Process Safety Management Best Practices & Enforcement Trends

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OSHA Enforcement Trends

PSM Inspection History Summary (May 26, 1992 to February 26, 2014)

Total Number of PSM Inspections ……3,721

Total Number of Violations……..20,100

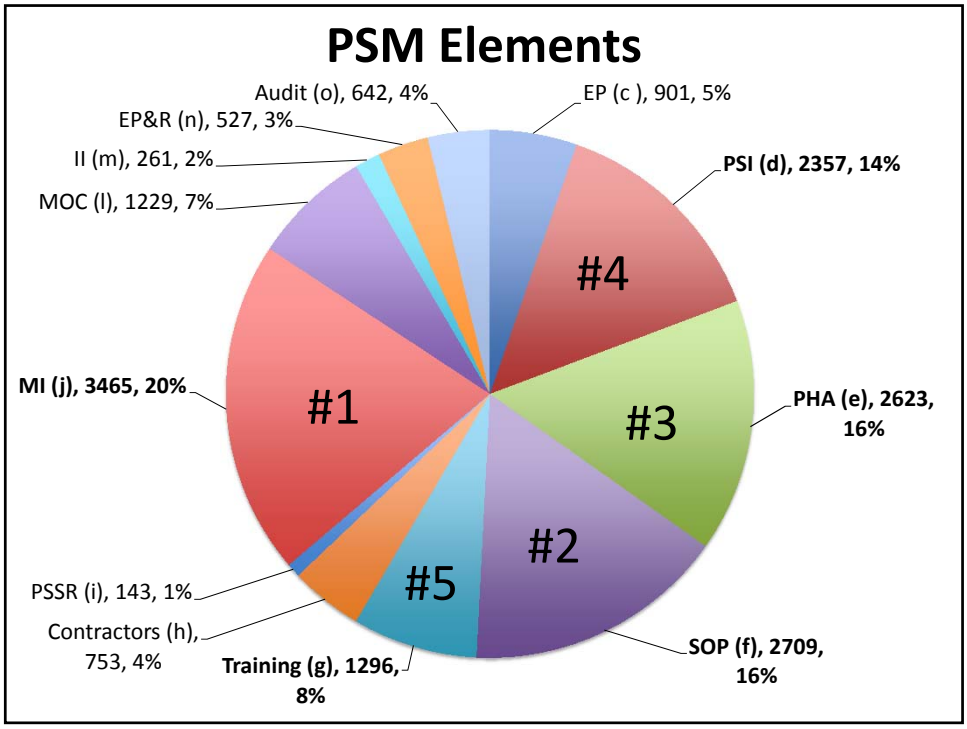
Total Initial Penalty……..$93 Million

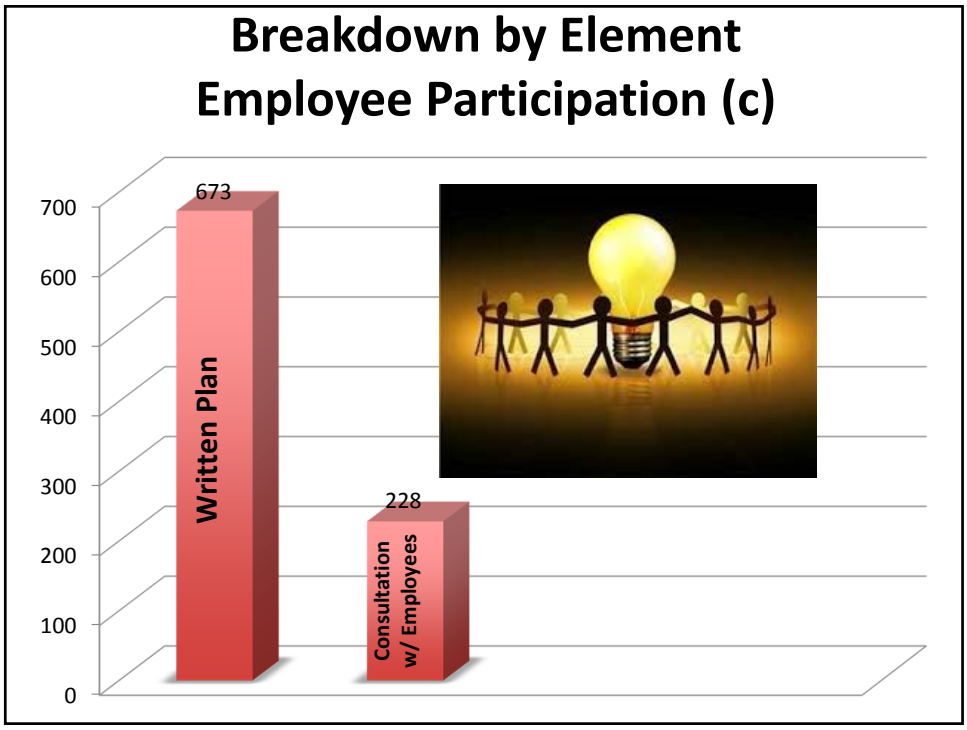
Total Number of CHEM NEP Inspection (11/11 to 2/26/14)……890

