

Chemical Occurrences - March, 1998

Class 1:

Los Alamos - Two workers received first and second degree burns on their hands and faces when fumes from an aerosol cleaner were ignited by a space heater. A fireball resulted and propagated through a constricted area. The burned workers were medically treated and released.

Class 2:

Sandia - Cutting operations were halted due to an unanticipated exposure to lithium bromide; possible symptoms were experienced.

INEEL - A painter experienced a possible allergic reaction to chemicals; treatment involved the administration of intravenous medication.

Fernald - Potential exposures to nitric acid fumes occurred when a work permit was violated; symptoms were noted but medical evaluation showed no effects.

Oak Ridge, Y-12 - During piping removal workers were unexpectedly contacted by caustic lithium hydroxide; no injuries resulted.

Hanford - Personnel reported symptoms after breathing vapors believed to result from chlorine; first aid treatment was provided.

Other Occurrences of Note:

[Fires at ANL-E and ANL-W](#) ** [Work Permit Violation at Fernald](#)
[Discovery of "Legacy" Chemicals](#)

Note: A minor change has been made in the way occurrences are date-sorted. In the past, reports were sorted into the month corresponding to "Discovery Date"; as of January 1998, reports will be sorted into months according to "Date of Notification Report". This minor revision will allow for quicker distribution of these Monthly Summaries without compromising comparison of report counts with past monthly values. Eight (8) reports are included in this month's data with a "Discovery Date" prior to March 1998.

A search of ORPS for occurrences having chemical safety relevance conducted for the month of March 1998 produced 43 reports representing potential chemical safety concerns. These occurrences are listed in [Attachment 1](#). There was one "Emergency" occurrence: a uranium fire took place in a hood at ANL - West (CH-AA-ANLW-FMF-1998-0001). There were three occurrences categorized as "Unusual" with the remainder identified as "Off-normal". The Office of Environmental Management (EM) was Cognizant Secretarial Office (CSO) for 20 occurrences, Defense Programs (DP) had 11, Energy Research (ER) six, Nuclear Energy (NE) four, and Fossil Energy (FE) had two. The CSO designation may change after the distribution of this monthly memorandum, and this change will be reflected in Quarterly and Annual Reviews.

There was one Class 1 occurrence and there were five Class 2 occurrences reported during March. There were 15 Class 3 occurrences. ([Class definitions](#))

Among the Class 3 occurrences, in addition to those noted previously, was the discovery of a waste drum at Rocky Flats with an inoperable vent designed to prevent hydrogen buildup. There was also a hydrogen concentration concern at Savannah River involving ventilation assurances. A pocket of methane gas was encountered in a salt mine at the Strategic Petroleum Reserve. In a follow-on to a Class 1 occurrence at Y-12 (ORO--LMES-Y12SITE-1997-0034), the potential for moisture to interact with lithium metal was recognized.

Summary of Class 1 Occurrence:

Employees Burned when Fumes Ignite (DP): (ALO-LA-LANL-ACCCOMPLEX-1998-0005) On March 30, at Los Alamos, two electricians received first and second degree burns to their hands and faces when a fireball ignited in the area where they were performing transformer preventive maintenance. The fireball was caused when fumes from the alcohol-based aerosol cleaner they were using came in contact with an electrical space heater. The electricians were taken to the Los Alamos Medical Center by their foreman, and were treated and released. The fireball was able to propagate in a constricted area where shielding blocks form a small L-shaped room. The shielding blocks are stacked approximately eight feet high, and there are approximately three feet between the top of the shielding blocks and the ceiling. There is a gap approximately 3 feet wide from the shield blocks to the wall. Reviewed in Operating Experience Weekly Summary [OEWS 98-13](#).

