

STRICTLY PRIVATE

Critique Minutes/Notes

Occurrence Report Number: [REDACTED]

Critique Date: 04/03/2000

Critique Leader: [REDACTED]

Attendees:

(DOE)

(DOE),

(DOE),

(DOE),

and

(DOE)

Brief Event Description: (attaching a copy of the 24-Hour Notification Report is sufficient)

On Thursday, March 30, 2000, at about 1600 hours, a four-liter bottle labeled ethyl ether was found in Lab 304 in the 331 Building. The bottle was less than half full of liquid and was believed to be ~10 years old. Once opened, ethyl ether has a shelf life of 6 months to one year, after which shock-sensitive crystals may develop if improperly stored. There were no visible crystals, however, crystals may form in areas not visible, i.e., under the container cap.

A CDRR was filed. Subsequently, a meeting was held with ES&H Line and Building management to prepare a plan for disposal of the ethyl ether. The plan was to place the container in a neutralizing solution per manufacturer's recommendation.

The Event Classifier originally categorized this incident as non-reportable at 1229:41 on 3/31/00, but recategorized it as a "Cross Category-Potential Concerns/Issues" at 1639:47 on 3/31/00 at the request of the division manager.

Reference Materials: (e.g. procedures, written statements, etc.)

SBMS Subject Area: Contents: Working with Chemicals

Chemical Management System (CMS)

Material Safety Data Sheet (MSDS)

PNL 2400 Report

Adverse Chemical Condition Recovery Plan (attached)

Workplace Exposure Assessment (attached)

RELEVANT FACTS AND DATA ASSOCIATED WITH THE EVENT

History:

1/16/89 – Container of ethyl ether was received.

7/27/89 – Container of ethyl ether was first opened.

10/05/89 – Manufacturer's expiration date on container of ethyl ether.

3/92 – Container of ethyl ether originally entered into CMS (Barcode # 10948).

4/94 – Inventoried container of ethyl ether (Room 116).

10/94 – Moved container of ethyl ether to Room 304.

5/14/97 – Hydroxylamine nitrate incident at the Plutonium Reclamation Facility (PRF) which is part of PFP.

3/97 to 1/98 – Inventoried chemicals that increase the kinetics of oxidation.

1/98 – Expiration dates now a required field in CMS.

1/98 – Picric acid found in crawl space of the 327 Building.

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2/99 – Container of the ethyl ether inventoried in 304.

7/99 – Container of ethyl ether inventoried in 304.

Thursday, March 30, 2000

1600 - AWU-NW student identified ethyl ether in an original 4-liter brown glass container stored in a flammable solvents cabinet. The bottle was purchased in February of 1989 and opened in July of 1989. The student recognized the bottle as being past the manufacturer's expiration date of 10/05/89, and notified the Cognizant Space Manager (CSM) for Lab 304. The CSM talked about disposal procedures with the Department Administrator.

The Department Administrator called the Field Service Representative (FSR) and left a message on the FSR's answering machine.

1715 – The Department Administrator called the former Department Administrator who advised going to the PNNL website to prepare a disposal request (CDRR).

1730 – The Department Administrator notified the Resource Manager of the discovery and relayed the actions taken. After a brief discussion, it was agreed that the bottle posed no immediate danger and it was left in the flammable storage cabinet overnight; no posting was done.

Friday, March 31, 2000

0800 – The CSM and the Department Administrator met to prepare a CDRR. The former Department Administrator was called who advised contacting the FSR for assistance in filing the CDRR.

The FSR, who had just listened to the previous day's voice mail message, came and assisted the CSM and the Department Administrator in preparing the CDRR for the disposal of the ethyl ether.

The CSM and the FSR went to the flammable storage cabinet located in Room 304, opened the cabinet to look at the bottle but did not touch it. The cabinet was closed.

0830 – The FSR called Organic Chemist (#1) to discuss the age and quantity of the ethyl ether.

0930 – The FSR notified the Staff Fire Protection Engineer and discussed the age and quantity of the ethyl ether.

The Staff Fire Protection Engineer came to inspect the bottle and brought a Material Safety Data Sheet.

The FSR called Organic Chemist (#1) and informed him that the Staff Fire Protection Engineer was responding.

The FSR notified the Building Manager of the bottle of ethyl ether.

The FSR, the Building Manager, two organic chemists, and the Staff Fire Protection Engineer went to Room 304 to inspect the container.

The Building Manager left to get a flashlight to better inspect the container. No visible crystals were found, liquid was clear, <1/2 full (<2 liters), container in good shape, label was legible.

A group convened in Building 331, Room 2 to discuss the situation. An Industrial Hygienist arrived at the request of the Staff Fire Protection Engineer to discuss a path forward.

0945 – The Manager of Field Service Operations for Environmental Management and a Technical Group Manager of Field Waste Management Services were notified by the FSR who described the container of ethyl ether.

0956 – The Building Manager called the DOE Facility Representative.

1000 – The Staff Fire Protection Engineer recommended formulating an Adverse Chemical Condition Recovery Plan. The DOE Facility Representative and the Department Administrator arrived at the meeting.

1015 – The Technical Group Manager of Field Waste Management Services arrived at the meeting.

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The team prepared a draft of the Adverse Chemical Condition Recovery Plan which was recorded by Organic Chemist (#2).

MSDS Key Factors:

- if viscous it is more dangerous
- explosive peroxides may form if exposed to air, sunlight
- Class 1A Flammable (highly)
- advise checking for peroxides periodically and prior to use (chem-strips)

1025 – Organic chemist (#1) called the manufacturer (American Burdick & Jackson) and talked with Steve Mills, Safety and Environmental Manager, who agreed with the recovery plan and suggested adding a 5 to 10 minute soak time to the plan. His suggestion was implemented into the recovery plan.