Total Number of Refinery NEP Inspections (4/4/13)……74

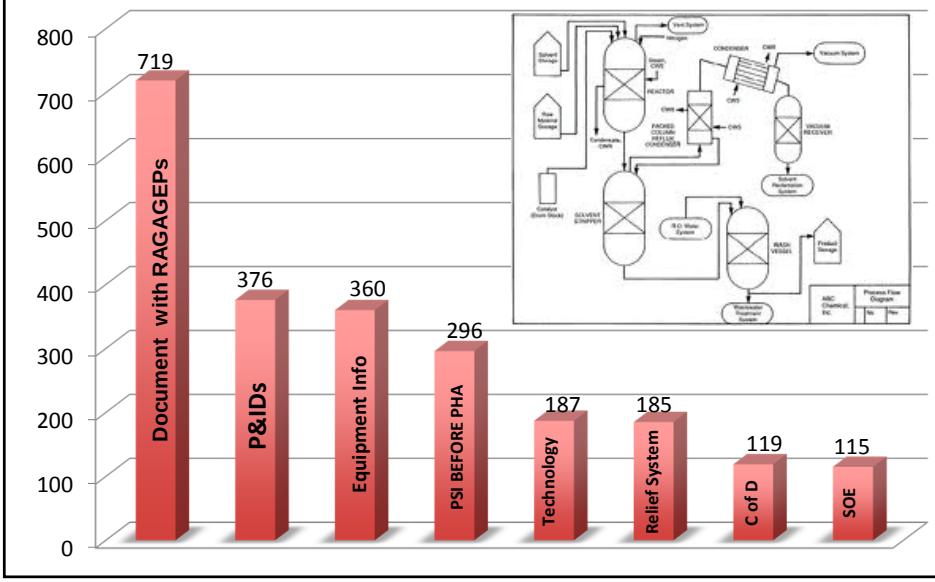
Includes Federal and State-Plan states
Defined as an inspection that included at least 1 PSM violation

