Implementing Process Safety Management in Oil and Gas Operations

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Where Aera Operates

San Ardo
Coalinga
Belridge Lost Hills
Cymric/McKittrick
Coles Levee Ecosystem Preserve
Midway Sunset
Ventura
Bakersfield Headquarters
Agenda

• WHY WOULD A COMPANY APPLY THE PSM REGULATIONS TO NON PSM UPSTREAM OPERATIONS?

• HOW DOES A COMPANY APPLY THE PSM REGULATION TO NON PSM UPSTREAM OPERATIONS?
• WHY APPLY PSM REGULATIONS TO NON-PSM OPERATIONS?

• A good way to manage operational risk

• The basics of PSM apply to all upstream operations; e.g., PSI, MI, MOC, PHAs, Auditing, OP

• Concept of having a “license to operate”

• Accident prevention politics are driving changes to PSM / CalARP regulations
Process safety regulations
California is an OSHA recognized “state plan state”

- Public Safety, 19 CCR, Chapter 4.5, California Accidental Release Prevention (CalARP) Program
- Other regulatory references that highlight process safety elements:
  - 8 CCR § 6533 Pipe Lines, Fittings, and Valves (MI, PHA, PSI)
  - 8 CCR § 5605 Protection Tanks in Locations That May Be Flooded (External Events)
  - 8 CCR § 5603 Sources of Ignition (Hot Work)
  - 8 CCR § 6531 Gas and Vapor Testing (Hot Work)
  - 8 CCR § 336.10, 336.11 Multiemployer Worksite (Contractors)
  - 8 CCR § 6551. Vessels, Boilers and Pressure Relief Devices. (MI, PSI, Fitness for Service)
  - 8 CCR § 3203 Injury and Illness Prevention Program (Training, Incident Investigation, PSI, Audits)
  - 14 CCR § 1773 et. al AB 1960 rules (PSI, PHA, MI, Spill Control)
  - 49 CFR, Parts 191, 192, 195 DOT Pipeline Safety Rules (PSI, MI, SOPs, Training, PHA, offsite consequences)
Operational threats and defenses

- Design: P&I, design specs, codes and standards, conceptual PHA
- Review: Design level and final PHA’s, effects of deviation, PSSR
- Procedures & Safe Practices: SOP’s, SU, SD, NO, ESD, JSA, operator qualification, hot work, CSE, HEC
- Maintenance: Schedules, PIC and contractor orientation
- MOC, MOOC: Change management, PDI, PSSR
- Mechanical Integrity: Vessels, piping, valves, equipment & instrument inspection, SCE
- Protective and Response Systems: Ears, exercises, SCE, alarm management
- Auditing & Assurance: Deviation reporting, compliance audits, RCA
How do you implement these program elements?

1. Process Safety Information
2. Process Hazard Analysis
3. Operating Procedures
4. Training
5. Contractors
6. Pre-Start Up Safety Review
7. Mechanical Integrity
8. Hot Work Permit
9. Management of Change
10. Incident Investigation
11. Emergency Planning and Response
12. Injury and Illness Prevention Program (Auditing)
13. Employee Participation
   - Trade Secrets
Experience - 7 years

- Major effort to begin implementation in non-PSM/RMP/DOT facilities and processes
- Field awareness of IOP and PSM requirements made significant difference in positive outcome (success)
- Self reporting of deviations and process safety challenges
  - Enabled increased management oversight and provides increased focus on RCFA Corrective Actions
- So far, so good…
First step - define what is a “designated facility”?

- A Designated Facility is a plant, equipment setting, or group of equipment that has been determined to present “elevated risk” when compared to other Aera facilities.

- Evaluation procedure
  - Facility (or process) is evaluated annually and recorded in the EHS Hazard Registry.
  - If assigned to the “high risk” category, becomes a candidate for Designated Facility status. (other risk management options include Level III audits and/or recurring PHA reviews)
  - SOE Steering Committee will make the final determination to add or remove a Designated Facility from list.
Identify designated facilities

• Existing PSM/RMP/Cal ARP facilities
  – gas plants, anhydrous ammonia,

• Identified facilities or processes:
  – Acid plants; e.g., H₂SO₄, HCL
  – Aqueous ammonia
  – Sulfur recovery plants
  – DOT pipelines with potential public impact
  – Gas lift operations
  – Light oil thermal recovery
  – Process facilities in close proximity of public
  – Waste gas injection
  – Casing Vent Recovery Systems (CVR)
  – Drilling/Workover/Well Servicing

• 30 facilities and processes identified
Management system model for PSM - EPA Title V Permit

• Some key aspects of Title V permit model that could be applied:
  – Permit for specific operating conditions
  – Deviation and breakdown reporting / (RCFA)
• Any permit condition that is not met;
• Annual compliance certifications
• Facility management reviews the requirements and annually certifies compliance with terms of permit
Develop the management system framework

- Apply the basics of PSM/RMP using an Internal Operating Permit (IOP)
  - Not just blanket facilities with requirements
- Require more rigorous notification
  - Leading indicators or “early warning” of problems
- Standardize requirements for specific process hazards
- Metrics to measure facility progress
Establish general permit conditions

• Each designated facility is issued an IOP with 50-70 operating conditions
  – Management system
  – RACI
  – Deviation reporting (permit conditions)
  – Annual compliance certification
  – Specific piping codes
  – Encroachment
  – Internal incident reporting
  – Emergency action plans and annual drills
  – Variance procedure
  – 3-year auditing of IOP
Process safety information

- PFDs, P&IDs,
  - Master drawings updated annually
- Material balances
- Equipment specifications and design codes
- Relief valve design basis
- MAWP calculations
- SAFE charts, cause and effect diagrams, effects of deviation from procedures
- Dedicated file location and documentation
Process hazard analysis (PHA)

• Initial PHA and five year revalidation
• Follow industry PSM standards (CCPS, API)
• Include: siting, human factors, external events, SIL level determination for ESDVs
• Document and track corrective actions
• Conduct PHAs on operating procedures
Mechanical integrity conditions

- Establish safety critical equipment (SCE)
- Establish inspection and maintenance program
- Instrumentation included in MI program
- Equipment and piping conforms to design standards, at time of construction
- ANSI piping class and inspection frequency
- ESD documented functional testing frequency
- MI documentation available for inspection
MOC and PSSR

• MOC for “not-in-kind” changes (equipment and/or personnel)
• PSSR requirements for new or modified facility/equipment
• Checklist PHA for equipment/small projects
• Documentation for review
• Project drawing package and equipment data files managed
Operating procedures

• Written operating procedures
  – Start up
  – Shutdown
  – Normal operation
  – Emergency shutdown
  – Consequences of deviation and steps to recover
  – Temporary operations

• Annual operating procedure certification
Process safety incident notifications

- Loss of primary containment (LOPC):
  - API 754 Incident Reporting: Tier 1, 2, or 3
- Fire (including electrical arc) directly on process equipment
- Explosion/detonation
- Mechanical integrity deficiencies (NDE < Tmin)
- Critical process alarms or unplanned activation of process ESD
- Encroachment (external influences on process integrity) not involving LOPC
Closing thoughts

• Build the knowledge while the regulatory framework is being developed
  – Regulatory changes will happen
    • Option 1: Lead your business and prepare
    • Option 2: Wait and compete for resources

• A considerable discretionary action is required to develop a framework and achieve “buy in”

• The effort takes technical competency and persistence

• Focus on the basics

• Good way to run a business
Questions...comments