



Officers Exposed to Hydrogen Fluoride

Purpose

To share “lessons learned” gained from incident investigations through a small group discussion method format.

To understand “lessons learned” through a Systems of Safety viewpoint.



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Lessons Learned

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Background Information

Before beginning this Lessons Learned, please review this and the next page which contain information that will introduce the concepts of Lessons Learned and Systems of Safety.

Creating a safe and healthy workplace requires a never ending search for hazards that sometimes are not obvious to us. These hazards exist in every workplace and can be found by using various methods. Lessons Learned are just as the name suggests: learning from incidents to prevent the same or similar incidents from happening again.

Systems Are Not Created Equal: Not equal in protection and not equal in prevention.

Using our Systems Focus to uncover system flaws or root causes is only one part of controlling hazards. We also need to look at the systems involved to decide on the best way to deal with the problem. The most effective way to control a hazard is close to its source. The least effective is usually at the level of the person being exposed. The system of safety in which the flaw is identified is not necessarily the system in which you would attempt to correct the flaw.



Major Safety System	Design & Engineering	Maintenance & Inspection	Mitigation Devices	Warning Devices	Training & Procedures	Personal Protective Factors
Level of Prevention	Highest—the first line of defense	Middle—the second line of defense			Lowest—the last line of defense	
Effectiveness	Most Effective	←————→				Least Effective
Goal	To eliminate hazards	To further minimize and control hazards				To protect when higher level systems fail
EXAMPLES OF SAFETY SUB-SYSTEMS**	Technical	Inspection and Testing	Enclosures, Barriers Dikes and Containment	Monitors	Operating Manuals and Procedures	Personal Decision-making and Actions HF
	Design and Engineering of Equipment, Processes and Software	Maintenance	Relief and Check Valves	Process Alarms	Process Safety Information	Personal Protective Equipment and Devices HF
	Management of Change (MOC)**	Quality Control	Shutdown and Isolation Devices	Facility Alarms	Process, Job and Other Types of Hazard Assessment and Analysis	Stop Work Authority
	Chemical Selection and Substitution	Turnarounds and Overhauls	Fire and Chemical Suppression Devices	Community Alarms	Permit Programs	
	Safe Siting	Mechanical Integrity	Machine Guarding	Emergency Notification Systems	Emergency Preparedness and Response Training	
	Work Environment HF				Refresher Training	
	Organizational (must address a root cause)				Information Resources	
	Staffing HF				Communications	
	Skills and Qualifications HF				Investigations and Lessons Learned	
	Management of Personnel Change (MOPC)				Maintenance Procedures	
	Work Organization and Scheduling HF				Pre-Startup Safety Review	
	Work Load					
	Allocation of Resources					
	Buddy System					
	Codes, Standards, and Policies**					

HF - Indicates that this subsystem is often included in a category called Human Factors.

* There may be additional subsystems that are not included in this chart. Also, in the workplace many subsystems are interrelated. It may not always be clear that an issue belongs to one subsystem rather than another.

** The Codes, Standards and Policies and Management of Change sub-systems listed here are related to Design and Engineering. These subsystems may also be relevant to other systems; for example, Mitigation Devices. When these subsystems relate to systems other than Design and Engineering, they should be considered as part of those other system, not Design and Engineering.

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Title: Officers Exposed to Hydrogen Fluoride

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Lessons Learned Statement:

The poor design of plant equipment, location of plant facilities and the lack of procedures added up to exposed employees. *Systems of Safety* are utilized to provide prevention from this type of incident. The prevention provided by a better designed cold trap cylinder provides a well-defined **Design and Engineering System of Safety** approach. It is also noted that the plant is running above their safe operating limits due to the fact that trap cylinders cannot handle the amount of gas coming through them.

The locations of the Officer's shack and the vent stack is a definite **Design and Engineering System of Safety** failure. The closeness of the stack and the shack contributed to the exposure of the officers.

