What's In Your Lessons Learned Program?

or

(How to Make Sure
Lessons Learned are Actually Learned
and Stay Learned)

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EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

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Biographical Information – Brian S. Anderson

- Employer: U.S. Department of Energy / Idaho Operations Office
- Position: Team Leader, Safety Performance Team and QA Manager
- Education: BS / Electrical Engineering, U. S. Naval Academy – 1977
- Experience:
  - 32 Yrs. Nuclear Operations (Submarines, Reactors, Nuclear Facility Operations)
  - Quality Assurance, ES&H, Construction, Maintenance, Training …
  - ORR, RA, Accident Investigation, ISMS Verification - Team Lead or member
- Certifications:
  - ANSI/ASME NQA-1 Lead Auditor – 1985, 2009
  - U. S. Navy Nuclear Program, Submarine Officer & Nuclear Engineer 1982 & 1984
  - DOE TQP – Senior Technical Safety Manager - 1999

What Do We Do With All this Information?

- There is a FLOOD of Operating Experience (OE) information from
  - ORPS
  - CAIRS (events and injuries)
  - Industry
  - and Lessons Learned databases, etc.
- How much of this is a precursor to the next accident?

There's No Such Thing as a "New" Accident

- No Type A or B accident report ever stated:
  - "Nothing like this has ever happened before …"
  - "This was totally unforeseeable …"
  - "We had no idea this could happen …"
- The objective of a Lessons Learned Program is
  - to eliminate known accident precursors …
  - by recognizing and correcting these conditions …
  - before an accident occurs.

Uh – Oh

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Lessons Learned Objectives & Requirements - DOE O 210.2

DOE wide program for the management of LL

- **to prevent adverse operating incidents** and
- to expand the sharing of good work practices among DOE sites.

- OE information must be collected and **analyzed** …
  - to ***identify*** significant crosscutting issues and trends,
  - ***detect*** weak signals across the Department, and
  - to ***take action to correct*** the identified weaknesses."
- When ***data suggests*** a significant near-term safety risk or vulnerability, those issues must be
  - ***prioritized*****,**
  - ***communicated*****,** and
  - ***resolved*****.**

DOE Corporate Operating Experience Program

- The following elements ***must be incorporated*** into the operating experience program:
  - (a) ***performance indicators*** and ***trends*** …

- Actionable or informative OE documents From HQ:
  - Special Operations Reports (SORs)
  - Environment, Safety and Health Alerts (SAs),
  - Environment, Safety and Health Bulletins (SBs)
  - Environment, Safety and Health Advisories (SAds)
  - Operating Experience Summaries (OESs)
  - Just-In-Time Operating Experience Reports (JITs)

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Special Operations Report 2006-1 - Electrical Safety

Special Operations Report
U.S. Department of Energy

Electrical Safety

DOE/EH-0703 | 2006-01 | August 2006

***Special Operations Reports** are issued to initiate management actions in response to events whose subject matter represents significant Departmental safety concerns.*

***Environment, Safety and Health Alerts** are issued to initiate immediate action on potentially significant safety issues.*

***Environment, Safety and Health Bulletins** are issued to share information and recommend actions on potential safety issues.*

***Environment, Safety and Health Safety Advisories** are issued to provide information to the DOE Complex on potentially significant safety or health issues.*

PURPOSE

The Department of Energy (DOE) has issued this Special Operations Report (SOR) to inform DOE and contractor line management that there continues to be a significant concern regarding the safe performance of electrical work across the DOE complex.

BACKGROUND

The Department experienced an increased number of

In order to achieve consistent improvement in electrical safety across the Complex and to ensure ownership for improvement, all electrical safety improvement activities are being integrated under the umbrella of the Energy Facility Contractors Group (EFCOG). In January 2006, DOE and EFCOG developed and approved an Electrical Safety Improvement Project Plan. All of the actions associated with this plan are expected to be completed by the end of calendar year 2006.

ANALYSIS

The risk of serious injury is always present when working with electrical systems. Electricity exists everywhere in the workplace and presents a hazard not only to electrical workers, but to anyone who could potentially come in contact with it. The amount of electrical current needed to cause a fatality is extremely small, and yet the energy released during an arc flash or arc blast can be tremendously large. Consequently, workers must possess an adequate knowledge of electricity's potential hazards in order to work smartly and safely.

