

Implementing Process Safety Management in Oil and Gas Operations

Jeff Gurican, CSP - Safety and Health Advisor

Process Safety Group Aera Energy LLC- Bakersfield, California

Central Valley Chemical Safety Day - Bakersfield

7th Annual Symposium March 19, 2015



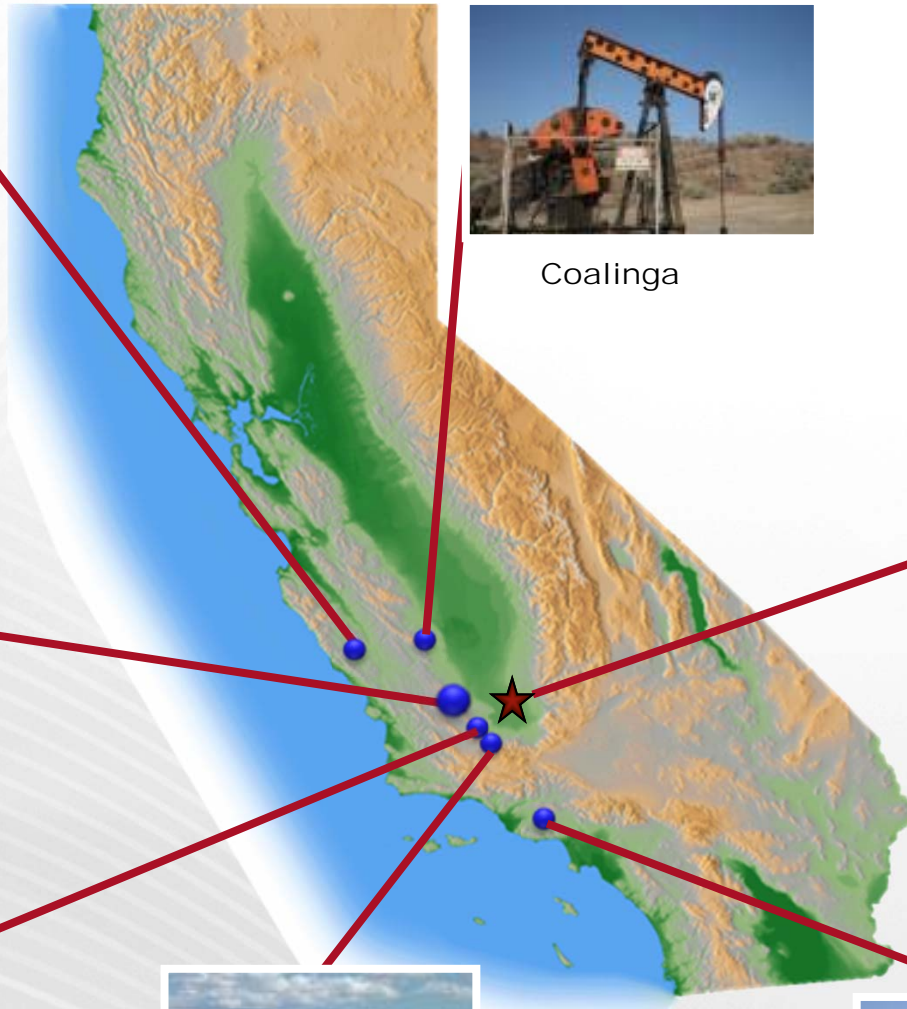
Where Aera Operates



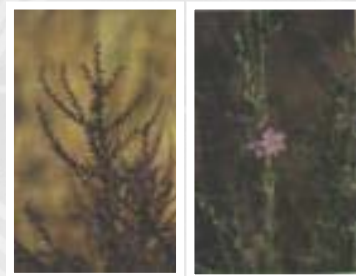
San Ardo



Coalinga



Belridge Lost Hills
Cymric/McKittrick



Coles Levee
Ecosystem Preserve



Bakersfield
Headquarters



Midway Sunset



Ventura

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?***

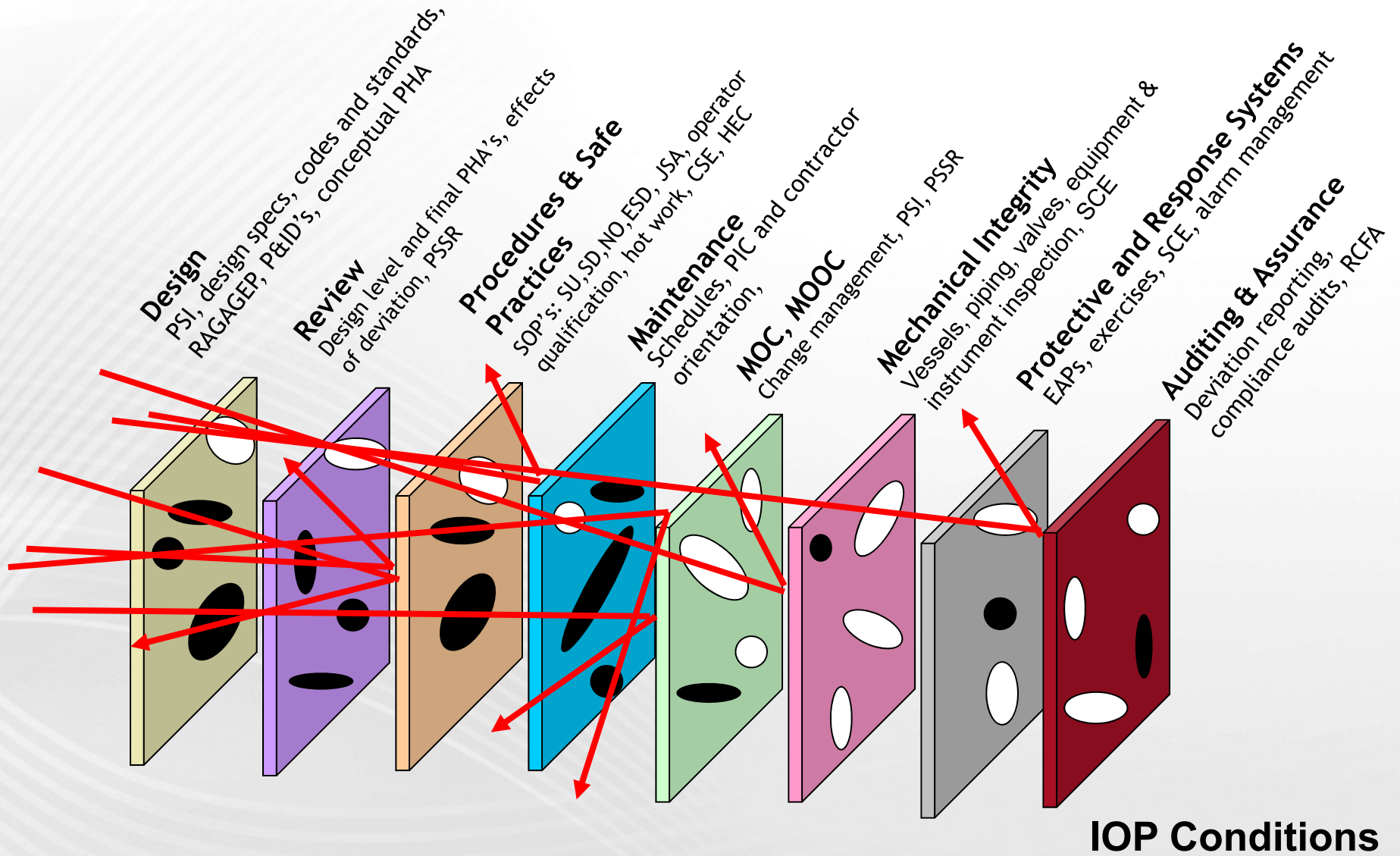
- A good way to manage operational risk
- The basics of PSM apply to all upstream operations; e.g., PSI, MI, MOC, PHAs, Auditing, OP
- Concept of having a “license to operate”
- Accident prevention politics are driving changes to PSM / CalARP regulations

Process safety regulations

California is an OSHA recognized “state plan state”

- General Industry Safety Orders, 8 CCR 5189, Process Safety Management of Acutely Hazardous Materials
- 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



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., H_2SO_4 , 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 < T_{min})
- 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

