted an event on May 1997 in which a run-away chemical reaction occurred in a small tank at the DOE Plutonium Reclamation Facility at Hanford. The resulting explosion destroyed the tank and the room where the tank was located and created a toxic release. The bulletin noted that unwanted chemical reactions on a smaller scale happen often throughout the DOE Complex. In fact, DOE records show 24 occurrences of unwanted chemical reactions over the past 5 years, including three injuries and four near-misses where chemical vessels exploded or ruptured, the bulletin reported. Furthermore, there were 16 additional reports of safety concerns for chemical reactions due to the presence of shock sensitive chemicals and potential mixing of incompatible chemicals.

DOE ESH Bulletins are issued by the Office of Health, Safety and Security to provide information to the DOE Complex on safety concerns that may impact operations at DOE facilities.

The bulletin warned that chemicals may be subject to longterm changes in concentration or degradation. Chemicals in the shut-down process equipment in the 1997 Hanford incident concentrated over time, which in turn led to the accident. Some chemicals may develop additional hazards upon prolonged storage. Time-sensitive chemicals may become shock sensitive through drying, decomposition, or slow reactions with oxygen, nitrogen, or the container. Other chemicals may generate toxic gases.

The bulletin advises employees to report suspect or shock-sensitive chemicals that are outdated. "DO NOT TOUCH OR MOVE SUSPECT CHEMICALS," the bulletin warns.

The bulletin advises that employees perform a thorough analysis for chemical properties and incompatibilities before working with the chemicals, and issued the following recommendations:

- Maintain a current inventory of chemicals with time-, temperature-, and shock-sensitive hazards that tracks locations, inspection dates, etc., from procurement through disposal.
- Include any chemicals created on-site and those not acquired through the acquisition process.
- Ensure that employees are adequately trained on the hazards, safe working methods, and emergency procedures for special hazard chemicals.
- Establish criteria and procedures for the safe and timely disposal of such chemicals. If you have any questions, please contact Dr. Bill McArthur by telephone at (301) 903-6061 or at bill.mcarthur@hq.doe.gov.

"Automated External Defibrillators"

On November 2007, the DOE's Office of Health, Safety and Security published Safety Bulletin No 2007-07 regarding the need for automated external defibrillators (AED) at all work facilities and departmental fitness centers. An AED is a computerized device about the size of a laptop computer that analyzes the heart rhythm and prompts a rescuer to deliver an electrical shock if needed.

The bulletin, titled "Automated External Defibrillators," reported that on June 11, 2007, a fatality occurred at the DOE Savannah River Site (SRS) involving a member of the SRS protective force. "The protective force member had just completed an unsupervised physical fitness activity and was in the midst of 'cooling down' prior to returning to duty when he suffered a heart attack resulting in death," the bulletin reported.

A limited scope investigation concluded that there are a number of programmatic implications arising from the fatality that suggested ways in which the overall departmental fitness and emergency response programs can be improved, the bulletin said. These suggestions included the provision of AEDs at facilities and procedures to enable more effective notification and first response.

More than 200,000 Americans die of sudden cardiac arrest every year. Up to 50,000 of these deaths could have been prevented if an AED had been available and someone had initiated the "cardiac chain of survival" immediately at the time of the emergency, the bulletin said. When AEDs are used in conjunction with cardiopulmonary resuscitation training (CPR), they can increase survival rates between 50-80 percent.

The bulletin also listed the following recommendations:

- Make AEDs available at all DOE facilities and departmentally controlled exercise centers.
- Provide appropriate training at each facility to assist on-scene responders in their use of AEDs and their integration into CPR.
- Have in place procedures to facilitate immediate notification of emergency medical services in the event of a health or safety emergency at such facilities.

If you have any questions, please contact Dr. Bill McArthur by telephone at (301) 903-9674 or at bill.mcarthur@hq.doe.gov.

"Silica Dust Exposure"

On November 2007, the Department of Energy's Office of Health, Safety and Security published Safety Bulletin No 2007-08 regarding a concern over the exposure of workers to silica dust during construction and demolition activities.

