Introduction of Presenter by Session Chair:
David Guss has over 32 years’ experience working in the oil & gas and chemicals industries, with the last 2 decades focused on PSM. He currently works at Nexen as the Senior Manager Process Safety with responsibility for developing and implementing of the company’s Global PSM program. For over 20 years, David has been actively supporting the advancement of PSM in Canada through his involvement and leadership in professional and industry associations and groups. He is: Founding chair of the Chlorate Process Safety Association; Past chair of the Canadian Chemical Producers Association Process Safety Committee; Past chair of the Canadian Society for Chemical Engineering PSM Division; and Immediate past president of the CSChE. David is also involved in a number of industry PSM related committees, such as: CSChE PSMD, CAPP PSM, ENFORM PSM, CSA PSM Standard, and CCPS TSC/Guideline committees. David received a degree in Chemical Engineering from the UBC. He is a registered professional engineer in Alberta and BC. He is also a Professional Process Safety Engineer with IChemE, and a Certified Process Safety Auditor. Today, David will share some of his experiences and learnings of implementing effective process safety management systems, and offer his thoughts on the future of PSM in Canada. Please join me in welcoming David Guss with his presentation “Implementing PSM – Where is the finish line?”

- PRESENTER:
- The Presenter is honored to be selected for the CSChE PSM Award for the 2015. He would like to thank the conference organization committee for allowing to speak to the PSLM Symposium at this time.
• As mentioned in the introduction, the presenter will share some of his experiences and lessons learned with implementing PSM over the last 20 + years. He will also share his thoughts on what the future might hold for PSM in Canada. There should be time at the end of the presentation for some questions.
Advisory

- The views and opinions expressed in this presentation and on the following slides are solely those of the presenter and not necessarily those of any organization with which the presenter is or was employed or affiliated. The presenter does not, nor does any referenced organization, guarantee the accuracy, completeness or reliability of the information provided herein. It is understood that the material in this presentation is intended for general information only and should not be used in relation to any specific application without independent examination and verification of its applicability and suitability by professionally qualified personnel. Those making use thereof or relying thereon assume all risk and liability arising from such use or reliance.
The presenter will share some of the lessons learned over his 20 years experience implementing PSM.

1980’s:
- PSM not in School/Industry

1990’s:
- CCPA (CIAC) Responsible Care
- Investigation of explosion
- Regulations
- Industry Standards

- When presenter was attending university for Chemical Engineering Degree, PSM was not part of the program. And when he started work, PSM was not formally discussed in oil/gas industry. But this was before the Mexico City (PEMEX, Nov 19, 1984, 600 dead), Bhopal (UC, Dec 2, 1984, 3000+ dead), Piper Alpha (Oxy, July 6, 1988 - 167 dead) and Pasadena Texas (Phillips, Oct 23, 1988, 24 dead) disasters.

1990’s:
- In the early 1990’s, presenter was first introduction to PSM through the implementation of the CIAC (formerly CCPA) Responsible Care program in a small chemical plant (RC was rolled out starting in 1988, updated 1992)
- Importance of PSM became very evident, when presenter was involved in incident investigation of explosion at another chemical plant in same company in 1994. You may know how devastating the effects of PSM events can be, but it really sinks in when you see first hand the effects on people, environment and property. Presenters personal story.
- Formed chlorate process safety association to share PS lessons learned with peer companies. It was possible to work with direct competitors with common goal of making the industry safer. Participants had to sign agreement to participate.
- API RP 750 Management Process Hazards in 1990
- API RP 75 SEMP in 1992
- USA OSHA PSM Regulations, 1992 and USA EPA RMP Regulations
- UK HSWA Act 1974, Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995 (PFEER), Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996 (DCR)
- UK COMAH Regulations in place 1999 to implement Seveso 2 Directive
- CIAC PSM Committee in late 1990’s and in 1999 CSChE PSM Subject Division. Two groups had join meetings.
- 1999 Environment Canada CEPA E2 regulations
- 1998 US CSB became operational
2000’s
- CSChE PSM Division is individual members who check off PSM as subject division (now up to about 300). Budget <$1 k
- CCPS Tech Steering committee (TSC) different in that member company joins CCPS and company rep attends TSC meetings. Budget >$1 M
- In 2003, OECD issued Guiding principles for chemical accident prevention, preparedness and response
- In 2007, CCPS issued Guidelines for Risk Based Process Safety with 20 elements.
- In 2008, OGP Asset Integrity – key to managing major incident risks
- Georgia sugar refinery explosion Feb 7, 2008, Dust explosion 14 dead. Guidelines on preventing dust explosions