As mentioned above, in the month of December 2005, two

Does this sound like your LL Program?

- Most Lessons Learned programs consist of:
  - a way to gather recent event information
  - a process to forward the information for awareness
  - a method to store and access information about events or topics

- These programs are doing something…but
  - will never truly be an effective program "to prevent adverse operating incidents."
  - and are we really "learning" anything?

Five Critical Steps to effectively apply OE information

- It takes a focused effort -
  - to ***sort*** and ***analyze*** the OE information,
  - to ***examine*** our own programs, management processes and operating practices, to find whether the same kinds of failures that led to an accident or serious event exist here,
  - to ***perform*** a rigorous causal analysis to ***determine*** what needs fixed,
  - to ***implement*** a robust corrective action process to make fixes, and
  - to ***follow-up*** to make sure the fixes stay fixed.

Starting Over ...

- "The way I see it, every time a man gets up in the morning, he starts his life over. Sure the bills are there to pay, and the job is there to do, but you don't have to stay in a pattern. You can always start over, saddle a fresh horse, and take another trail. "

Louis L'Amour – The Proving Trail

So how do I get started?

- Sort and analyze the available OE information
  - ***Identify*** significant crosscutting issues and trends:
    - Categorize events by type, causes, etc.
    - Evaluate the frequency of similar categories of events
  - ***Review*** and ***evaluate*** events for applicability:
    - Do we have a similar type of operation?
    - How could a similar event occur at our facilities?
    - How do I know we don't have these deficiencies in our processes?
  - ***Determine*** degree of risk and vulnerability:
    - What's the probability of our having a similar event?
    - What are the impacts of a similar event here?
    - How long since we looked at this in our oversight?

Assess your programs and operating practices

- Examine processes for similar weaknesses
  - Discuss the event with key Managers and staff
    - For high risk issues - take a quick look …
      - Who,
      - What,
      - Where, and
      - When ?
    - Is this something we should add to our oversight schedule for a more thorough evaluation?
  - Evaluate programs, management processes and operating practices, to see if the same kinds of failures that led to the accident exist here

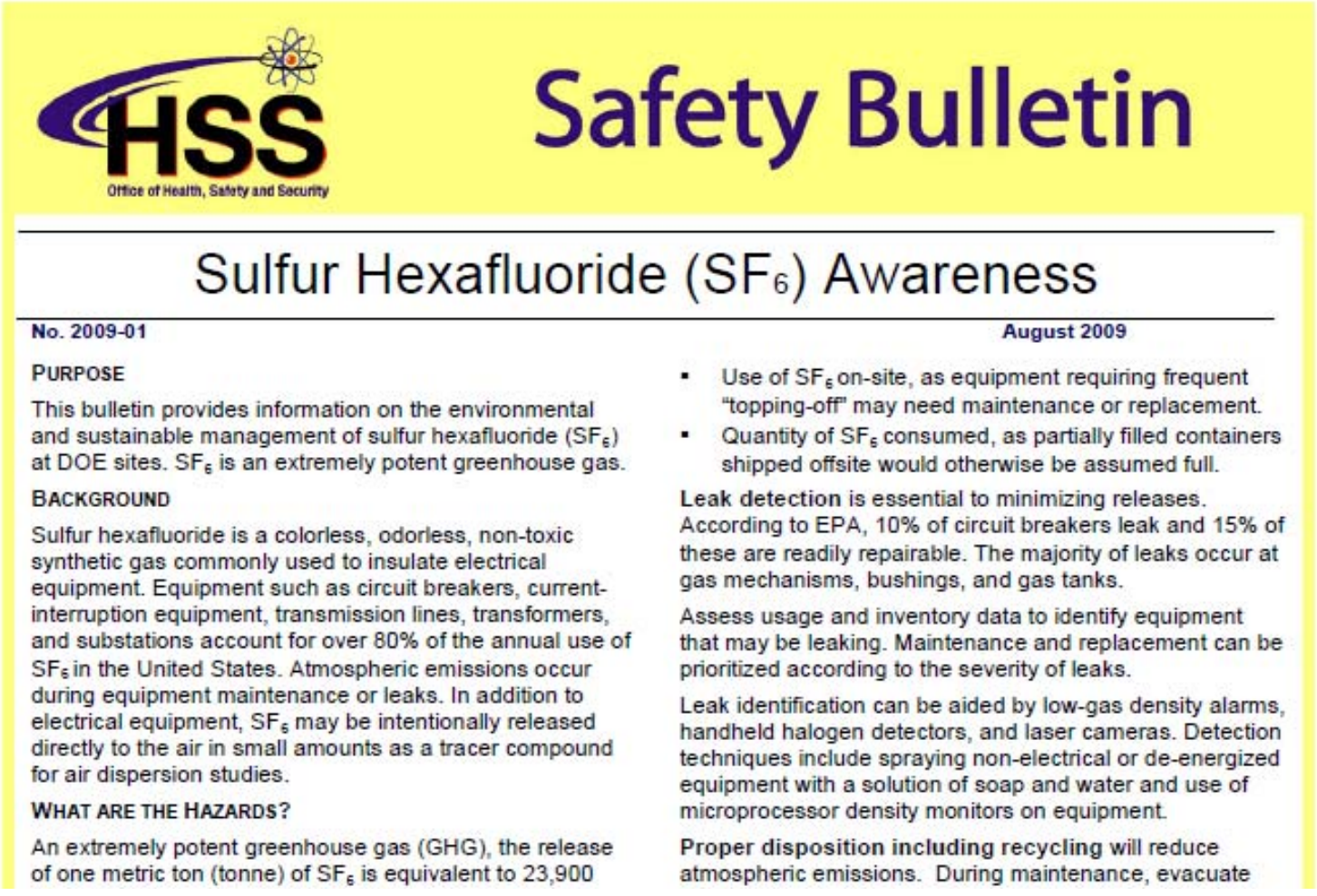
Effective Corrective Actions can Prevent Recurrence