"Safety is something a lot of people learn by accident"
Trevor Kletz, 1922-2013

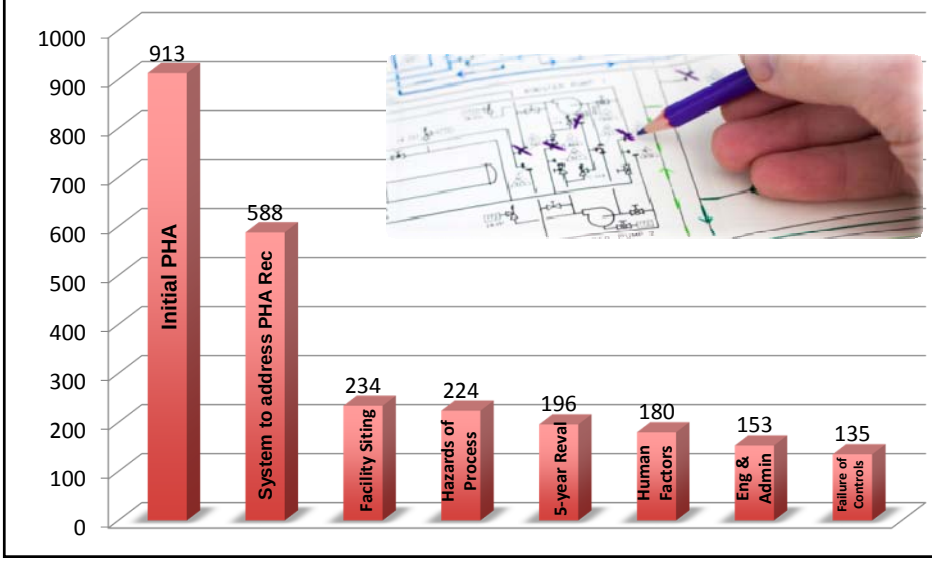

PSM Elements
Audit (o), 642, 4%
EP (c), 901, 5%
EP&R (n), 527, 3%
II (m), 261, 2%
PSI (d), 2357, 14%
MOC (l), 1229, 7%
#4
MI (j), 3465, 20%
#1
#3
PHA (e), 2623, 16%
#2
#5
PSSR (i), 143, 1%
Contractors (h), 753, 4%
SOP (f), 2709, 16%
Training (g), 1296, 8%


Breakdown by Element
Employee Participation (c)
700
600
500
400
300
200
100
0
673
Written Plan
228
Consultation w/ Employees

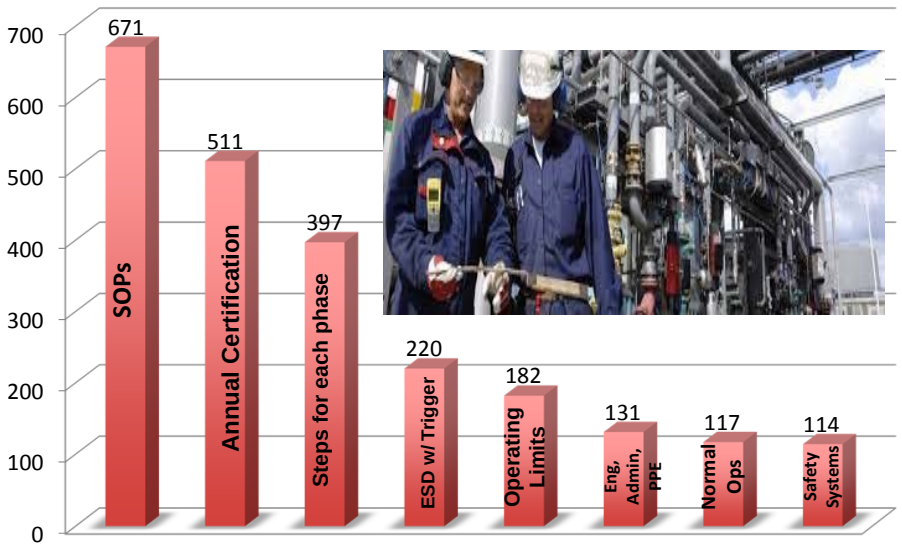
Breakdown by Element
Process Safety Info (d)