2010’s
- 2010 Energy Institute PSM Framework
• BP Macondo well blow out (June 2010, 11 dead, 5 million barrels of oil lost) resulted in new regulations in USA (US BSEE SEMS 2 Oct 2010). Company PSM program went beyond regulations.
• CSChE PSMD PSM standard, guide 2012 and PSM audit protocol 2013
• West, Texas Fertilizer explosion (April 17, 2013, 15 dead mostly first responders)
• Lac-Magantic rail incident in July 6, 2013 resulted in 47 dead. Improved rail regulations in Canada and USA.
• Tianjin China explosion (Aug 12, 2015), 173 dead - most of causalities were fire fighters and police
• BC OGC LNG Facility Regulations, 2014 includes risk criteria
• O&G Industry: IOGP PSM Committee, CAPP PSM Committee and Enform PSM Steering committee
• Canadian CSA PSM standard – draft issued for public comment and deadline is Oct 7, 2015
What were some of the key Learnings of the presenter from 20+ years of implementing PSM in chemical and oil/gas companies?

LEADERSHIP –

• An effective PSM system starts with Leadership Commitment and Accountability.
• Sometimes this happens after a catastrophic event in a company. But small and mid size companies may survive this level of event so they need to learn from experience of others.
• After the Baker report was issued in Jan 2007, many company boards were asking questions about can this happen here and what are we doing to ensure it does not?
• May have to overcome “it hasn’t happened here” or “it can’t happen here because we are better/different than the other guys” bias
• Holding persons accountable by including safety in individual’s performance reviews. Require everyone to include a personal performance goal related to safety.
• Leaders should engage employees at all levels of organization. May need to coach some leaders on how to talk to field workers about process safety. They need to use the correct language: personal safety vs process safety. Coaching leader to talk about “process safety”, but said “production safety”.
• Powerful for leaders to visit field during or after PS incident to show they care about well being of people and offer support.
• Strong leaders at different levels of the organization → CEO to field operator, but field operator at risk so they have most to gain from effective PSM. Steering Committee with VP Operations.
• People are watching leaders all the time, so they need to talk and act in a way that supports the organization’s values and beliefs about safety.
• Message needs to be consistent, i.e. ask operations to improve PSM performance, but at same time reduce maintenance budgets (e.g. BP Texas City)
• Should understand different social cultures at different locations/countries, or after mergers. For example the difference from NA vs middle east vs Asia. Don’t assume people will act the same across the globe.
• Give people the authority and responsibility to stop unsafe work – more about personal safety but also support strong PS culture if people can speak up if they think something is wrong, i.e. space shuttle challenger
• Leaders who share a personal story about process safety events have must stronger impact on work force.
DEFINING AND PLANNING

• A management system is a self sustaining initiative that achieves a specific set of goals
• Process Safety Management (PSM) is a disciplined framework for managing the integrity of hazardous operating systems.
• Many frameworks, systems and approaches: CSChE PSM Standard, CCPS RBPS, OSHA PSM, UK HSE Safety Case/COMAH, US BSEE SEMS/API RP 75, IOGP AI, Energy Institute PSM, etc.
• Refer to CAPP PSM Regulatory Scan August 2014
• Pick an internationally recognized one that is fit for purpose for the organization. No ISO PSM standard yet, but maybe CSA PSM will be seed document for one in the future?
  • Presenter has experience with using CCPS RBPS adapted for upstream Oil/Gas, including Drilling & Completions, and recently resource development (i.e. oil/gas reservoirs). In industry, there have been recent cases where there was LOPC from reservoir through cap rock.
• Best to integrate with other related management systems: Health, Personal Safety, environment, security, QA/QC, Asset Integrity, Operations Excellence
• Gap analysis should be against agreed framework and done by qualified personnel. Requirements may need to be translated in terms that can be understood by practitioners
• Developing and implementing a PSM system can take a lot of time and resources.
Use resources efficiently, but plan according to the scope and complexity of the implementation effort. It may take years and $M. Identify key milestones.

