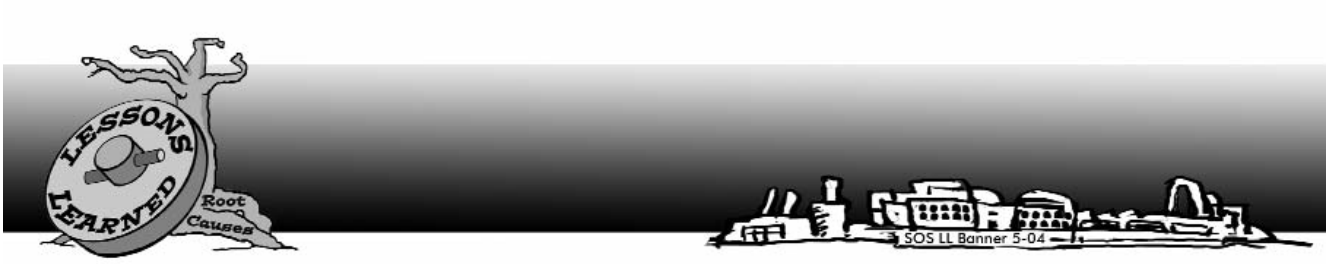

Possible Worker Exposure to Leaking HF (Hydrofluoric) Acid

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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FOR HEALTH, SAFETY AND ENVIRONMENTAL EDUCATION
A PROJECT OF THE UNITED STEELWORKERS AND THE LABOR INSTITUTE

