

United States Government

Department of Energy

# memorandum

DATE: August 11, 1997

REPLY TO

EH-53 (R. Sastry, 301-903-4664)

ATTN OF:

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

TO: Distribution

## Significant Occurrences

**July, 1997****Class 1:**

None

**Class 2:**[Oak Ridge, Y-12](#) - Employee struck in face by lid ejected from storage drum[Oak Ridge, Y-12](#) - Dead fish due to chemical release**Additional:**

There was a building evacuation at LLNL caused by mixing of incompatible chemicals. There were two other occurrences involving overpressurized and/or potentially reactive storage containers at PNNL and INEEL, and another occurrence at Y-12 wherein mercury was found to be stored without the appropriate thermal environment.

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

A search of ORPS for occurrences having chemical safety relevance conducted for the month of July 1997 produced 28 reports representing potential chemical safety concerns. These occurrences are listed in the [Attachment](#). There were four occurrences categorized as "Unusual" with the remainder identified as "Off-normal". The Office of Environmental Management (EM) was Cognizant Secretarial Office (CSO) for 16 occurrences; Defense Programs (DP) reported six; Energy Research (ER) had three; Nuclear Energy (NE) two; and Fossil Energy (FE) one. The CSO designation may change after the distribution of this monthly memorandum, and this change will be reflected in Quarterly and Annual Reviews.

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 were two Class 2 occurrences reported during July. There were 11 Class 3 occurrences. Among the Class 3 occurrences, in addition to those noted previously, were two inadvertent transfers of acid at Savannah River due to problems with proper valve alignments. There was also an occurrence at PETC involving generation of vacuum oil mist when the restarted after a power outage with no one around to monitor the pump's operation.

## Summaries of Class 2 Occurrences:

**Employee Injured when Struck by Drum Lid (EM):** (ORO--LMES-Y12WASTE-1997-0005) On July 30, 1997, at the Y-12 Plant, a metal container lid on a sealed eight (8) gallon container blew off, striking an operations employee on her upper lip. The container lid blew off due to pressure buildup associated with high temperatures within the warehouse. This event occurred as the "retaining ring" (which seals the lid to the container) was being loosened by the subject employee. There were no visible signs to indicate the container had become pressurized. The actual breaching of this and other containers was to be conducted at a later point in time as sampling activities progressed. The breaching operation was immediately halted and the employee was transported to Y-12 Medical Services for evaluation and treatment. No serious injuries were incurred. Ice was applied to the employee's upper lip to reduce swelling, and she returned to work without restrictions.

The subject drum contained Methyl Ethyl Ketone (MEK) sludge waste material from a paint reclamation facility. The sampling/analysis operation was being conducted as part of the material disposition process. During the critique of this event, administrators placed a temporary moratorium on any further breaching of containers, pending further evaluation of procedures and related safety concerns.

### Storage/Compatibility Concerns

In addition to the Class 2 occurrence (ORO--LMES-Y12WASTE-1997-0005) summarized above, there were four other occurrence reports in July dealing with various aspects of chemical storage and/or compatibility issues. RL--PNNL-PNNLBOPER-1997-0022 and ID--LITC-TRA-1997-0015 deal most directly with the concern of chemical reactions in waste/storage containers causing overpressurization, container rupture, and potential employee injuries. SAN--LLNL-LLNL-1997-0037 involves the issue of directly mixing incompatible chemicals when placing these chemical wastes into storage containers. ORO--LMES-Y12NUCLEAR-1997-0029 deals with the discovery of a storage container under inadequate environmental control which could have led to the generation of hazardous vapors and/or overpressurization.

I strongly urge DOE Secretarial Offices, field organizations, and contractors to promptly review their chemical waste and/or storage safety analyses and procedures, and current status of stored hazardous materials with the following concerns in mind:

**Chemical commingling and compatibility,  
Chemical compatibility with storage container materials,  
Environmental controls associated with chemical storage, and  
Monitoring processes for overpressurization and/or chemical releases.**

We must all focus on preventing these types of occurrences and their potential consequences.

**Fish Kill Discovered (DP):** (ORO--LMES-Y12SITE-1997-0033) On July 24 at the Y-12 Plant, the Utilities Monitoring System received an alarm indicating low dissolved oxygen (DO) levels (3.07 ppm) in Upper East Fork Poplar Creek at one of the monitoring stations. Subsequently personnel arrived at the station and observed dead fish. Management was aware of activities that had begun just prior to the discovery and directed that the raw water flow from the Flow Augmentation Project be increased to maximum levels in an effort to increase oxygen levels in the creek. The alarm cleared and DO levels were then acceptable for aquatic life (5.15 ppm). There were no other adverse environmental effects or offsite consequences as a result of the event. The loss of fish has ended. A final estimate of 24,000 dead minnow-sized fish has been attributed to the low DO condition. Based on current estimates of the fish density in the creek, this loss may represent as much as 50 percent of the overall population. None of the fish lost were endangered species and population recovery is expected to occur without lasting impact.

The cause of the low DO has been traced to a dechlorinator system which treats chlorinated raw water before it is added to the creek. The raw water feed and its corresponding treatment system had been in stopped due to higher than normal water flow in the creek from recent rainfall. The sodium bisulfite used in the treatment process had flowed through the controlled pump/metering system and accumulated in a small basin. When the raw water flow was restored, the accumulation was washed into the creek. The system now has redundant administrative and physical controls in place that will prevent the material from migrating into the basin until permanent, engineered control can be added. Additional information regarding these occurrences and others will be discussed in an upcoming Quarterly Review; some are currently summarized on the website. As occurrence reports are finalized, lessons learned will be communicated.

Two occurrences with discovery dates in June 1997 were not reported to ORPS in time for inclusion in the June Monthly Report. CH-BH- BNL-PE-1997-0020 involved a potential exposure of employees to mercury vapor when clean-up was effected without appropriate monitoring and/or protective equipment. ORO--LMES-Y12WASTE-1997- 0004 was yet another discovery of a pressurized drum containing acid and organic wastes. These occurrence reports will be added to the June Monthly Report located on the Homepage and will be included in the Quarterly Review for April - June.

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 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](mailto: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.

The DOE Chemical Safety Program homepage is now available. The Internet address for this site is [http://tis-hq.eh.doe.gov/web/chem\\_safety/](http://tis-hq.eh.doe.gov/web/chem_safety/). This report is accessible using the Chemical Occurrences link via the homepage.

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