- May get push back on the costs if there are financial constraints (e.g. downturn). Cost benefit analysis may help justify the spend.
- May be difficult to find or develop qualified resources to support development, implementation and sustainment of PSM programs. If use external resources, knowledge may leave with them. PS Engineering could be a good career path.
- Integrating PSM into other business initiatives may make for more efficient implementation, e.g. OE or reliability improvements.
- Involving the correct stakeholders from the start, i.e. in addition to O&M, HSE and Engineering, also include: change management, HR (training, MOOC), project management, supply chain, marketing, IT.
- Understand regulatory requirements – some regulations are prescriptive (OSHA PSM or API 14C) and others are performance base (UK HSE Safety Case).
- The degree of how centralized or decentralize the PSM systems are will depend on the structure of the organization. Need to find the correct balance for the specific organization.
For some leaders, PSM was new and they required coaching and mentoring on what to do and say. For example, process safety not the same as personal safety.

Roles, responsibilities, and accountabilities need to be clearly defined. PSM Coordinator was a new role formed to support implementation of PSM. When things are not getting done, everyone should know who is responsible and accountable (e.g., review overdue actions at stewardship).

Implementation plan should prioritize elements based on risk/opportunity. Don’t do it all at once—this leads to initiative overload on the organization. For example, based on gap analysis, may start with MOC, PSI, HIRA, AlA etc.

Formal change management process can ensure new programs, processes, systems, are implemented effectively and sustainable. Not enough to develop new standards and procedures and issue them. Need to “socialize” them with the workers.

May have resistance to change, need to prepare for this and deal with it appropriately—strong and clear message from leaders that we are moving forward with PSM and we expect everyone to support it.

Monitor progress of implementation, i.e., use KPI’s to measure % complete with implementation. For example, could use 5 Levels of maturity model. Acknowledge and celebrate successful completion of milestones/key deliverables.
• Important for ongoing communications at all levels of organization. Gap in communication can be filled with rumours.
• Share experiences and leverage lessons learned with different parts of organization and other companies. Good way of doing this is use of internal and external communities of practice.
• During and after implementation of PSM programs, need to monitor the effectiveness of program.
• Assurance activities should be done on regular basis by qualified personnel. Ask if the processes and procedures are being used/followed?
• Conduct self assessments or self audits on planned basis (e.g. annually).
• Conduct formal independent management system audits as needed, e.g. every 3 years. Use recognized process, e.g. ISO 19011 and trained auditors. Give facility time to complete recommendations before auditing again. However, if they cannot address the issues in a timely basis, then there may be issues with leadership commitment/accountability, competing priorities and or lack of resources.
• Develop appropriate KPIs for measuring PS performance, i.e. leading and lagging indicators, and that will help organization monitor and improve performance. Edwards Deming (1900-1993): “Can’t manage, what you don’t measure”.
• Refer to CCPS Guidelines on PSM performance indicators, API RP 754, and OGP Report 456. Pick ones that fit the organization, but also have some KPIs that allow for external benchmarking, i.e. API RP 754 Tier 1 and 2 process safety events and rates.
Organization should be clear about its commitment to continuous improvement
- Stewardship process should include review of the performance information. Management should address areas that are off track.
- Strategy may need to be revised to respond to significant changes, e.g. new regulations BSEE SEMS, critical incident
- Need to manage changes in plant, people, process, and systems.
- Organizational changes can be a big challenge. With down turn in O/G, layoffs may have left some gaps in organization. Is there an effective process in place to manage risk of these type of org changes?
- Keep key stakeholders informed on your progress and performance. This could include Shareholders, Board, Executive, Management, Employees, Contractors, Customers, Suppliers, Regulators, Community, insurers, special interest groups, and others.
- Reporting performance (Tier 1 & 2 PSE) to external groups, such as industry associations such as CIAC, CAPP, OGP
Concerns of Stakeholders
• What is the level of public concern regarding PS incidents in Canada? May not be high on agenda for current federal election, but it is important to people that have been effected by PS events, e.g. Lac Megantic in July 2013
• News and social media coverage of incidents is more intense that ever and distributed globally almost instantly.
• Expectations of society on processing industries will increase over time, as they have been over the last 50+ years.
• What level of risk is generally accepted by Canadian society? Is it 10E-6, 10E-7, or 10E-8? MIACC land use guidelines 10E-6 and 0.3x10E-6
• Public is more educated about the HAZARDS, but they are not risk experts. Still have work to do to better explain the risks of industry.