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Lessons Learned

Volume 08, Issue 23

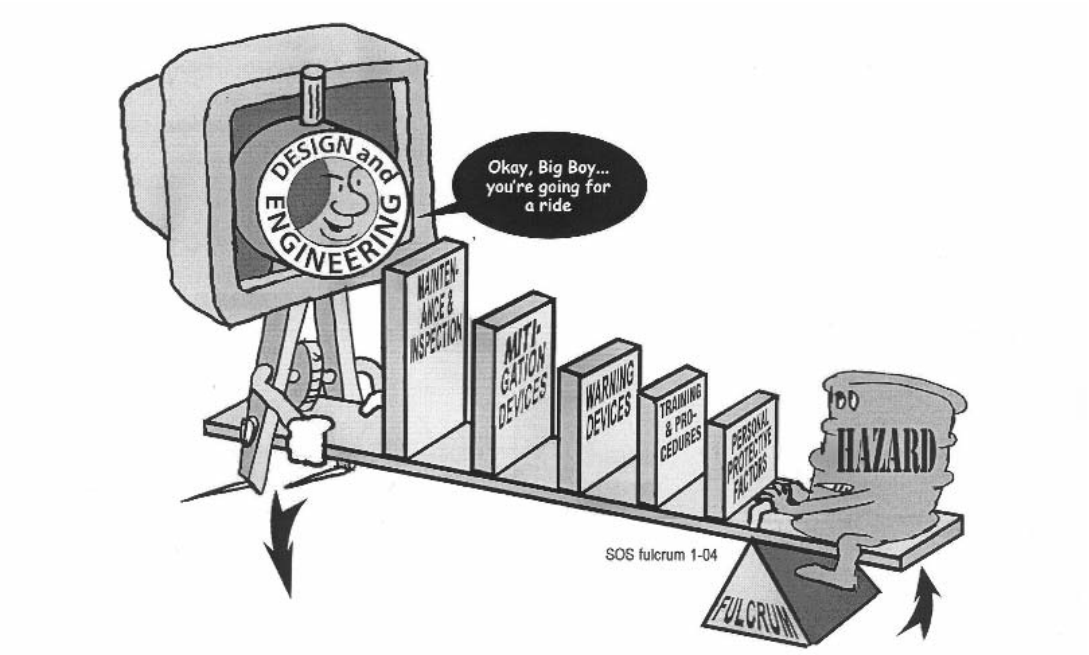
Background Information

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** Design and Engineering of Equipment, Processes and Software Management of Change (MOC)** Chemical Selection and Substitution Safe Siting Work Environment HF **Organizational *(must address a root cause)*** Staffing HF Skills and Qualifications HF Management of Personnel Change (MOPC) Work Organization and Scheduling HF Work Load Allocation of Resources Buddy System Codes, Standards, and Policies**	Inspection and Testing Maintenance Quality Control Turnarounds and Overhauls Mechanical Integrity	Enclosures, Barriers Dikes and Containment Relief and Check Valves Shutdown and Isolation Devices Fire and Chemical Suppression Devices Machine Guarding	Monitors Process Alarms Facility Alarms Community Alarms Emergency Notification Systems	Operating Manuals and Procedures Process Safety Information Process, Job and Other Types of Hazard Assessment and Analysis Permit Programs Emergency Preparedness and Response Training Refresher Training Information Resources Communications Investigations and Lessons Learned Maintenance Procedures Pre-Startup Safety Review	Personal Decision-making and Actions HF Personal Protective Equipment and Devices HF Stop Work Authority

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 subsystems 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 systems, not Design and Engineering.

Revised October 2006

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Title: Possible Worker Exposure to Leaking HF (Hydrofluoric) Acid

Identifier: Volume 08, Issue 23

Date Issued: June 6, 2008

Lessons Learned Statement:

The failure to use tightly-sealed containers for storing and transporting materials which leaked HF gas created a dangerous hazard for workers. ***Systems of Safety*** are utilized to provide prevention from this type of incident. The use of containers designed to hold and transport HF containing materials provides a well-defined **Mitigation** ***System of Safety*** approach. Utilizing lifting aids can also provide distance between workers and possible hazards.

Despite previous reports and concerns about the containers, the "lessons" were not "learned" and no ***System of Safety*** actions were taken.

Putting a sampling plan into place to ensure containers are not leaking is an effective use of the **Training and Procedures** ***System of Safety***.

The use of respirators until the effective containment of material in proper containers is completed would be a use of the **Personal Protective Factors** ***System of Safety***.

Discussion:

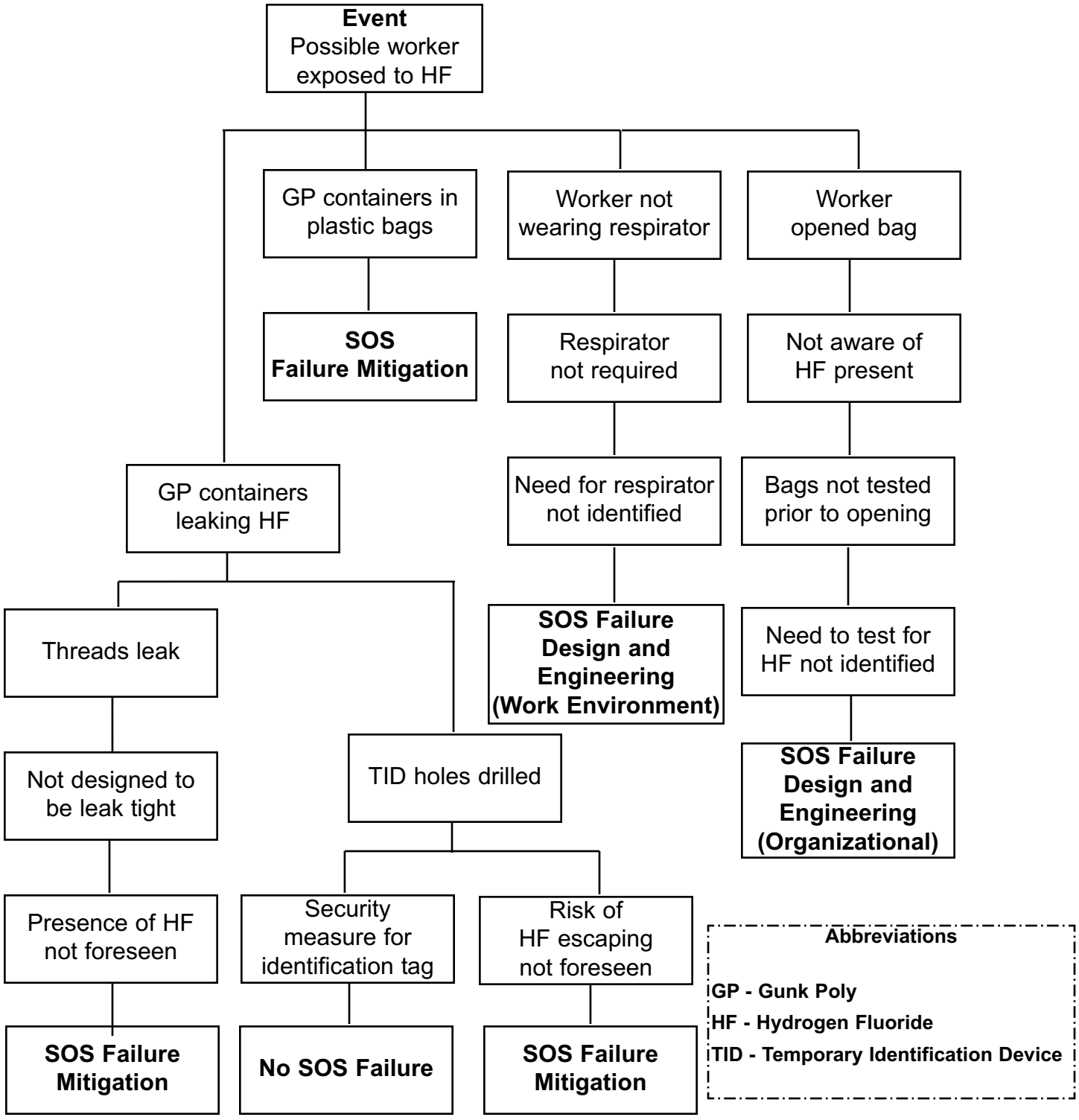
Several Gunk Poly (GP) containers were to be removed from plastic bags and prepared for transport. A worker had noticed several cardboard tags that had been recently attached to the containers were crumbling and in bad condition. The worker knew of recent concerns with Hydrogen Fluoride (HF) with other GP containers, but was not expecting those to be an issue with these containers. These containers had been filled with trap material and alumina from top purge and were being checked for radioactive contaminants, but not for HF.