- If you find that you have similar problems:
  - Establish interim controls/preventive measures
  - Perform a rigorous causal analysis
    - Why is it like this?
    - What precursors needs fixed?
  - Implement corrective action process
    - Specific and measureable actions
    - Reasonable but challenging schedules
  - Schedule a follow-up assessment
    - make sure the fixes stay fixed.

How to eliminate the ineffective e-mail overload

- Take ownership of your program or operations:
  - Review OE information and select key events:
    - Similar activities/operations
    - High consequence or high probability of failure/accident
  - Task appropriate personnel to evaluate facilities for:
    - Applicability to the operations or equipment
    - Likelihood for similar process failures or deficiencies
    - Determination of whether a similar event could occur
  - Request a response within a specified period
    - Hold line-management accountable for safety within their program or operation
  - ?

Safety Bulletin 2009-1 - Sulfur Hexaflouride Awareness



HSS
Office of Health, Safety and Security

Safety Bulletin

Sulfur Hexafluoride (SF_6) Awareness

No. 2009-01 **August 2009**

PURPOSE

This bulletin provides information on the environmental and sustainable management of sulfur hexafluoride (SF_6) at DOE sites. SF_6 is an extremely potent greenhouse gas.

BACKGROUND

Sulfur hexafluoride is a colorless, odorless, non-toxic synthetic gas commonly used to insulate electrical equipment. Equipment such as circuit breakers, current-interruption equipment, transmission lines, transformers, and substations account for over 80% of the annual use of SF_6 in the United States. Atmospheric emissions occur during equipment maintenance or leaks. In addition to electrical equipment, SF_6 may be intentionally released directly to the air in small amounts as a tracer compound for air dispersion studies.

WHAT ARE THE HAZARDS?

An extremely potent greenhouse gas (GHG), the release of one metric ton (tonne) of SF_6 is equivalent to 23,900

- Use of SF_6 on-site, as equipment requiring frequent "topping-off" may need maintenance or replacement.
- Quantity of SF_6 consumed, as partially filled containers shipped offsite would otherwise be assumed full.

Leak detection is essential to minimizing releases. According to EPA, 10% of circuit breakers leak and 15% of these are readily repairable. The majority of leaks occur at gas mechanisms, bushings, and gas tanks.

Assess usage and inventory data to identify equipment that may be leaking. Maintenance and replacement can be prioritized according to the severity of leaks.

