

Chemical Occurrences - October, 1997

Class 2:

[Argonne](#) - Acid solution erupts and sprays on chemist's face

Key Observations:

[Pressurized drums](#)

[Work planning: inadequate hazard analysis](#)

[Excavation and utility drawings](#)

A search of ORPS for occurrences having chemical safety relevance conducted for the month of October 1997 produced 37 reports representing potential chemical safety concerns. These occurrences are listed in [Attachment 1](#). There were two occurrences categorized as "Unusual" with the remainder identified as "Off-normal". The Office of Environmental Management (EM) was Cognizant Secretarial Office (CSO) for 26 occurrences; Defense Programs (DP) reported five; Energy Research (ER), Fossil Energy (FE), Nuclear Energy (NE) each 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 2 occurrence reported during October. There were 15 Class 3 occurrences. ([Class definitions](#)) Among the Class 3 occurrences, in addition to those noted previously, potential Unresolved Safety Questions (USQs) were reported at INEEL, Fernald, and Hanford. The Hanford occurrence involved the unexpected generation of acetone from a reaction in a Hexone storage container; nitric oxide was unexpectedly generated and noted in a process vessel discharge at Savannah River.

Summary of Class 2 Occurrence:

Acid Solution Erupts and Contacts Chemist (ER): CH-AA-ANLE-ANLEER-1997-0008) On October 21, an analytical chemist was dissolving samples containing uranium-zirconium-fissium alloy contained in steel cladding. The alloy and cladding had been exposed to chloride-containing salts during a process development experiment. The dissolutions were being done on a laboratory benchtop. The chemist had made additions of water to the samples and then added a pre-mixed solution of 80% by volume nitric acid and 20% by volume hydrofluoric acid to the sample. Some of the samples had a greater mass than the rest. The chemist added more of the acid mixture to these to compensate for the larger mass of sample. Three of the additions were performed with nothing unusual being observed. However, when the addition was made to the fourth sample, a small amount of the mixture (~2 mL) erupted from the beaker; some of it landing on the chemist's face. The chemist was wearing safety glasses, protective gloves, and a lab coat. The chemist immediately called for help and then used the eyewash fountain. Paramedics arrived, continued the eyewash treatment for 15 minutes, then coated the facial area with calcium gluconate and transported the chemist to the Health Division. The Health Division continued treatment for some period of time and released the chemist to return to work. A follow up visit on October 22 showed no effect of the incident and no work restrictions were imposed.

Again this month I note two occurrences involving pressurized drums. These two occurrences each contain information of import in improving chemical safety at DOE facilities:

The occurrence at Hanford (RL--PHMC-TANKFARM-1997-0084) involved a drum containing Soil-Sement; the drum was unopened and in "as new" condition. Soil-Sement is a non-combustible, acrylic and vinyl acetate polymer that is used as a dust retardant. After discovery of the bulging drum, information was sought from the manufacturer who advised that are "no toxic chemicals in Soil-Sement and that [the manufacturer was] not aware of any previous drum pressurizations." The manufacturer "also stated that the bulging could be caused from impurities in the Soil-Sement mixture, and that it should be safe to release the pressure by removing the bung (cap) on the drum." Subsequently the Hanford Fire Department carefully penetrated the drum and sampled for lower flammability limit (LFL); values from 13% to 200% of LFL were determined in the subject drum and two others also found to be slightly pressurized. It is stated that the occurrence "report will serve as notification to all other DOE facilities who may have this product in their inventories until a formal Lessons Learned Bulletin can be issued. A request will be made to the manufacturer of Soil-Sement to issue a product alert on this possible condition to all known end users."

The occurrence at West Valley (OH-WV-WVNS-WMSA-1997-0001) involved an inspection of several drums containing materials from a petroleum hydrocarbon spill. As the lid on one of the drums was loosened it popped off accompanied by a loud noise (bang). No one was injured. The drum had "exhibited no evidence of pressurization." It was observed that "there was a strong odor of sulfides ("rotten eggs"). When opening one of the earlier drums, this same smell had been noted." I conclude that even though none of the previously inspected drums had been pressurized, the presence of the previously "noted" odor (signifying a generated gas) warranted a more cautious inspection of the remaining drums. "Evidence" of pressurization comes in forms other than readily apparent bulging of containers.

Two occurrence reports point out the need to incorporate adequate hazard analysis in work planning. A welder at ANL-West (CH-AA-ANLW-ANLW-1997-0001) was unaware of the presence of NaK in a vessel he was working on. Even though the actual NaK release was small, there was a recognized potential for a larger release. The report comments that "(i)t is important to know the contents of vessels and tanks prior to any maintenance. Absence of this information can result in unnecessary exposure to hazardous materials and personnel injury ..." The report from Savannah River (SR--WSRC-SLDHSD-1997-0017) pointed out that "(d)uring routine maintenance activities (installation of cork board using adhesive) facility personnel noticed obnoxious odors coming from the job area. Upon investigation it was discovered that all hazards had not been properly screened to ensure proper personnel protection equipment (PPE) was used/specified." These occurrences both point out the importance of adequate prejob hazard analysis and communication.

Finally, there were two reports (HQ--GOPE-NIPER-1997-0004 and - 0005) of damaged natural gas lines at the National Institute for Petroleum and Energy Research (NIPER) this month. One report states that "(a)n outdated and inaccurate drawing was used" in planning the work. "A more recent facility drawing" existed but was not used. As a lesson learned the report states that "(a)ll drawings for excavation in areas where utility lines exist should be verified independently and reviewed in the field before work starts." The second event was said to be caused by "(i)nadequate coordination and supervision of subcontractor personnel." Once again the importance of effective hazard analysis and communication in work planning is illustrated.

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.

This report approved by

Rama Sastry
Office of Field Support

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.oh.doe.gov/web/chem_safety/.