Summaries of Class 2 Occurrences:

Lithium Bromide Exposure during Cutting Operation (DP): (ALO-KO-SNL-NMFAC-1998-0001) On March 9, at Sandia, conditions not anticipated in a work plan caused two construction workers to experience an exposure to lithium bromide while cutting apart an HVAC absorption chiller. Chillers had been drained and flushed of their operational medium of lithium bromide solution in water. The hazard assessment performed prior to the chiller removal listed lead paint on the chillers and the potential for lithium bromide residue in the tanks. The hazard abatement plan ordered a removal of the lead paint, but was silent on the lithium bromide issue. Notes on the contract drawings inform the contractor that the lithium bromide had been drained and rinsed from the chillers, and further states that "there does not appear to be a hazard to the contractor with respect to lithium bromide residues". When cutting away pieces of the chiller with a cutting torch, the building occupants began to complain of a strong odor. All further work on the job was halted until a reassessment of the hazards could be performed. One of the workers experienced flu-like symptoms over the weekend. Sandia IH advised that flu-like symptoms were possible side effects of lithium bromide exposure. The contractor was advised to seek medical attention with that possibility in mind.

Possible Allergic Reaction to Chemicals while Painting (NE): (ID--LITC-ATR-1998-0006) On March 28, at the INEEL, a craftsman reported to the shift supervisor complaining of a swollen tongue and cheeks. He stated that he had been working with acetone and may have gotten some on his hands; he had not been wearing gloves. The craftsman was transported to the dispensary for evaluation by the shift nurse. The nurse administered medication and the craftsman was transported to a hospital for further evaluation. The craftsman was subsequently administered intravenous medication which immediately stopped the allergic reaction. He was released to return to work. He later indicated to the shift supervisor that his allergic reaction may also have been due to a prescription drug. The area where the craftsman had been working was investigated and a strong odor was noted. It was determined that there was an odor of spray paint. Personnel noticed several cans of spray paint and a bottle of 2-propanol (rubbing alcohol); no acetone bottle was found out of storage. An Industrial Hygienist performed measurements and did not find any health hazards present.

Potential Nitric Acid Fume Exposure - Symptoms Noted (EM): (OH-FN-FDF-FEMP-1998-0009)

On March 27, at Fernald, personnel notified the Assistant Emergency Duty Officer (AEDO) of a potential fume exposure that occurred when workers were in the process of dumping sample bladders, plastic vials and glass volumetric flasks containing thorium nitrate digestates into poly-drums located in a walk-in fume hood. As part of this task a radioactive materials bag was cut open. When the bag was cut, one worker stated he "smelled something." Shortly thereafter, another worker experienced tingling on his lips. Subsequent investigation revealed that while two RWPs were being utilized -- one for handling samples and the other for dumping samples -- only one hazardous material permit was issued for this work. That permit required the use of supplied air respirators without distinguishing between sample handling and sample dumping. In addition, it was determined that work planning did not address the potential existence of fumes inside the radiological materials bag. There were no injuries. All involved personnel were released from Medical and returned to work.

Lithium Hydroxide Solution Contacts Workers (DP): (ORO--LMES-Y12SITE-1998-0012) On

March 11, at Y-12, two maintenance workers were splashed with a small amount of caustic solution. The workers immediately doffed their protective clothing (gloves, and safety glasses with side shields) and washed off the solution. They were not injured as a result of this event. As a precautionary measure, both workers were transported to a hospital. Both were returned to normal duties with no injuries. Workers were removing old abandoned piping. The first pipe was successfully removed without incident. When the workers sawed the second pipe, to remove it by sections, the solution was encountered. Pre-job hazards had been identified; however, the concern was that there could possibly be dry material in the pipe. The section of pipe being removed had not been in use for approximately 30 years. This section happened to be the lowest portion of the run of pipe. Reviewed in [OEWS 98-11](#).

Potential Exposures to Chlorine Gas (EM): (RL--PHMC-TANKFARM-1998-0032) On March 25, at Hanford, a health physics technician (HPT) while working around Evaporative Cooling Towers noticed an odor of Chlorine. The HPT felt light-headed and was transported to first aid for evaluation. The HPT was released from first aid with no work restrictions. The HPT was to report to Hanford Environmental Health foundation (HEHF) the next morning for a follow-up exam. On March 27, management was informed that the HPT had complained of more symptoms. Evaporative Cooling Towers were barricaded. All personnel were directed to don SCBA prior to entering the barricaded area. Evaporative Cooling Towers were drained.