That the Officers were not aware of the venting taking place is a definite **Training and Procedures System of Safety** failure. The notification of all people in the area of the vent stack during venting is critical in preventing exposures.

The inability to begin air sampling immediately has prevented knowing the amount of HF in the air at the time of the venting.

Discussion:

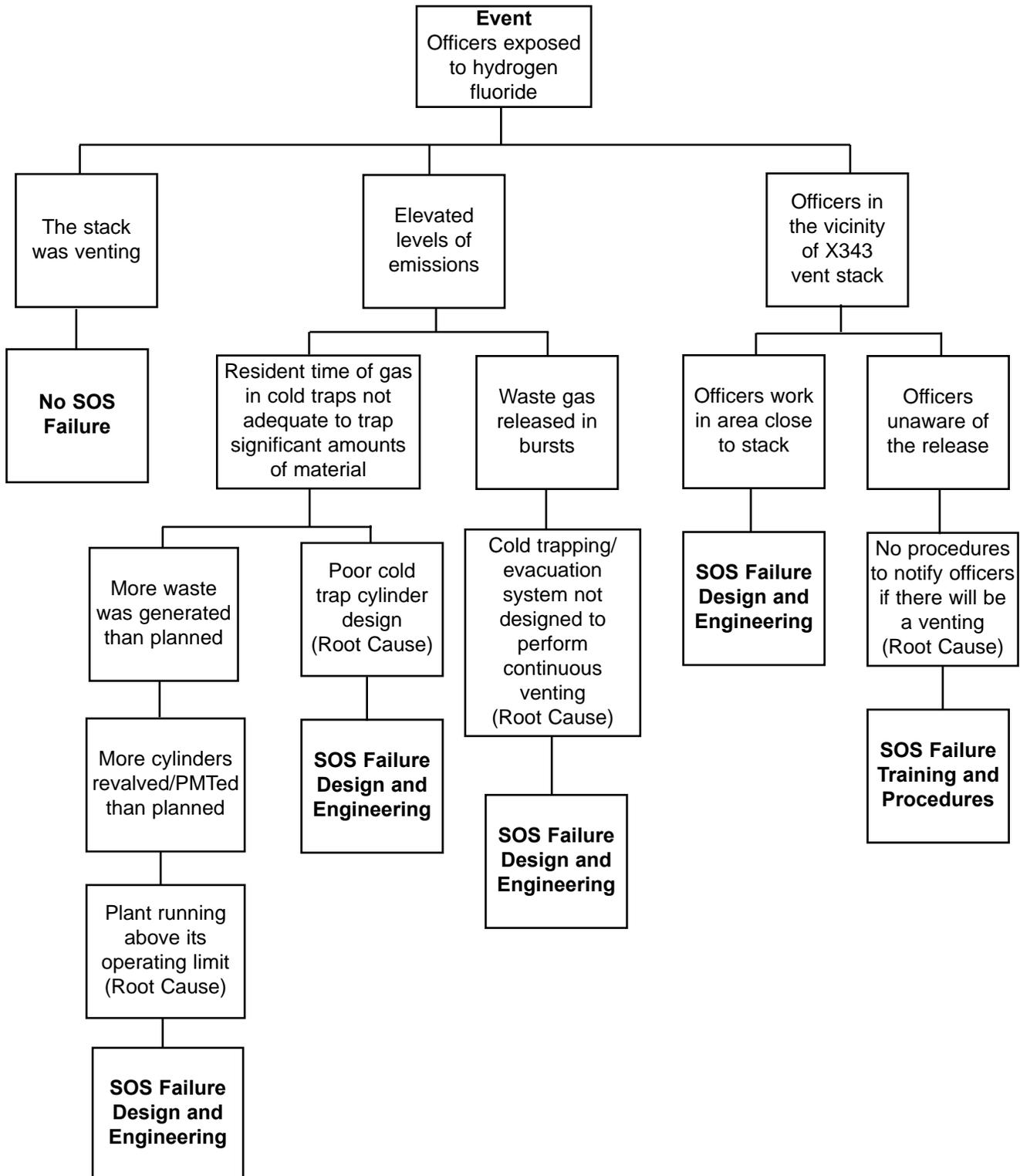
Two Officers were exposed to hydrogen fluoride. At about 9:50 a.m., while in the guard shack, Officer #1 began to smell a light odor of hydrogen fluoride. Within a couple of minutes he developed a headache. At 10:00 a.m., Officer #2 was heading down to the guard shacks when he smelled the HF. As he got closer to the shack, the smell became stronger.