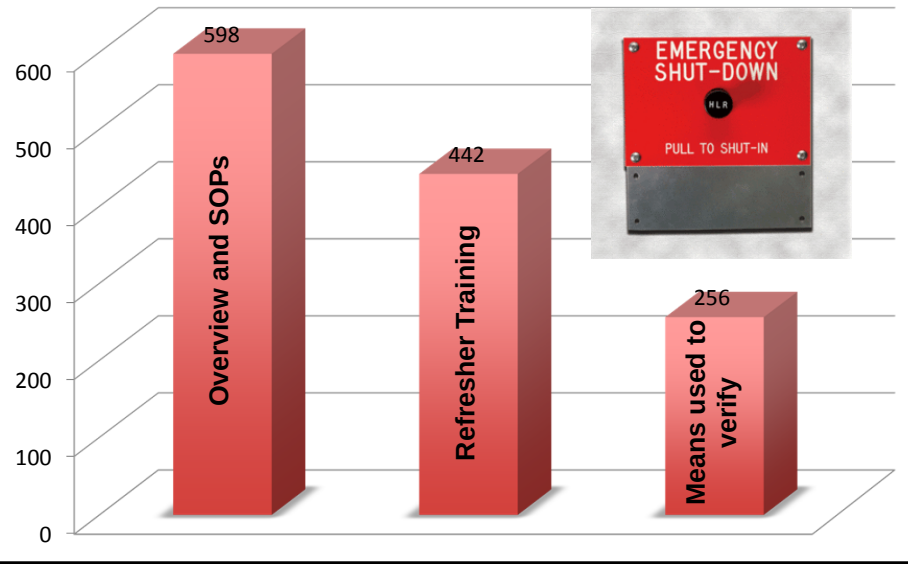
Breakdown by Element
Process Hazards Analysis (e)



Breakdown by Element
Operating Procedures (f)

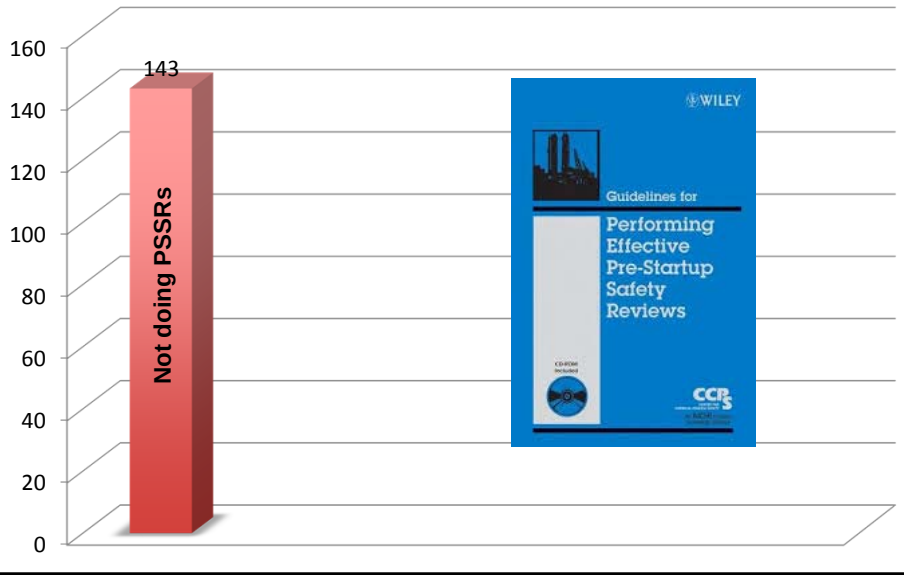


Breakdown by Element
Training (g)



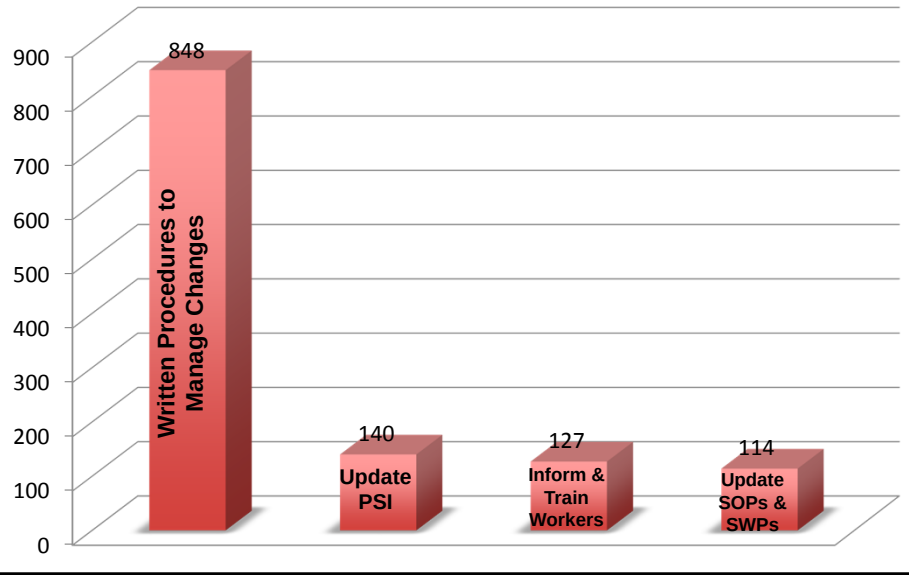
Breakdown by Element
Contractors (h)