Other Occurrences of Note:

Difficulty was experienced in extinguishing two separate fires involving pyrophoric materials at ANL-East and ANL-West. At ANL-East (CH-AA-ANLE-ANLEET-1998-0001), scientists were conducting an experiment with gaseous reagents including silane, a pyrophoric gas. The gases were subsequently evacuated, and the chamber was purged with nitrogen. When an investigator loosened a fitting at the top of the chamber, a flame (3-4 inches high) appeared at the perimeter of the fitting. The flame was eventually extinguished by valving off the supply of nitrogen. The flames caused some damage; considerable smoke was generated. There were no personal injuries. At ANL-West (CH-AA-ANLW-FMF-1998-0001 [OEWS 98-12]), personnel were in the process of consolidating passivated uranium hydride that had been previously removed from uranium plates and stored in 18 cans into one can. The personnel had opened and emptied 13 cans into the consolidation can without incident. When the technician started pouring the contents of the 14th can into the consolidation can, both cans started burning. The technician immediately started pouring MET-L-X into the cans. The MET-L-X effectively extinguished the fire in the small can, but did not extinguish the fire in the larger can. Personnel left the area and contacted the ANL-W Fire Department. Fire Department personnel entered the facility to respond to the fire and found that it was no longer burning. There were no injuries.

At Fernald (OH-FN-FDF-FEMP-1998-0008), personnel notified the AEDO of a work permit violation that occurred when personnel were in the process of removing material from an open-top tank. The RWP and the Fernald Environmental Management Project (FEMP) Work Permit stated that forced HEPA filtered ventilation was required for personnel entry into the tank. The supervisor and workers stated that the forced ventilation requirement was not mentioned during the pre-job briefing. An Industrial Hygiene (IH) Technician issued a Confined Space Permit for the activity and tested for oxygen, organics, carbon monoxide, and hydrogen sulfide. The IH Technician did not require forced ventilation (natural ventilation only), which was contrary to the requirements on the work permit. Subsequently, two workers located outside the tank complained of a strong odor. The supervisor suspended activities and sent all personnel to Medical for evaluation. There were no injuries or exposures. IH was recalled to the area to perform additional monitoring and detected trace levels of ammonia, but the ammonia was not the source of the foul odor. It was determined that [forced] ventilation was not utilized during the tank entries, thus violating the requirements set forth in the permit.

Two occurrences were reported involving discoveries of legacy or "orphaned" chemicals. At Los Alamos (ALO-LA-LANL-TARGETFAB-1998-0001), a waste management coordinator inventoried legacy chemicals. During the inventory, the coordinator identified two bottles of unstable chemicals, one with benzoyl peroxide, and the other with 3-chloroperoxybenzoic acid. The bottles were stored in an inoperable refrigerator. It was determined that the chemicals should be placed in the Laboratory's burn box for destruction. At Oak Ridge (ORO--ORNL-X10LIFESCI-1998-0002), an employee, working upon request of a Facility Manager to aid in vacating and closing a building, discovered a small container of 2,4,6-trinitrochlorobenzene in a flammable solvent cabinet. The chemical was recognized as being potentially hazardous, was not listed in the building chemical inventory, and did not have a Material Safety Data Sheet (MSDS) on file within the Division. The chemical was classified as having a Department of Transportation (DOT) hazardous classification of 1.1 ("potentially explosive"). The discovery of the chemical is being reported as a near miss since it was not known that it was being stored in that location and because of the potential for explosion unless properly handled. The building will remain under controlled/restricted access until a safe method for removal and disposal of the chemical is determined and implemented.

Additional information regarding these occurrences and others will be discussed in an upcoming Quarterly Review; some are currently summarized on this website. As occurrence reports are finalized, lessons learned will be communicated.

This report approved by

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Note:

A version of this report is distributed via e-mail either as a WordPerfect or a text file. Please contact **John Usher** (516-344-2096, Fax: 516-344-3957, E-mail: usher@bnl.gov) at Brookhaven National Laboratory to be placed on e-mail distribution. If you want to receive hardcopy, please contact John Usher who will make every effort to accommodate you.

Please feel free to use the other resources available on the DOE Chemical Safety Program homepage. The Internet address is http://tis-hq.eh.doe.gov/web/chem_safety/.