

United States Government

Department of Energy

memorandum

DATE: October 15, 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

September, 1996**Class 1:**

None

Class 2:[Naval Petroleum Reserves](#) - oil and gas wellhead struck by vehicle**Additional:**

Workers felt ill when exposed to fumes at Weldon Springs. Unanticipated chemical reactions took place at Oak Ridge and Hanford. Groundwater contamination surfaced in "seeps" in a forest preserve south of Argonne National Laboratory. Crystallized picric acid was discovered at Savannah River.

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 September 1996 produced 30 reports representing potential chemical safety concerns. These occurrences are listed in the [Attachment](#). Three occurrences were categorized as "Unusual" with the remainder identified as "Off-normal." The Office of Environmental Management (EM) was Cognizant Secretarial Office (CSO) for 20 occurrences; Energy Research (ER) and Uranium Enrichment (UE) each reported three; Fossil Energy (FE) had two; Defense Programs (DP) and Nuclear Energy (NE) one each. This 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 was one Class 2 occurrence reported during September. There were 20 Class 3 occurrences. Among the Class 3 occurrences, in addition to those noted previously, were discoveries of mercury contamination at NIPER and at Livermore. There was a discovery of hydrogen buildup in tanks to levels of four times "normal" at Rocky Flats. There was also a chlorine leak at Hanford. At the Paducah Gaseous Diffusion Plant there were two occurrences involving inadequate posting of UF6 smoke watches.

Summary of Class 2 Occurrence:

Oil and Gas Wellhead Damaged by Vehicle (FE): (HQ--BPOI-NPRC-1996-0032) On September 11, 1996, a water truck driver backed into the wellhead and damaged both the main and swab valves. No leaks were found upon inspection of the wellhead. The wellhead was replaced the following day due to the damaged valves. It was found that the driver was inattentive to his surroundings and unaware of the safety perimeter around the wellhead. This well produces more than 400 bbls per day of oil and approximately 10 million standard cubic feet per day of gas at a tubing pressure of nearly 1000 psi. Had a release occurred, a fatality could have resulted and a significant quantity of hydrocarbons (oil and gas) would have been discharged to the environment.

Among the Class 3 occurrences were two involving unanticipated chemical reactions. The first took place at Hanford on September 13 and involved a chemical waste container that became pressurized after the addition of hydrochloric acid and expelled its chemical contents. Other chemicals present in the container included nitrates, hydrofluoric acid, anhydrous ethanol, nitric and sulfuric acids. Hydrochloric acid may, under certain conditions, react with any of these chemicals in exothermic reactions producing heat and pressure. The second occurrence, at Oak Ridge, involved the mixing of methanol and sodium permanganate producing an energetic reaction that caused the mixture to spray. The flammable nature of methanol when combined with the heat from the unanticipated reaction could have caused a fire.

The primary lesson to be learned from these occurrences is always to read and/or review the MSDSs of chemicals involved in mixtures for compatibility issues. Any changes in chemicals used or other variables such as concentrations, amounts, and/or reaction vessel configurations (capped or vented) should be reviewed with appropriate safety personnel. Unfortunately, these occurrences are not isolated incidents; **Chemical Safety Concerns** reports as well as the **Operating Experience Weekly Summary** have recounted numerous recent unanticipated reactions.

Please stop exposing employees to these hazards before someone is seriously injured or killed.

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](#)

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