PSM Regulations in Canada
• Although no formal federal PSM regulations, new CSA PSM standard may be referenced in regulations going forward.

PSM in Education
• Some engineering schools in Canada offer courses related to PSM, but not all chemical engineering schools do at this time. Work is under way to change this. U of T on line PSM training modules, U of A Engineering Safety and Risk management Program, Dalhousie Risk & Loss Control Management are some examples of bring
PSM into the universities, but ways to go to get in all Chemical Engineering schools across Canada. Hopefully within the next few years this will be the case.

- But not just chemical engineers. All Engineers, should have basic understanding of PSM before they graduate, e.g. U of A.
- Not award of any Masters degrees in PSM in Canada at this time, so engineers are looking to schools like Texas A&M in USA and Heriot Watt in UK.

PS Engineer Designation
- IChemE Professional Process Safety Engineer, AICHEM / CCPS Certified Process Safety Engineer are relatively new. Presenter was 1 of first 2 to get first IChemE PPSE designation in Canada, and is currently working on beta testing for CPSE from CCPS.
- APEGAn does not list PS Engineer as recognized engineering role.

Canadian CSB
- It would be good to have a federally run group to investigate and report on process safety incidents for all industries. Similar to the US CSB.
- Now it is difficult to get information about events that happen in Canada, e.g. sunrise propane incident.

Passionate Leaders and Professionals
- MIACC 1987 to 1999 lead by passionate persons.
- CSCHE PSM Division – lead by passionate PS professionals. They volunteer a lot of their time to progress the state of PSM in Canada, e.g. CSA PSM standard. PSM Division Risk Expert Committee is also updating risk guidelines for Canada
- More industrial associations are supporting PSM: CIAC PSN, CAPP PSM Committee, ENFORM PSM steering committee
Conclusions

- PSM is still evolving
- Incidents → Regulations
- Implementing PSM big effort – fit for purpose
- Leverage company & industry experience
- Understand concerns of stakeholders
- Strive to improve
- Remain passionate
- Where is the finish Line?

To summary some key points from Presentation:
PSM in Canada is still evolving
- PSM have improves a lot since presenter started working in the industry 30+ years ago.
- PSM will continue to evolve as we share our improve our understanding of how to effectively sustain good PSM performance
- More sharing of information in industry will enable us to all improve. A significant incident in one company can effect the others in the industry (Macondo)

Incidents
- After PS incidents occur, it often leads to new regulations, standards and codes. Raising the bar.
- Unfortunately PS incidents are still occurring with causes similar to previous events. Need to watch for normalization of deviation or risk.
- But getting better at sharing lessons learned, e.g. Sun Bruno near San Francisco pipeline gas explosion (8 dead) in Sept 2010→Atco gas replacing their pipelines in Alberta.

Implementing PSM
- Implementing PSM effectively can take a lot of resources and time, so plan and budget accordingly. Make the PS MS fit for purpose for the organization.
Understand Stakeholder
• Listen to your stakeholders and address their concerns

Continue improvement and strive to be better than yesterday
• Have passion and chronic unease

Finish Line
• So where is the finish line? Maybe when we are able to successfully operate our facilities without having a serious process safety event everyday, not just for a week, a month, a year, or even a decade, but for the life of a facility.

• Presenter end quote:
  • I AM STILL PASSIONATE ABOUT PSM AFTER 20 YEARS, BECAUSE I BELIEVE THAT WHAT WE DO AS PROCESS SAFETY PROFESSIONALS CAN SAVE LIVES. AND IF I CAN SAVE ONE LIFE IN MY CAREER, IT IS WORTH ALL THE HARD, CHALLENGING AND, AT TIMES, FUSTURATING WORK. I HOPE YOU SHARE THAT SAME PASSION.”
Thank you for our attention.

*Time Permitting ask if there any questions?*