

United States Government

Department of Energy

# memorandum

DATE: February 21, 1996

REPLY TO  
ATTN OF: EH-53 (R. Sastry, 301-903-4664)

SUBJECT: Chemical Safety Concerns / Search of Occurrence Reporting and Processing System (ORPS)

TO: Distribution

## Significant Occurrences

**January, 1996****Class 1:**

[Argonne National Laboratory](#) - employee burned by hydrofluoric acid

**Class 2:**

[Sandia National Labs](#) - magnesium fire ignited during machining

[National Renewable Energy Lab](#) - explosion while lighting hydrogen flare

[Hanford](#) - worker exposed to ammonia vapors

[Lawrence Livermore National Lab](#) - fire in chemical storage cabinet

**Additional:**

A glass cell ruptured inducing a chemical deflagration at the Pacific Northwest National Lab. A mechanical spark was experienced while disconnecting drill string parts at the Hanford Tank Farms. USQs were noted at Savannah River and at Portsmouth Gaseous Diffusion Plant.

These occurrences are further described below with additional information, including Occurrence Report (OR) numbers, provided in [Table 1](#).

A search of ORPS for occurrences having chemical safety relevance conducted for the month of January 1996 produced 26 reports representing potential chemical safety concerns. These occurrences are listed in [Table 1](#). Four occurrences were categorized as "Unusual" with the remainder identified as "Off-normal"; one OR was "Cancelled." The Office of Environmental Management (EM) was Cognizant Secretarial Office for 12 occurrences, Energy Research (ER) reported five, Defense Programs (DP) had four, Nuclear Energy (NE) two, and Energy Efficiency (EE), Fossil Energy (FE), and Uranium Enrichment one each.

In order to determine which chemical safety occurrences represent more important (significant) Levels

of Concern, a classification scheme has been developed. The definitions of these Classes are as follows:

**Class 1** Occurrences characterized by an injury or exposure requiring hospital treatment, or confirmed, severe environmental effect; also occurrences that had the potential to cause these effects with all safety barriers down, except, for example, that no one was nearby to be injured or exposed, or escaped in time, or the climatic conditions were favorable;

**Class 2** Occurrences characterized by minor injury (first aid) or exposure, or minor environmental damage; also occurrences that were near misses (where one additional safety barrier remained to prevent consequences) to those in Class 1;

**Class 3** Potential precursors to the occurrences in Class 1 or 2;

**Class 4** Minor occurrences such as leaks, spills, or releases, which may be significant in their frequency of occurrence though not in their consequences.

There was one Class 1 occurrence and four Class 2 occurrences reported during January. There were 11 Class 3 occurrences. Among the Class 3 occurrences, in addition to those noted previously, were a nitric acid spill from a ruptured storage bottle at BNL, a building evacuation due to an oxygen deficiency at METC, and an overflow of chromate water at Savannah River due to improper valve positions.

## Summaries of Class 1 and Class 2 Occurrences:

**Worker Receives Hydrofluoric Acid Burns (ER):** (CH-AA-ANLE-ANLEMSD-1996-0001) On January 2, 1996, at Argonne, a research scientist was using a 10% hydrofluoric acid solution to clean out blocked stainless steel tubing. After the work was completed, the scientist discovered that the glove on one hand had been permeated by the acid. He was initially treated at the Argonne Medical Department where he was advised to continue treatment and to seek additional medical attention if the pain persisted or became worse. During the course of the evening the pain in the fingers became more intense and the scientist called his personal physician who advised him to go to LaGrange Memorial Hospital. At LaGrange the emergency room physician referred the scientist to Loyola Medical Center, which has a poison control center, where one fingernail was removed and additional treatment applied. He was admitted to Loyola Hospital for observation and remained overnight.

**Magnesium Fire Ignited during Machining (DP):** (ALO-KO-SNL-1000-1996-0001) On January 26, at Sandia, magnesium chips ignited during a machining operation. A layer of magnesium chips had accumulated on the machine table, and a hot chip from the point of work ignited them. The fire lasted less than a minute, extinguished by an overhead sprinkler. There were no injuries associated with this occurrence. One potential employee exposure exists as a result of the fire. The employee has been to the SNL Medical Department and results are pending. The employee returned to work with no work restrictions.

**Explosion during Lighting of Hydrogen Flare (EE):** (CH-NA-NREL-NREL-1996-0001) On January 2, at the NREL, during an attempt to light the hydrogen flare inside a Metalorganic Chemical Vapor Deposition (MOCVD) system burn box, a small explosion occurred blowing the back section of the burn box off. Hydrogen flow was shut down immediately, and this MOCVD operation was suspended. Due to the potential for release of arsenic oxides, appropriate personal protective equipment was donned and clean-up procedures ensued. There were no injuries.

**Worker Exposure to Ammonia Vapors (EM):** (RL--WHC-ANALLAB-1996-0006) On January 26, at Hanford, three employees were performing initial decontamination in an unventilated containment structure. Powered air purifying respirators were in use for abatement of potential airborne radiological

contamination. Bartlett TLC Stripcoat was being applied to an area of pavement as a contamination fixant, releasing low levels of ammonia. The employees stopped work after ~15 minutes and left the containment structure once odors became noticeable. One employee exhibited burning eyes and felt nauseous. The remaining two employees also noticed the ammonia odor but did not exhibit ill effects. The affected employee was sent to first aid for an evaluation. The symptoms ceased and the employee returned to work without restriction. Upon investigation it was discovered that the MSDS for Bartlett TLC Stripcoat was not reviewed during preparation of the work package or during the pre-job meeting. The MSDS specifically states that in confined areas a gas mask for ammonia or forced ventilation is required.

**Fire in Chemical Storage Cabinet (ER):** (SAN--LLNL-LLNL-1996-0002) On January 19, at Livermore, a technician, working in his office adjacent to a microwave lab, heard a sound, looked into the lab, and saw flames shooting from a cabinet in which chemicals were stored. He immediately called emergency services and evacuated the building. Sprinkler heads activated. The Fire Department responded immediately and crews extinguished the fire. The ventilation system in an adjacent building was shut down to prevent smoke from entering that building. Four personnel reported to Medical for observation. They were monitored and returned to work. The inventory of chemicals in the room was reviewed and the cabinet was visually inspected. Fuming nitric acid (stored in the cabinet) is believed to have started the fire.

Additional information regarding these occurrences and others will be discussed in an upcoming Quarterly Review. As occurrence reports are finalized, lessons learned will be communicated.

[Signature of]

**Rama Sastry**  
**Office of Field Support**

[Attachment](#)

**Note to Distribution:**

This document is being electronically distributed. If you want to receive the document electronically and/or to be removed from the hard copy distribution list, to add another person, or to change your address, please contact **John Usher** 516-344-2096, Fax: 516-344-3957, E-mail: [usher@bnl.gov](mailto:usher@bnl.gov) at Brookhaven National Laboratory.

---

*Web conversion by: Joe Carbonaro*  
*Web page design: Joseph Kahn*