Breakdown by Element
PSSR (i)

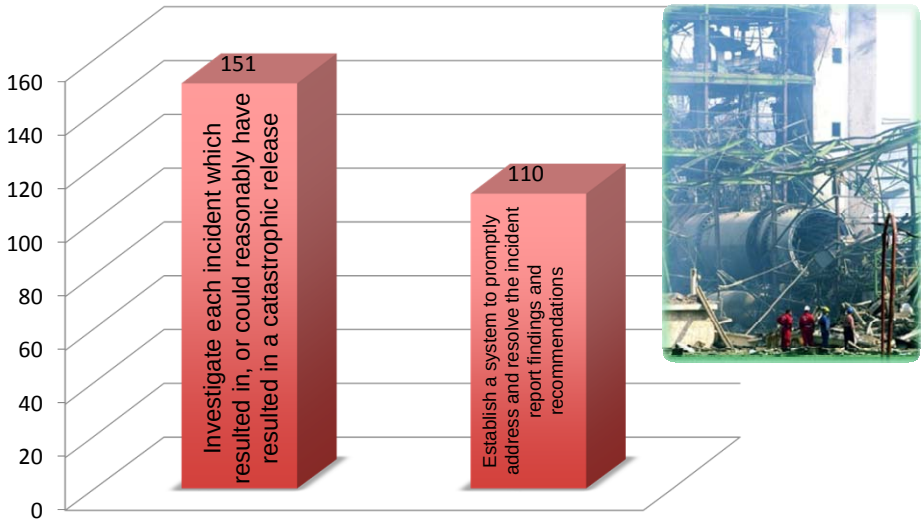


Breakdown by Element
MI (j)

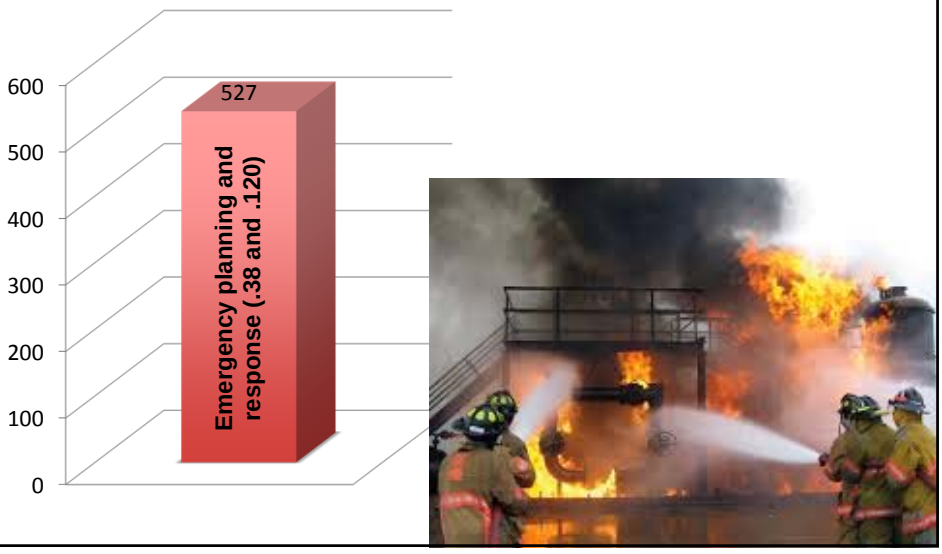
Breakdown by Element
MOC (l)

