

## Chemical Occurrences - July, 1998

### Class 1:

[INEL](#) - Fatality at Idaho National Engineering Laboratory

### Class 2:

[SAND](#) - Lid from metal drum blows off when being opened for sampling

[LANL](#) - Abnormal effluent containing ammonia-nitrogen enters sanitary waste treatment plant

[INEL](#) - Operators exposed to organic vapors above STEL limits

### Other Occurrences of Note:

[PCBs in a waste storage tank](#) \*\* [Tank misclassified](#) \*\* [Flammable material in waste containers](#)

**Note:** Occurrences included in this report are date-sorted according to the "Notification Report" date, this promotes timely alerting of occurrences.

### Highlights of ORPS Occurrences for July, 1998

- **33** Total reports representing potential chemical safety concerns.
- **1** Total reports characterized as "**Emergency**"
- **5** Total reports characterized as "**Unusual**"
- **27** Total reports characterized as "**Off-Normal**"
  
- **7** Total reports listing **DP** as Cognizant Secretarial Office
- **22** Total reports listing **EM** as Cognizant Secretarial Office
- **2** Total reports listing **ER** as Cognizant Secretarial Office
- **2** Total reports listing **NE** as Cognizant Secretarial Office
  
- **1** Class 1
- **3** Class 2
- **13** Class 3
- **16** Class 4

### [Definitions of Classes](#)

### SUMMARY OF CLASS 1 OCCURRENCES :

**Personnel Fatality And Multiple Injuries Due to Sudden Release Of Carbon Dioxide in TRA-648 (ETR Electrical Building). ID-LITC-TRA-1998-0010: (DP)**

**At approximately 1755 hours on July 29, 1998, an accident occurred at the Test Reactor Area (TRA) Building 648 at the Idaho National Engineering and Environmental Laboratory (INEEL)**

when fire retardant carbon dioxide (CO<sub>2</sub>) was accidentally released during routine maintenance operations. This accident caused one fatality, and three serious injuries.

The incident occurred during routine preventive maintenance (PM) involving providing temporary lighting to the TRA-648 Electrical Building, tagout and lockout of 13.8 KV switchgear that supplied power to the Engineering Test Reactor (ETR) building complex and then performing scheduled 4-year PM on the numerous downstream electrical breakers.

A multi-discipline team consisting of 13 Operations, Fire Safety, electrical crafts and supervisors was present in TRA-648 to perform and/or coordinate the electrical outage and PM after normal working hours. The TRA -648 building is protected from fire by a Notifier AFP-200 control panel fire extinguishing system consisting of a control panel, two electric solenoid actuating valves and fifty-five 100-lb CO<sub>2</sub> cylinders. The control panel is approximately one year old and is supplied by a 24 volt battery backed system. The solenoid valves that control the release of the CO<sub>2</sub> are designed such that power is required to open the valves. The loss of power to the Notifier AFP-200 panel or solenoid valves should not have activated the CO<sub>2</sub> fire protection system. The system is also designed to activate local fire alarms and buzzers, and provide an approximate 30 second delay prior to CO<sub>2</sub> discharge. Due to lock down of the ETR building complex to preserve evidence and absence of key individuals who were in the building, it is not possible to determine an exact sequence of events, but preliminary findings do not indicate that local fire alarms provided any warning that a CO<sub>2</sub> discharge was about to occur.

When the CO<sub>2</sub> discharge occurred, workers attempted to immediately evacuate the building. Visibility within the building became poor due to a fog caused by the CO<sub>2</sub> release. All but four people were able to make their way out of the building. Co-workers were able to retrieve three of the four people that were unable to get out of the building on their own. Cardiopulmonary resuscitation (CPR) was administered to two people, while an operator notified security of the event. CPR efforts on these two workers continued until transported to the hospital. Security notified the Central Facilities Area (CFA) Fire Department and the ATR Shift Supervisor (SS) of the event. The CFA Fire Department responded immediately and the ATR SS requested that the TRA Immediate Response Team (IRT) respond. A fourth worker could not be retrieved without self contained breathing apparatus. The fourth worker was retrieved with assistance from the CFA Fire Department. CPR efforts performed on the fourth worker were not successful and the individual died as a result of his injuries.

