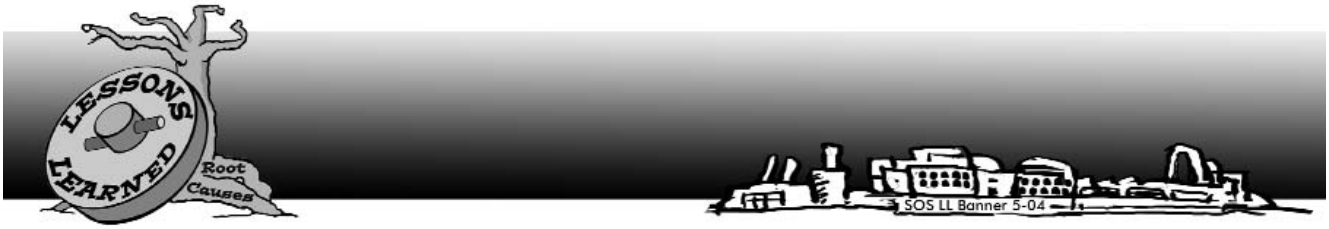

Worker Evacuated into Direction of Vapor Release

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.

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

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Lessons Learned

Volume 07, Issue 37

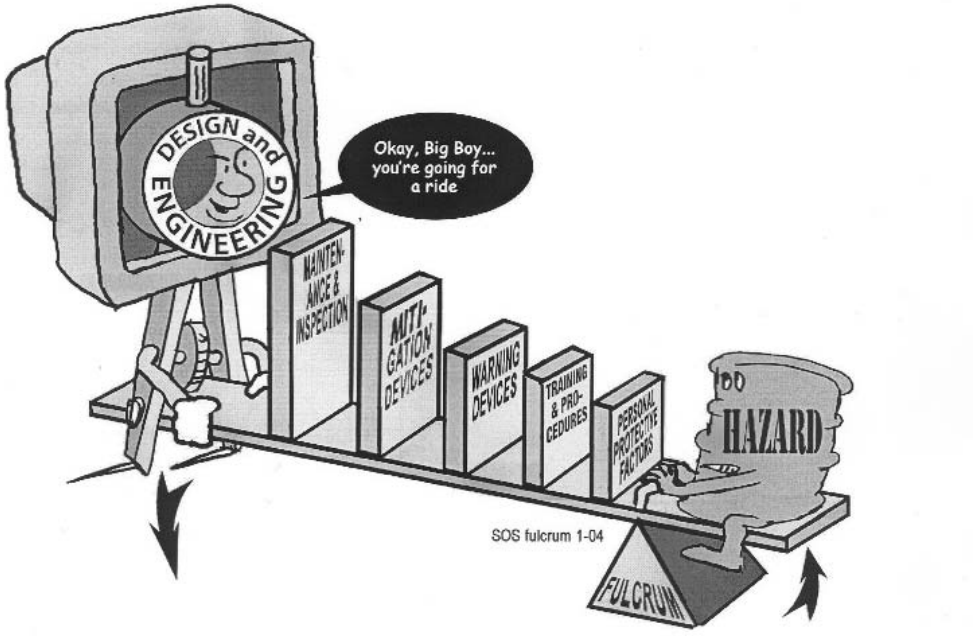
Background Information

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 sub-system 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 sybsystem 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 sub-systems relate to systems other than Design and Engineering, they should be considered as part of those other system, not Design and Engineering.

Revised October 2006

TONY MAZZOCCHI CENTER
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Title: Worker Evacuated into Direction of Vapor Release

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Lessons Learned Statement:

Not effectively utilizing the appropriate ***Systems of Safety*** at this facility led to communication breakdown during a critical time. Craftsman were performing a job task in an environment that required them to be in insulated PPE for extended periods of time. In an effort to improve time and avoid delays, it was decided to allow the craftsman to score the piping on a bin that stored decaying radioactive pellets. It was while performing the pipe scoring task, where the lack of a ***System of Safety*** culture in the **Design and Engineering, Maintenance and Inspection, Warning Devices** and **Training and Procedures** ***Systems of Safety created*** a scenario where workers evacuated their work space during a vapor release into the path of the release.

The root cause identified in the **Design and Engineering** ***System of Safety*** by the investigating team making recommendations was that there was no available radio communication and the recommendation was to establish radio station points at work locations in the facility where the public announcement system is inoperable. This recommendation was only made as mitigation until the primary recommendation of repairing the broken Public Address (PA) system was completed.