Officer #1 asked an operator if there was a plant venting HF. The operator then went to notify his supervisor. The officers also notified their supervisor. The Shift Commander came to the shack and relieved the officers so they could report to the medical facility for evaluation.

At 10:10 a.m., the venting of the HF was discontinued. The air was sampled 30 minutes after the incident and tests indicated that the levels were within the permitted levels.

Analysis

The Logic Tree is a pictorial representation of a logical process that maps an incident from its occurrence, “the event,” to facts of the incident and the incident’s root causes.



Recommendations:

1. Make sure that the plants are operating within their safe limits.
2. Design a better cold trap cylinder to better fit its expectations in the plant.
3. Determine, if possible, if the guard shack can be moved so that the officers are not in the vicinity of the vent stack. If unable to do so due to security problems, then the vent stack must be redesigned or moved.
4. Review all guard shacks in area and make sure that SCBA packs are available for guards that are working there.
5. Redesign the guard shack to protect guards inside (shelter in place).
6. Implement a procedure to notify all people in the area of the vent stack when there will be any venting at all
7. When there is a release, testing of the air needs to take place as soon as possible to get an accurate reading of the material in the air at the time of release.
8. Make sure all personnel in plants are aware and trained on hazards inside the facility.

Education Exercise

Working in your groups and using the Lessons Learned Statement, Discussion, Analysis and Recommended Actions, answer the two questions below. Your facilitator will give each group an opportunity to share answers with the large group.

1. Give examples of ways to apply the Lessons Learned Statement at your workplace.

2. Of the examples you generated from Question 1, which will you pursue in your workplace? (**Note:** When we say something you may pursue, we mean a joint labor-management activity or a union activity rather than an activity carried out by you as an individual.)

Trainer’s Lessons Learned Success Inventory

Following a Lessons Learned (LL) session, **the trainer who led the LL** should complete this form. This information will: 1) Help you reflect on the successes and challenges of the session; 2) Help USW with new curriculum development; and 3) Help USW as a whole better understand how the LL Program is supporting their workers.

By reviewing LL from different sites or from other areas of their workplaces, workers are able to analyze the information and apply these lessons to their own workplaces in order to make their workplaces healthier and safer.

1. Site name (if there are participants from more than one site, please list all).

2. Date of LL training _____

3. LL number used in today’s Training _____

4. Your name _____

5. **Summary of Education Question 1:** Please summarize participants’ examples of ways to apply this LL Statement to their workplace.

Please continue on reverse side.

- 6. Summary of Education Question 2:** Please summarize which actions or recommendations participants discussed pursuing at their workplace(s).

Thank you for completing this form.

EVALUATION

Lessons Learned: Officers Exposed to Hydrogen Fluoride

Please answer the two questions below:

1. How important is this lessons learned to you and your workplace? (Circle one.) Rate on a scale of 1 to 5, with 5 being the most important.

1	2	3	4	5
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2. What suggestions would you make to improve this Lessons Learned?

End of Training Trainer's Instructions

Please complete the information below.

Trainer's Name _____
(Please Print)

Date of training: _____

No. of Participants: Total _____ Hourly _____ Management _____

Location of Training: _____

USW Local # _____

Send:

1. This page;
2. The Education Exercise (page 8);
3. The Trainer's LL Success Inventory form (pages 9 and 10);
4. The evaluation for each participant (page 11); and
5. The Sign-in sheet (page 13) to:

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Thank you for facilitating the sharing of this
Lesson Learned with your coworkers.