1100 – The Staff Fire Protection Engineer attempted to call several chemical researchers and reached a chemical researcher with former HAZMAT responder who agreed with the recovery plan.

The Industrial Hygienist typed the Adverse Chemical Condition Recovery Plan on a PC.

The organic chemist (#1) assembled items for recovery plan.

The team agreed to reconvene the meeting at 1300.

1130 – Meeting broke up

1132 – Building Manager called 375-2400

1135 – Event classifier notified. Originally classified as not reportable.

1145 – After a discussion of appropriate safety equipment, Organic Chemist (#1) contacted the Technical Group Manager of Field Waste Management Services to change gloves to gloves with a better breakthrough time.

1200 – The Staff Fire Protection Engineer notified the 300 Area Fire Captain of the conditions and advised recovery plan begin at 1400.

1215 – The Manager of Field Service Operations for Environmental Management, the ES&H Department Manager and the Staff Fire Protection Engineer met to review the recovery plan and decided they needed more information.

1230 – The Acting Division Manager and the Operations Manager for EHSD were contacted by the Manager of Field Service Operations for Environmental Management.

The Staff Fire Protection Engineer contacted the Hanford Fire Department and invited the Battalion Chief to attend the 1300 meeting.

The Department Administrator notified department staff by e:mail and verbally of the potential to relocate staff and to vacate the third floor laboratories from 1300 to 1500 and posted doors with the notification. The door to room 304 was not locked. There were no research activities scheduled for room 304. The CSM is normally the only worker in that room.

1300 – The meeting in room 2 resumed to review the recovery plan. The Adverse Chemical Condition Recovery Plan (attached) was modified and a Workplace Exposure Assessment (attached) was added.

1330 – The research chemist assigned as part of the Adverse Chemical Condition Recovery Team inspected the bottle of ethyl ether, found no crystals, rotated the bottle 90 degrees, found normal viscosity and recommend that the recovery plan be implemented.

During the discussion, the Battalion Chief and the 300 Area Captain recommended that the Hanford Fire Department be positioned in the hallway as backup (in full bunkers and SCBA). This recommendation was incorporated into the recovery plan.

The Adverse Chemical Condition Recovery Team research chemist calculated the energetics based on observations of the container. Discussion and calculations were made to determine the risk and probability of the energetics becoming a problem. Because there were no crystals found and the viscosity was normal, the decision was made to implement the recovery plan

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emphasizing the “stop all activity” hold points in the plan.

The building was in normal operations. Laboratory activities on the third floor were curtailed.

1400 – Completed the Adverse Chemical Condition Recovery Plan and the Workplace Exposure Assessment.

Organic Chemist (#1) and Organic Chemist (#2) went to Room 304 to set up for the recovery.

- practiced moving to the safety shower/eye wash stations
- four dry runs were made using a bottle filled with water

1430 – The Department Administrator set up exclusion boundaries to include all laboratories on the third floor but not including offices located on the opposite side of the third floor.

Hanford Fire Department brought in 300 and 400 area standby team with 1 engine and 1 ambulance.

- prestaged Hanford Fire Department staff
- recovery team action discussed with Hanford Fire Department

400 area Hanford Fire Department proximity cards did not provide entry access to the 331 Building.

1530 – The Building Manager talked with the Hanford Fire Department Captain who placed extra staff at exclusion points and walked down third floor and then met with Incident Commander.

- made sure all staff were staged in predesignated locations
- reported to Incident Commander and notified him that all stations were ready

1539 – Incident Commander gave go ahead to proceed

Building Manager called 375-2400 to advise that the recovery plan was started.

Hanford Fire Department staff went on SCBA

Team began recovery actions

- moved the material into the hood (~ 20 seconds)
- stabilizing soak for 10 minutes
- no peroxide was identified (from analysis of chem strips)

1600 – Completed the recovery plan as written.

1604 – Categorized the event as reportable at Division Manager’s request.

1605 – Hanford Fire Department exited the 331 Building.

Monday, April 3, 2000

1436 – ONO notification report submitted to ORPS

1500 – Critique

ANALYSIS OF RELEVANT FACTS AND DATA:

Probable Cause Factors

Direct Cause:

3b. Personnel Error – Procedure Not Used or Used Incorrectly.

- CSM did not perform checks for peroxides as recommended in SBMS (unstable chemicals).

Root Cause

6a. Management Problem - Inadequate Administrative Control.

- The administrative controls in IOPS and CMS failed to identify the potential hazard in a timely manner.

6e. Management Problem – Policy Not Adequately Defined, Disseminated, or Enforced.

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- No requirements for back filling expiration dates into CMS.

Contributing Cause:

- CMS does not flag expired chemicals.
- CSM did not understand the recommendations contained in the Working With Chemicals Subject Area in SBMS.

Recommended Corrective Actions:

1. CSM was counseled regarding his responsibilities for storage of peroxidizable organic chemicals. [REDACTED], TRM, 3/31/00)
2. Review CMS inventories for peroxidizable chemicals that have exceeded their expiration date. (Manager, Safety & Health by 5/15/00)
3. Develop action plan for evaluating each chemical container identified by the review above. (Manager, Safety & Health by 5/30/00)
4. Track progress and completion of action plan above. (Manager, Safety & Health by 6/30/00)
5. Develop a lesson learned and distribute to Lab. [REDACTED], TRM, by 7/01/00)

Recommended Lessons Learned:

To be determined.

Signatures:

[REDACTED]
Critique Leader

[REDACTED]
Date