NEWS & ANNOUNCEMENTS

DOE News and Other Items of Interest

The bulletin, titled "Silica Dust Exposure," reported that recent information and incidents at DOE suggest that cutting and grinding cement during construction and demolition activities are more hazardous than previously recognized. Exposure to free crystalline forms of silica (silicon dioxide) from quartz, cristobalite, and tridymite could cause respiratory disease. Quartz is the most common form of crystalline silica and is found in granite, sand, and other minerals, the bulletin reported. Potential work exposure to airborne crystalline silica includes abrasive blasting, sandblasting, rock cutting, chipping, drilling, grinding, jack hammering, concrete work, and demolition of concrete and masonry structures.

The bulletin noted that DOE records show 17 health-related incidents involving crystalline silica dust over the past 5 years. Thirteen of these occurrences resulted in worker overexposures. The remaining cases had working environments that had the potential for overexposures.

The bulletin explained that overexposure of workers to airborne crystalline silica may lead to the development of silicosis, lung cancer, and airways diseases. Silicosis increases the risk of tuberculosis infection. These exposures may also be related to the development of autoimmune disorders, chronic renal disease, and other adverse health effects.

The DOE exposure limit for respirable crystalline silica follows the lower Threshold Limit Value (TLV) of 0.050 mg/m3 of air given by the 2005 American Conference of Governmental Industrial Hygienists (ACGIH) as required by 10 Code of Federal Regulations 851, "Worker Safety and Health Protection." However, the bulletin noted that in 2006, the ACGIH adopted the value of 0.025 mg/m3 of air as the lower TLV for respirable crystalline silica in recognition of the increased risk from silica overexposure.

The bulletin reported that overexposure to silica can be avoided though the use appropriate respirators and other controls whenever necessary.

For more information, contact Dr. Bill McArthur by telephone at (301) 903-9674 or at bill.mcarthur@hq.doe.gov.

"Application of 10 C.F.R. 707 Workplace Substance Abuse Programs at DOE Sites"

On October 2007, the Department of Energy Office of Health, Safety and Security issued "Safety Advisory 2007-05" to alert Department of Energy (DOE) and DOE contractor personnel to new Departmental Policy regarding drug testing programs. The advisories are published by DOE HSS to provide information to the DOE Complex on potentially significant safety or health issues.

The advisory, titled "Application of 10 C.F.R. 707 Workplace Substance Abuse Programs at DOE Sites" reported that on September 14, 2007, the DOE Secretary issued a memorandum stating that all federal and contractor positions that require a security clearance ("Q" or "L") and all employees in positions that currently have security clearances have the potential to significantly affect the environment, public health and safety, or national security. Therefore, all federal employees with security clearances will be considered to be in testing designated positions (TDP), and all contractor employees with security clearances will be included as TDPs following consultation with the contractors as required by 10 C.F.R. 707. All such positions will be subject to applicant, random, and for-cause drug testing at the rate prescribed under the current version of the regulation. The advisory reported that 10 C.F.R. Part 707.7(b) describes which jobs are classified as TDPs. These positions include:

DOE ESH Advisories are published by the Office of Health, Safety and Security to provide information to the DOE Complex on potentially significant safety or health issues.

- Those covered by the Personnel Security Assurance Program;
- Employees with critical duties involving nuclear explosives; personnel directly engaged in construction, maintenance, or operation of nuclear reactors;
- Individuals having unescorted access to the control areas of DOE reactors; personnel working with hazardous materials;
- Protective force personnel, pilots, and firefighters; and
- Other positions that could significantly impact the environment, public health and safety, or national security.

The advisory noted that all those TDPs identified under this section of the rule are currently designated to be included in the pool for 50 percent annual random sampling. In some cases, other rules or DOE directives will require individuals to be included in a 100 percent annual sample. The advisory reported that in order to make the requirements of 10 C.F.R. 707 consistent with the Secretary of Energy's memorandum, 10 C.F.R. 707 is being amended to reduce the sampling rate of the TDPs designated for 50 percent testing to 30 percent annual sampling for random drug testing.

In addition, the advisory reported that all applicants for TDPs (including those that do not require clearances) will be tested before final selection into the position or, for current federal or contractor employees, before a security clearance is granted. All applicants for security clearances (including current federal employees and contractor employees applying for a new clearance) who have been determined to have used illegal drugs within the 12 months preceding their completion of a Questionnaire for National Security Positions (SF-86) will be

NEWS & ANNOUNCEMENTS

DOE News and Other Items of Interest

disqualified from further consideration for a security clearance, until such time as they can demonstrate non-use of illegal drugs for 12 consecutive months.