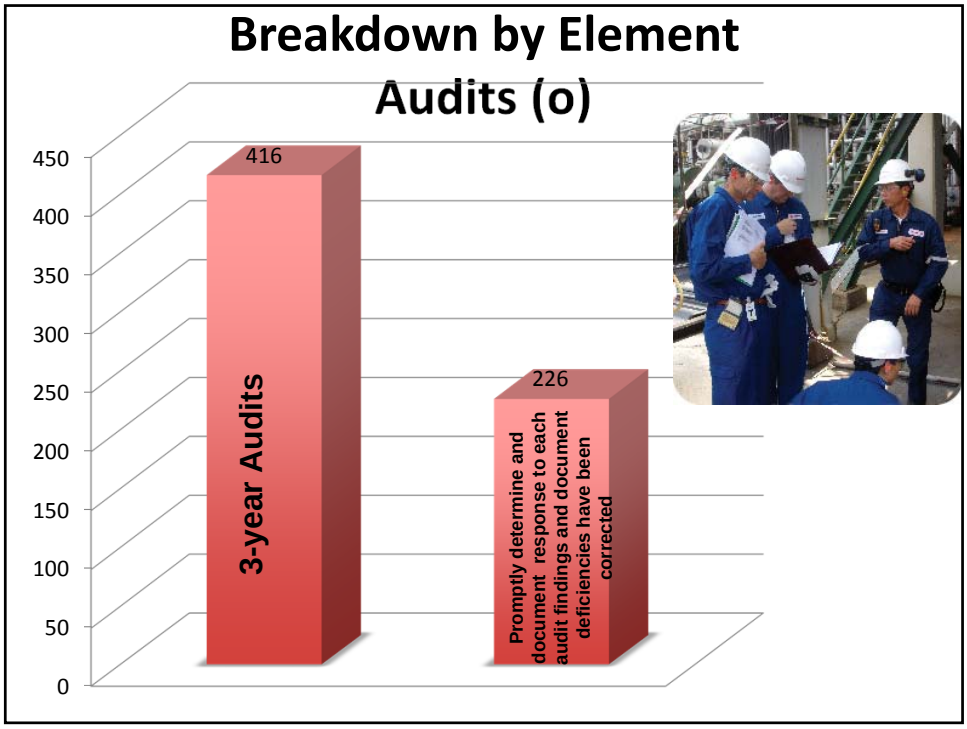


Breakdown by Element
Incident Investigation(m)



Breakdown by Element
Emergency Planning & Response (n)





EPA's CAA GDC

- Covers a WIDE array of EHS/HHC
- Does **NOT** have to be a listed RMP chemical
- Facilities with 9,000#'s of NH_3 and 4,675 gallons of FLAGS have been cited:
  - *Failed to provide protections consistent with applicable industry codes and standards*
  - *No hazard analysis performed using industry recognized hazard assessment techniques*
  - *Failure to meet Recognized and Generally Accepted Good Engineering Practice (RAGAGEP)*
  - *Inadequate signs and labels*
  - *Lack of Documentation*

What brings VALUE to an AUDIT?

- Should be a TEST of the management system
  - NOT a "checklist exercise" to meet a requirement
- Auditors should be STRONG in:
  - designing a process safety management system
  - Implementing a management system, and
  - Managing a management system on a DAY-TO-DAY basis

A great auditor know the tricks and mistakes because they have LIVED through them!

What brings VALUE to an AUDIT?

- TESTING the management system
  - Sample a fair number of items in EACH element
  - "Connecting the Dots" between elements
  - Is the system functioning as 14 independent programs or as a "management system"?
  - Is the Management System a SINGLE BRANCHED TREE or is "management" actually involved?
  - Is there a Process Safety SME on site or is process safety being managed "off-site" or by 3rd party?

What brings VALUE to an AUDIT?

- SCOPE of Audit Matters!
  - Fall Protection
  - Fixed Industrial Stairs
  - PPE Hazards Assessments
  - Respiratory Protection (Op's, Maint, ERT)
  - Egress labeling, lighting
  - Fire Protection Systems
  - Fixed and Portable/Personal meters
  - PRCS Rescue Team
  - PIT in HAZLOCs

PAY attention to DETAIL

PSI

- RAGAGEPs Listed?
- Walkdown P&ID(s) to validate their accuracy
- Inspect HAZLOC's for proper equipment
- Ventilation design matches engineering documentation?
- Relief System design matches engineering documentation?