Three employees remained hospitalized overnight. Of those who remain hospitalized, two employees were in critical condition, one was listed in serious condition.

Lock/tag out, and other work control issues, and the system operation of the CO<sub>2</sub> fire protection system are being investigated further. A "Type A" investigation of this event by DOE is underway.

#### **SUMMARY OF CLASS 2 OCCURRENCES:**

**Lid from Metal Drum Containing Septage Blew Off When Being Opened for Sampling: (EM):  
ALO-KO-SNL-7000-1998-0004**

**On June 29, 1998, at SANDIA, at about 1:00 p.m., 55-gallon drums containing septage were being sampled to characterize tritium levels and/or RCRA constituents to ensure the drums met waste acceptance criteria for disposal. The sampling took place in Building 6596 where the drums had been stored. The temperature inside the building was similar to the outside temperature, which was in the mid to upper 90's.**

**The drums that were being sampled had been filled with septage in 1995 and 1996. Two metal drums containing dry solid septage, and sealed with solid lids (without bungs), had been sampled without incident. However, when the lid of the third (and final) METAL drum was being removed, the lid and the drum ring were projected approximately 30 feet into the air and then fell to the ground. No one was struck by the lid, the ring, or any of the contents of the drum. The septage was found to be intact in a plastic bag within the drum. Additional sampling of eleven remaining PLASTIC drums continued after this incident without any problems. All of the PLASTIC drums had screw caps that allow for safe venting if overpressurization is found.**

**This incident is another example of similar near-miss events previously reported and described in Monthly Reports, and indicates the level of attention that is necessary during sampling procedures. In addition, all unvented (METAL) drums should be secured with additional restraints (such as bungs) in order to prevent future incidents of this type from occurring. The use of protective clothing, worn by maintenance staff in this case, added to personal protection should the septage have not been contained in a plastic bag.**

#### **Abnormal Influent Containing Acid/Ammonium Mixture Enters the Sanitary Waste Treatment Plant : (DP) : ALO-LA-LANL-SIGMA-1998-0003**

**On July 11, 1998, at LANL, at approximately 1120 through 1350, the Sanitary Wastewater Treatment Plant (SWTP) received an alarm on the plant's pH monitor indicating a low pH condition. The range of pH readings were from a low of pH 4.0 to a high of pH 4.5 for a two and one-half hour period. Analysis of grab samples taken of the SWTP influent also indicated an ammonia-nitrogen reading of 320 milligrams per liter (m/L). The plant operator on duty was able to divert the influent to a flow equalization basin before it entered the activated sludge aeration basins. Based on the chemical toxicity of the influent and based on the sustained volume, it was estimated by the Sanitary Waste System management, that the impact to the plant could have caused major National Pollution Discharge Elimination System (NPDES) Permit violations, as well as State of New Mexico Water Quality violations, that could have cost LANL an estimated 100K in fines. But even more significantly, could have had major impacts to the SWTP biological systems to the point of causing full or partial shutdown of the SWTP facility for an estimated 2 to 4 week period. Which in turn, could have had significant impacts on other LANL operations.**

**The source of the acid/ammonium mixture that caused the low pH, high ammonia nitrogen condition was investigated, and identified. A critique was held on July 23, 1998. Because the plant operator on duty was able to divert the influent in a timely fashion, costly and major disruption to the LANL SWTP and other facility functions were prevented.**

#### **Operators Exposed to Organic Vapors Above Short Term Exposure Limits (STEL) While Applying Barrels of Anion Resin: (NE): ID-LITC-ATR-1998-0014**