It was discovered that the broken PA system had been out of service and on a work order backlog due to a low priority rating. This gap in the **Maintenance and Inspection** ***System of Safety*** could have been closed if the PA system was repaired or placed on some type of maintenance schedule. This recommendation was made by the investigation team to prevent delays when critical communication devices need to be repaired.

The inability of employees to locate the emergency alarms during the emergency was identified as another ***Systems of Safety*** failure that could have prevented this incident from escalating to where employees were left in harm's way for over nine minutes with no knowledge of the vapor release in their building. The team made two recommendations in the Warning **Devices** ***System of Safety*** that prevented employees from activating alarms:

- The first is to clearly mark all emergency alarms so they can be identified by anyone working in the building.
- The other is allow employees to activate the alarm system without having to wait for instructions from Incident Command.

In this situation, if the console operator had sounded the alarm and not waited for nine minutes, the workers would have been notified as soon as the release occurred. Instead, they continued to work in a location where dangerous vapors had been released and they had no know way of knowing they were in danger. The team felt that if the company had effectively incorporated the **Warning Device** ***System of Safety*** and the **Training and Procedures** ***System of Safety*** into their culture, everyone working in the facility would have understood that they have the authority to activate emergency alarms when they view any situation as critical.

The last recommendation by the team (in the **Training and Procedures** ***System of Safety)*** was based on the information that the evacuating employees could have been prevented from entering a potentially hazardous area after they were evacuated. The failure of site Security to set up an evacuating perimeter and the ERT department having to disconnect from the worker reporting the incident, left the team with recommendations to:

continued

Lessons Learned Statement *(continued)*:

- Revise the facility emergency reporting system to allow for all parties to remain connected during an emergency;
- Training for the security forces to address the gaps in response protocol; and
- Procedures for proper response to a plant emergency.

These failures were identified as root causes that kept valuable information on who was sheltered in place and what evacuation routes were available from those organizing the evacuation of the employees during this incident.

Discussion:

During the day shift, a work order was issued by the Health Workers Oversight Department to the Maintenance Department to score the plugs on a contaminated product bin. The maintenance craftsman received the instructions on communications and responsibilities. Emergency action plans were reviewed. After receiving the permit to work, the craftsman proceeded to use a new style cutting blade to score the pipe. In the process of making his fifth rotation, the craftsman backed off the pipe cutter and suddenly noticed smoke coming from the pipe he was scoring. The reason the craftsman broke through the pipe was due to the new style blade and the fact that the pipe specifications were not within the normal thickness range for the pipe used in this type of service.