A "Design Basis" is more than formulas and calculations!

PAY attention to DETAIL

PHA(s)

- Team make-up **representative** of process?
- Facilitator capable using the **methodology** used?
- Include **Facility Siting** & **Human Factors**?
- FORMAL management system for **TRACKING** rec's to CLOSURE?
- Closures **DOCUMENTED** properly?
- Done on schedule?

Take NOTE of the significant scenarios and audit the safeguards listed in the PHA!!!

PAY attention to DETAIL

SOP(s)

- **ALL PHASES** of operation covered?
- Safe Upper and Lower Limits defined (same as PHA?)
- Consequences of Deviation stated (same as PHA?)
- **ACTUAL** steps to correct/avoid deviations?
- Walk-Down some critical SOPs to see if they are accurate (you may be surprised)
  - Triggers for activation of ESD
- PPE in SOP obtained from "certified PPE Hazard Assessment(s)" (1910.132(d)

Take the time to PHYSICALLY WALK-DOWN a Safety Critical Procedure such as RCar/Tanker Unloading or Emergency Shutdown Procedure!

PAY attention to DETAIL

Training

- Done **AT LEAST** every 3-years
  - Have operators walk-down an SOP to demonstrate they can find the equipment and operate the equipment
- Means to **VERIFY KNOWLEDGE**?
- Training is on **EACH SOP** and **SWP** applicable to the job
  - 3rd party course help but are often times **NOT** process specific
- Look at the training Doc's
  - *Training on 150 SOPs done in 6 hours once every 3 years leads one to a lot of QUESTIONS*

Training is a NEVER ENDING process in process safety. We have three (3) years to get it all done – NOT a 2 year, 11 month, 3 Week, 6 day, 16 hr training break!!

PAY attention to DETAIL

Contractors

- Daily sign-in sheets are your sample of contractors
  - Verify contract companies have been evaluated
- Get names of contractor employees from sign-in logs
  - Verify each of these employees have been trained
  - Work Permits are also another source for names/companies
- Verify that contractor training covers EAP (alarms, muster areas, etc.), SWP (LOTO, LB, HW, PRCS, PPE)
- Perform field inspections and interviews of contractors working in/on/adjacent to covered process

NEVER Forget… Contractors work at many facilities and EACH facility will have different emergency procedures, SWP's, Alarms, Permits, etc. Training 30-45 minutes once a year MAY NOT be adequate!

PAY attention to DETAIL

PSSR

- Ask for "Capital Projects" over the past 3-5 years
- Match new equipment with MOCs and PSSRs
- Don't be fooled by a piece of Paper with dates and signatures!
- Verify (DETAILS!!!)
  - SOPs were in place BEFORE the process started
  - Equipment was in MI CMMS and MI procedures in place
  - PSI was updated (P&IDs, RV Calcs, etc.)
  - Training for Ops and MI

An MOC is asking for permission and working through the details of a "change" - the PSSR is VERIFICATION that the "change" was done as designed/permitted!!

PAY attention to DETAIL

Mechanical Integrity

- Refer to PHA(s) to identify those items listed as "safeguards"
  - NOTE: EVERY Mechanical SAFEGUARD listed in PHA should be in the MI inspection/Testing program!
- MI procedures for PM's
  - Does the data in the MI procedures MATCH the PSI data (i.e. SIS set points?)
- PM's meet or exceed the manufacturer's frequency (or RAGAGEP)
- Refer to W.O.'s for those who perform the work - verify TRAINING
- Inspections on Vessels/Piping meet a RAGAGEP (listed in PSI?)
- Inspection/Testing documentation meets (j)(4)
- Equipment found to be outside established limits – removed (e.g. vibration analysis)

LOPC is often times the FIRST domino to fall in a fatal release of the HHC/EHS!