Suspecting a possible problem, the worker asked an HP-IH (Health Physics-Industrial Hygiene) technician to check for HF in the bag of the next container about to be opened. A small cut was made in the bag and an HF probe was inserted into the bag. A concentration of HF was detected. The probe was removed and the HP-IH technician instructed the worker to seal the hole immediately and stop work on the containers.

Since it was not routine procedure to check the bagged GP containers from top purge for HF before removing their bags, it is possible workers have been exposed to unknown levels of HF and other contaminants. The concern is that workers have been exposed numerous times without warning since the early 1990s when GP containers were first put to use.

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.



Recommended Actions

1. Evaluate replacing GP containers with tightly-sealed containers, such as storage drums.
2. Evaluate using sealed storage drums to store and transport full GP containers.
3. Devise a sampling plan to evaluate all possible exposure to HF per the NIOSH ceiling of 6 PPM in 15 minutes.
4. Revise the JHA (Job Hazard Analysis) for the Tech media or generate a new JHA to address the radiological and HF exposure issues as they pertain to workers being in very close proximity to GP containers.
5. Reevaluate the use of respirators when in close proximity of full GP containers.
6. Utilize lifting aides for GP containers to help maintain distance from lid of containers.
7. Do a failure-mode analysis of GP containers.
8. Do an engineering evaluation of GP containers to determine amount of wear-to-container body and useful life span.
9. Evaluate addition of Alumina to GP containers to help absorb HF.
10. Develop a Lessons Learned Bulletin based on this event.
11. Review the applicable portions of this event with the general plant population at the monthly safety meetings.

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 actions or recommendations participants discussed pursuing at their workplace(s).

Thank you for completing this form.

EVALUATION

Lessons Learned: Possible Worker Exposure to Leaking HF (Hydrofluoric) Acid

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

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:

If you are a TOP Site (excluding DOE TOP Sites)	**Send to: Steve Cable 2915 Gradient Drive St. Louis, MO 63125**
All other sites (including DOE TOP Sites)	**Send to: Doug Stephens United Steelworkers 3340 Perimeter Hill Drive Nashville, TN 37211**

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

Sign-in Sheet

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Name of Class_____ Date of Class_____

Instructors: _____

Please Check One* H	M	Print Name	Signature

***H = Hourly Worker**
M = Management or Salaried Worker