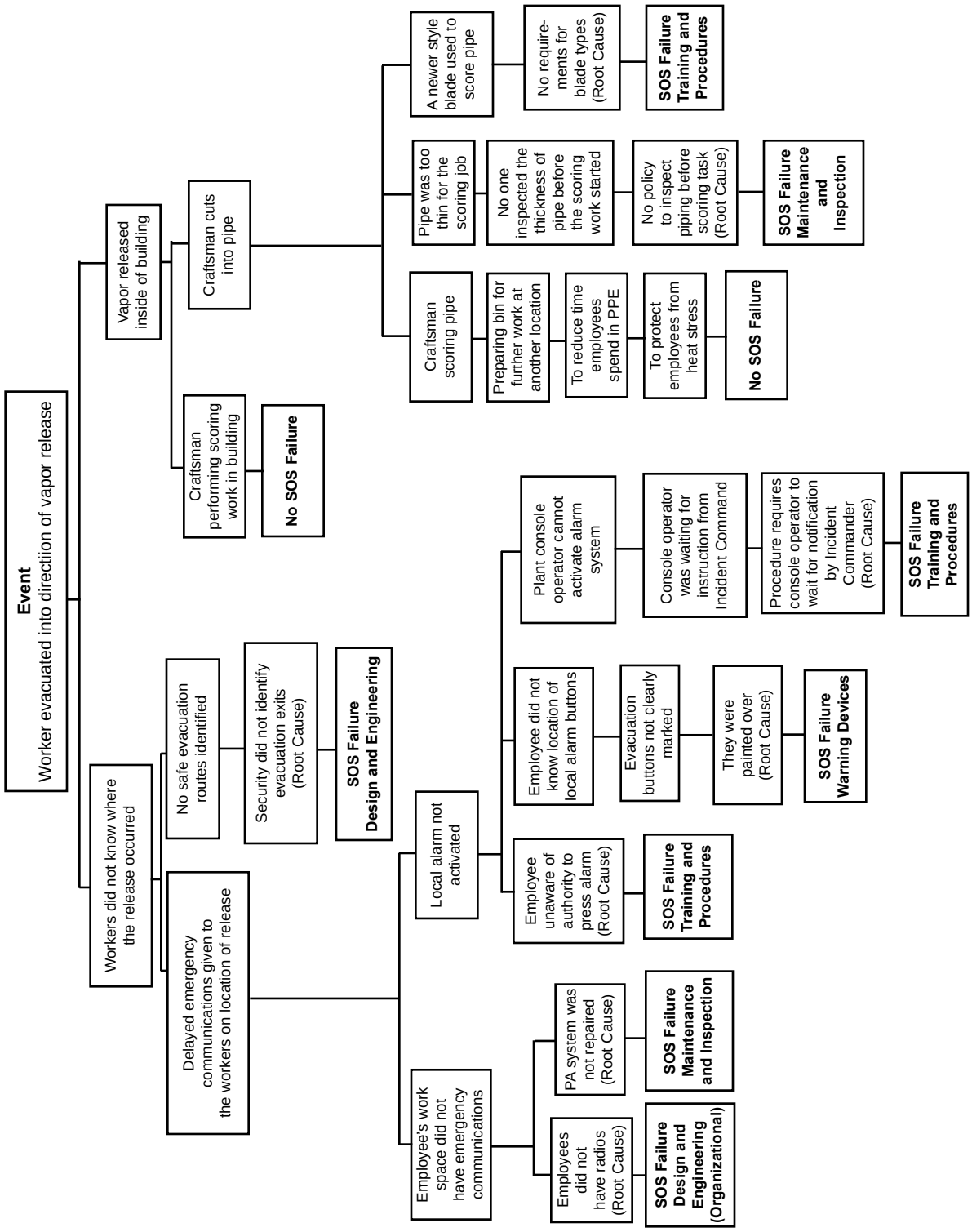
The Health Worker observing the job noticed the smoke and instructed the craftsman to leave the building immediately. He then placed a call to 911 and in the process he was cut off by the Facility ERT (emergency response team). ERT personnel who answered the call hung up on the Health Worker who reported the smoke so the plant superintendent, the console operator and security personnel could be contacted and informed

of the pipe breach. Once incident command was set up, the plant superintendent was notified that employee was still present in the building and had not been evacuated because the local alarm had not been sounded. (This was nine minutes after the pipe breach was reported). The plant superintendent ordered the alarm be sounded so all employees could be evacuated to a safe location; but security had not yet established a safe evacuation zone.

The siren was sounded and the ERT personnel contacted the Equipment Repair Lab and informed them of the vapor release. Soon after the alarm was sounded, the employee in the Equipment Repair Lab exited the building and proceeded to evacuate to their normal evacuation station. Unfortunately, their station placed them directly in the path of the released product. Fortunately, no one was exposed to the vapor cloud because it was contained to the building; but the emotional impacts are still be felt from the breakdown of the EEP (Emergency Evacuation Plan).

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. Repair the PA system and include the system on routine maintenance schedule.
2. Place radios at each work location in the facility until PA system is repaired.
3. Inspect and repair all emergency alarm buttons and place visible signs so they can be easily identified.
4. Revise the emergency reporting system to allow for all involved parties during an emergency to maintain contact so important information is available.
5. Train workers to understand they have authority to press alarm activation to alert other workers.
6. Revise current policy which requires operators to wait for instruction before activating the emergency alarms during an incident.
7. Train Security personnel on duties and responsibilities when the emergency alarms are activated.

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 ore 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: Worker Evacuated into Direction of Vapor Release

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 11);
3. The Trainer's LL Success Inventory form (pages 12 and 13);
4. The evaluation for each participant (page 14); and
5. The Sign-in sheet (page 16) to:

Doug Stephens
United Steelworkers International Union
3340 Perimeter Hill Drive
Nashville TN 37211

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

Sign-in Sheet

Name of Class_____ Date of Class_____

Instructors: _____

Please Check One* H	M	Print Name	Signature

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