Leak identification can be aided by low-gas density alarms, handheld halogen detectors, and laser cameras. Detection techniques include spraying non-electrical or de-energized equipment with a solution of soap and water and use of microprocessor density monitors on equipment.

Proper disposition including recycling will reduce atmospheric emissions. During maintenance, evacuate

Suggested actions for LL Program Improvement - Everyone

- Select a Lessons Learned report that may have applicability investigate the potential for similar failures
- Periodically spotlight JONs or LL from a recent event
  - to all employees and workers in the organization
- Charter a worker level review team
  - to determine whether similar problems exist in your organization
- Investigate no consequence or near-miss events for failures
- Include discussions of recent Accidents and LL
  - in qualification / requalification for key personnel
- Request external evaluation of your organization
  - to determine if similar management system failures exist

Suggested actions for LL Program Improvement - Everyone

- Transmit selected OE events to appropriate managers
  - have them evaluate and report back on results
- Follow-up on corrective actions for significant events
  - what was changed at the affected facility to prevent recurrence?
- Find a way to get operations managers to evaluate their programs for similar weaknesses (or do it for them!)
- Use causal factors or JONs as a checklist
  - self-assess your programs to look for similar weaknesses
- Emphasis on re-evaluating corrective actions taken
- Submit LL reports to the DOE OE Program to share

Don't Forget the Good Stuff

- There's a lot of things that we do right
- It's just as important to review and analyze the good things we do and the things that worked well …
  - What was it?
  - Who did it?
  - Why did we do it?
- And most importantly, how can we make sure that we do it again, every time, from now on?
- Provide recognition to those who do a good job

Suggested actions for LL Program Improvement – Complex-wide

- On a regular basis (e.g. quarterly), publish (DOE-wide) summary of the Corrective Actions taken to correct the JONs and LL from Type A and B Accidents
- More effective use of DOE OE Special Operations Reports, Safety Alerts, Safety Bulletins, etc.
- Quarterly ORPS Performance Analysis – Complex-wide summary report
- ?

Safety Advisory 2010-5 - Contact With Overhead Lines …

Office of Health, Safety and Security

Safety Advisory

Contact with Overhead Lines and Ground Step Potential

2010-05 **August 2010**

PURPOSE

This Safety Advisory is issued to warn sites about the potential for serious electrical injury (potentially fatal) caused by ground step potential resulting from a phenomenon called ground gradient, which is produced when equipment comes in contact with energized overhead power lines.

BACKGROUND

On March 26, 2010, at the Hanford Site, an excavator (Figure 1) accidentally touched an energized 13.8-kV electrical power line. The actual voltage to ground was 7.96 kV because only one phase was in contact with the excavator. The burned power line is shown in Figure 2.

A Project Safety Representative (PSR) saw sparks underneath the excavator and inappropriately responded by driving his truck to approximately 13½ feet from the excavator. The PSR stepped out of his truck onto

Figure 2 – Burned contact point on 13.8-kV power line

DISCUSSION

When an energized source of electricity (e.g., a downed power line) comes in contact with the ground, the electrical current can pass through the ground. The voltage is strongest at the point where ground contact is made and becomes weaker as it radiates out from

What does an Accident cost the Department?

- As an Accident Investigation Board Chairman
  - The enormous cost expended to determine
    - what went wrong,
    - why, and
    - what was needed to fix the problems
  - Not to mention the cost of the accident itself, lost production or operations, and the corrective actions to be taken
- So … Why not conduct an accident investigation before an Accident occurs?

"Pre-Accident Investigation"

- "The only good accident investigation is the one that you conduct to prevent the accident before it happens."
- Assume an accident has occurred at your facility
  - How could this accident occur at your facility?
  - Pull the strings to find where process failures exist
  - Formal causal analysis and corrective action
  - Follow-up effectiveness review of actions taken

Preventing an Accident is the best thing you'll never realize you did

- If we do this right, there may be dozens of accidents that were prevented
- We'll never really know what they were, because they didn't happen
- It doesn't happen by "Accident"
  - A questioning attitude needs cultivated
  - Organizational learning must be embraced
  - Nuclear Safety must undergo constant examination
- Take the initiative to move your program or facility beyond the LL email overload stage
- Start " Preventing Accidents"