PAY attention to DETAIL

Management of Change

- Scope of changes included in the process?
  - Changes to SWPs (PPE, LOTO, PRCS), SOP/MI procedures, EAP/ERP?
  - Changes to personnel or staffing levels, roles and responsibilities?
  - Look for CHANGES that are NOT on the process BUT do impact the process
- Use CMMS and Capital Project to ID changes
- Pay attention during field work to identify "new equipment"
- Pay attention during interviews with operators/mechanics for hints of changes
- Look at dates on ISO controlled documents & P&IDs that indicate document was "changed"
- MOC "paper work" is **NOT** managing changes!
- Are updates being made to PSI, SOPs, MI, EAP/ERP?
- Is facility addressing identified needs from the HAZ Assessment from the MOC

MOCs are MUCH MORE than a paper trail required by OSHA/EPA… they are meant to be a TOOL to MANAGE CHANGES that can impact our covered process(s).

PAY attention to DETAIL

Incident Investigations

- What is being investigated?
  - Unintentional releases REGARDLESS of size?
  - Near-misses?
- Report generated with the required data?
- Team make-up proper?
- System in place to track rec's to CLOSURE
- Investigation(s) met timeline?

There is TREMEDOUS VALUE in investigating Near-misses within the covered process and those outside the process BUT could impact the process!

Any size of an UNEXPECTED/UNPLANNED release is cause to investigate.

PAY attention to DETAIL

Emergency Planning & Response

- ERP meets 1910.120(q) (Review OSHA CPL on 1910.120)
- Verify Training records of responders
- Verify Medical Evals, Fit testing (OSHA Respirator Physical is NOT enough)
- ERT equipment inspection program
  - Level A's being pressure tested per manufacturer's frequency/protocol
  - SCBA's being inspected/tested per manufacturer's frequency/protocol
    - Bottle Hydro's meet DOT
- EAP meets 1910.38
  - Contractors know how to report emergency, what the alarms sound like, what each tone means, where they go with each alarm
  - Actual head count procedure
  - Procedures for those operators who delay their evac to operate critical equipment

Even those site who do not have a response team NEED TO COORDINATE emergency activities with their community responders.

A LOT has changed since the 2009 economic crash… Local FDs have paired back the specialized services they provide.

Executive Order 13650

Improving Chemical Facility Safety & Security

- OSHA Request For Information – Comments due 3/10/14
- EPA Request For Information – Comments due 10/29/14
- Department of Homeland Security – Advanced Notice of Proposed Rulemaking – Comments due 10/17/14
- Status report sent to President in May 2014
  - https://www.osha.gov/chemicalexecutiveorder/final_chemical_eo_status_report.pdf

Potential Changes- OSHA PSM

- Clarifying Atmospheric Storage Tank Exemption – known as Meer decision
- CCPS – Risk Based Process Safety
- Adding definition to RAGAGEP
- Requiring evaluation of RAGAGEP
- Management of Organizational Change
- Adding chemicals
- Updating Ammonium Nitrate rules
- Expand Mech Integrity to Safety critical equipment
- Third Party Compliance Audits

Potential Changes – EPA RMP

- Add ammonium nitrate and other chemicals
- Lowering or raising thresholds
- Safer technology and alternatives
- Emergency Drills
- Automated detection and monitoring
- Worst Case scenario and numerous small vessels stored close together
- Public disclosure
- NAICS codes automatically in Program level 3
- Safety Case Regulatory Model

References

- Safety Case http://www.csb.gov/assets/1/7/WorkingPaper_87.pdf
- Overview of Risk Based Process Safety

http://www.aiche.org/ccps/resources/publications/books/guidelines-risk-based-process-safetyccps/documents/overview

- Center for Chemical Process Safety (CCPS) http://www.aiche.org/ccps
- Mary K O'Connor Process Safety Center – Texas A&M http://process-safety.tamu.edu/
- Chemical Safety Board http://www.csb.gov/videos/

THANKS for your time and attention

Now we will take any QUESTIONS or COMMENTS

Jonathan Zimmerman, MS,
CSP, CHMM
EHS Manager

Special Thanks to:
Bryan Haywood, MS
Founder & CEO