**On June 30, 1998, at INEL, three ATR Reactor Auxiliary Operators, who were tasked to recharge Anion Exchange Resin into the M-19 Bypass Demineralizer tank, were exposed to trimethylamine that was well above the STEL (limit for a 15 minute exposure). This task they were performing had been successfully performed in accordance with an approved Operating and Maintenance Manual (O&MM) procedure numerous times each year during the past thirty years without incident, and was written in accordance with the Material Safety Data Sheet (MSDS) provided by the resin manufacturer. MSDS included precautions about lifting the barrels of resin, and about slipping; there was no warning about physical or chemical hazards in the MSDS.**

**However, during the application, a stronger than usual ammonia type odor was noticed that led to the operators stopping the work and contacting the ATR Chemistry Coordinator and TRA Industrial Hygienist. Air samples were taken to measure trimethylamine in the worker's breathing zone. Measurements showed that the concentrations of trimethylene were in the order of 300 ppm, which is well above the Threshold Limit Value of 5 ppm and the STEL Limit fo 15 ppm for trimethylamine .**

**The job was halted. No adverse worker respiratory symptoms were noted.**

#### **OTHER OCCURRENCES OF NOTE:**

**The following Class 3 Level occurrences are worth noting, all reflect mis-labeling and/or mis-handling of waste containers that could have led to potentially more serious chemical occurrences.**

**1)POTENTIAL INACCURACY IN AUTHORIZATION BASIS AS A RESULT OF NEW INFORMATION INDICATING A LARGER SOLVENT POOL THAN ORIGINALLY ANALYZED. (EM): RL--PHMC-TANKFARM-1998-0083. At Hanford, on 07/13/1998, three tanks, B-103, C-110, and T-111 were listed in table 5.3.2.15-6 of the Basis for Interim Operation, as having been vapor sampled and noted as not having a potential for an organic solvent fire, and therefor not requiring that organic solvent fire control be applied. However, more recent information (PNNL-11698) indicated that the three tanks exceeded the criteria established for potential organic solvent hazards (specifically, that they contain solvent equivalent to a pool greater than one square meter in area). Such a case would be a potential organic solvent fire hazard, if the tanks are determined to have an equivalent pool size greater than one square meter of organic solvent.**

**The tanks appeared to be misclassified. A standing order was issued requiring Ignition Source Controls for the three tanks. An Unreviewd Safety Question screening helped identify this Potential Inaccuracy of Authorization Basis (PIAB).**

**2)Potentially Flammable Material In Waste Containers (EM) SR--WSRC-SLDHZZD-1998-0006 . On 07/29/98, at Savannah River, two waste containers were received from GTS Duratek (formerly Scientific Ecology Group) with sodium tetraphenylborate. The containers did not have the required vent installed and have potentially flammable concentrations of benzene due to radiolytic decay of TPB during extended storage. Because of this Cell 2 investigation, additional**

cells were placed on standby. This was due to a potentially wider variation in the sodium tetraphenylborate (TPB) inventory term in the analysis, thus indicating a greater TPB concentration within the entire waste stream.

3)Potential Concerns Related to PCBs Located in a Waste Storage Tank (EM) ORO--ORNL-X10WSTEMRA-1998-0005. On 07/09/1998, at ORNL, during a review in preparation for a shipment of waste from the building 7830A tank, environmental compliance personnel questioned the May 1998 analytical results showing 353 parts per million (ppm) polychlorinated biphenyls (PCBs) in the waste. Further investigation discovered analytical results dated 1995 showing 389 ppm PCBs. This tank was not labeled for PCBs and has not been identified on the annual report having PCBs over 50 ppm PCBs. There was no release or known health hazards associated with the discovery of the improperly labeled tank. The tank was re-labeled for PCB storage.

**[\\*\\*\\* CLICK HERE FOR A COMPLETE LISTING OF CLASS-3 EVENTS \\*\\*\\*](#)**

**[\\*\\*\\* CLICK HERE FOR A COMPLETE LISTING OF CLASS-4 EVENTS \\*\\*\\*](#)**

This Report was approved by:

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**Note:**

Non-HTML versions of this document are available upon request.

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