If you have any questions, please contact Dr. Bill McArthur at (301) 903-9674 or at bill.mcarthur@hq.doe.gov.

"SEELER Exothermic Torch"

The Department of Energy's Office of Health, Safety and Security issued "Safety Advisory 2007-06" on November 2007 to inform DOE sites about the hazards associated with the SEELER Exothermic Torch and to recommend suspension of the use of such equipment.

Advisory 2007-06, "SEELER Exothermic Torch," reported that on November 15, 2005, a student attending a course at the National Training Center (NTC) was injured while using the SEELER Exothermic Torch. An investigation conducted by NTC and SEELER Enterprises found the dead-man switch leaking, which allowed oxygen to flow into the cable prior to the user's activation of the system. It appeared that the plunger inside the valve may not have fully sealed when closing the switch.

In 2007, the NTC experienced two additional failures in which the switch from SEELER torches was again found leaking. A similar failure with the switch was also reported by a student taking a familiarization course on the SEELER torch at Oak Ridge (Y-12).

The NTC found that the dead-man switch supplied by SEELER is rated to operate at 300 pounds per square inch (psi) while the SEELER regulator supplying the oxygen to the switch is factory-set to 310 psi. NTC has been unable to determine if this factor is a direct contributor to the switch failure. To date, the problem with the leaking switch has not been resolved by SEELER Enterprises. The advisory urges Sites to suspend the use of SEELER Exothermic Cutting Torch.

For more information about the torch defect, contact Charlie Lopez (NTC) at (505) 845-5170, x-636, or e-mail clopez@ntc.doe.gov. Contact Dr. Bill McArthur at (301) 903-9674 or e-mail bill.mcarthur@hq.doe.gov concerning issues regarding this advisory.

"Coping with Post-Traumatic Stress"

The Department of Energy's Office of Health, Safety and Security issued "Safety Advisory 2007-07" in December 2007 to provide information on managing stress following a traumatic event within communities or at Department of Energy (DOE) facilities.

Advisory 2007-07, "Coping with Post-Traumatic Stress," reported that traumatic stress can cause an anxiety disorder called post traumatic stress disorder (PTSD). The advisory noted that it is typical for people to experience a variety of emotions following an exposure to catastrophic events. These traumatic incidents can produce unusually strong emotional reactions that may interfere with their ability to function.

The advisory noted that symptoms may occur immediately after a traumatic event or may be a delayed reaction to the stress. These feelings can include shock, sorrow, numbness, fear, anger, disillusionment, and grief. Employees may have common and normal reactions, such as trouble sleeping, recurrent nightmares, or problems with concentrating, eating or remembering even simple tasks. Employees probably have PTSD if the symptoms last longer than four weeks, cause great distress, or interfere with their work or home life. They may have to seek medical attention or mental health support, especially if they experience chest pain, difficulty breathing, long term nausea or mental distress.

The advisory offers the following tips for employees to help them deal with stress:

- Recognize and accept what you cannot change.
- Give yourself time to experience your feelings and to recover - The symptoms of PTSD should pass after a while.
- Talk about it. It often helps to speak with others who have shared your experience so you do not feel so different or alone.
- Turn it off and take a break. While getting the news from the internet, television, newspapers or magazines is informative, being overexposed to it may actually increase your stress.
- Take care of yourself. Avoid excess alcohol and drugs. Maintain as normal a schedule as possible and establish or reestablish routines such as eating meals at regular times and maintain physical activity in your day. If you are having trouble sleeping, try some relaxation techniques, such as deep breathing, meditation, pleasant reading, or yoga.

If you have any questions, please contact Dr. Bill McArthur by telephone at (301) 903-9674 or at bill.mcarthur@hq.doe.gov.

Product Recalls Not Listed in "Mirror"

The "Mirror" no longer publishes the U.S. Consumer Product Safety Commission product recalls. The recall notices can be found at the CPSC website at http://www.cpsc.gov. Contact Robin Justice (justice@lanl.gov) of CAO-IS if you would like to receive the recall notices.

SHARE THE "MIRROR"

The LANL ESH&Q Integration Office recommends that LANL managers include the "LANL Mirror" in their Required Reading Programs.

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