PSM in Incident and Project Delay Disputes

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Process Safety and Loss Management

• In early times
  --Done locally by experience—trial and error
  --Process safety focused on chemistry, plant design and operations
  --Loss focused on chemicals and materials of value
Process Safety and Loss Management

- In modern times
  - Practiced and understood world wide
  - Integrated and logically developed programs under regulations
  - Procedures and methods differ but have common PSLM objectives
  - Process safety focus on protection of people, property, environment
  - Loss considers valued materials, wastes, and other financial losses and liabilities associated with the operations
PSM

- February 1992, process safety management (PSM) promulgated by US OSHA
- Applies to systems involving hazardous chemicals
- Requires compliance with 14 elements
- Hazards analysis (HAZOPs) a key element
- PSM and PSLM closely related and used interchangeably
- Similar programs implemented in other countries
- Benefits of PSM type programs are recognized and realized
PSM Expectations and Challenges

• Upper managers
  --Concerned with company and business risks
  --Rely on technical staff for plant risk management (PSM)
  --Expect low/remote likelihood of accidents
PSM Expectations and Challenges (contd.)

- Technical managers
  - Manage plant specific process safety, HAZOPs/PSM
  - Costs for risk reductions may not include litigation and intangible costs
  - Litigation and intangible costs contribute to “L” in PSLM
PSM Expectations and Challenges (contd.)

- Mind set and expectation in Operating Plants
  --Implementing PSM and HAZOPs eliminates incidents
- Reality
  --Risks and incidents can be reduced not eliminated
PSM Expectations and Challenges (contd.)

• Mind set and expectation in Capital Projects
  --Process design and HAZOPs complete
  --Firm basis for detail design, procurement, construction done

• Reality
  --Firm design basis rarely achieved
  --Late design changes happen and cause delays and cost overruns
PSM and Post Accident Law Suits

• In the US lawsuits usually follow after accidents
• Post-accident mentality in lawsuits
  -- Adequacy, quality and implementation of PSM deficient
  -- “But for the deficient PSM accident was preventable”
  -- Limitations of HAZOPs and PSM do not matter
Capital Project Lawsuits

• New and Retrofit Capital Project lawsuits can result from:
  --Schedule and construction delays with cost overruns
  --Start-up and operational problems
  --Inefficient plant performance
Capital Project Lawsuits (contd.)

• Underlying causes
  -- Untimely and inadequate HAZOPs/risk analysis
  -- Late HAZOP-initiated changes causing engineering rework, procurement and construction delays
  -- Unproven technology with deficient design and risk evaluation
List of Selected Example Lawsuits

• Pipe rupture---fatalities, property damage---deficient PSM
• Gas release---exposure---health effects---deficient PSM
• Toll Manufacturing---explosion---PSM was business owner’s responsibility
• Post plant acquisition---explosion---seller’s HAZOP/PSM deficient
List of Selected Example Lawsuits (contd.)

• New chemical plant---delay/cost overrun---late HAZOP
• New plant retrofit---cost overrun---late HAZOP
• Metals recovery plant---delay/cost overrun---Deficient HAZOP and process design
Pipe Rupture Case

- Two similar pipe elbows in parallel trains in same service
- Second train and elbow installed much later than the first
- Second one failed—fatalities, damaged plant
- Lawsuit alleged elbow failure due to deficient PSM
Pipe Rupture Case (contd.)

• In-depth cause analysis included:
  --PSM implementation
  --HAZOP Performance
  --Operations and maintenance records
• Analysis did not corroborate allegations— inadvertent failure
• Court dismissed case on summary judgment
• Extensive, efforts time, costs expended in defense
New Plant Delay and Cost Overrun

- Multimillion dollar capital project
- Owner obtained “proven” technology from licensor
- Engineer did feasibility study for owner
- Tight schedule and budget mandated by Owner
- Same Engineer given detail design-build/EPC contract
New Plant Delay and Cost Overrun (contd.)

- Licensor’s process package stated as “frozen” for design
- HAZOPs done over 4 months during detailed design
- Late design changes, schedule delays, cost overruns
- Engineer sued
- Defense showed HAZOP and technology deficiencies
- Matter settled out of court
Lessons Learned

• Post accident lawsuits allege deficient and non-compliant PSM/HAZOP
• Limitations and site specific nature of PSM/HAZOP not recognized
• Defense efforts time and costs can be huge
Lessons Learned (contd.)

• Capital project delay and cost overrun lawsuits can have underlying technology deficiencies and late HAZOPs causing design and project completion delays
• Defense costs and efforts can be huge
• Unanticipated legal defense costs can cause huge financial losses (the big “L” in PSLM)
Suggestions for Loss ("L") Prevention-- Operating Plants

- Expect and prepare for post accident lawsuits
- Perform timely, thorough and defensible hazards analysis
- Implement risk reduction measures
- Keep upper management and involved staff fully apprised
Suggestions for Loss ("L") Prevention-- Operating Plants (contd.)

• Keep PSM, HAZOPs and related programs up-to-date
• Maintain clear, organized documents, drawings and records in support of proactive due diligence
• Keep in-house counsel informed
• Budget time and money to implement the above
Suggestions for Loss ("L") Prevention—Capital Projects

- On capital projects insist on timely performance of hazards and risk analysis
- Involve process, engineering, operations and construction personnel early in the project to flush out key design decisions
- Insist on “frozen” design package before starting detailed design
Suggestions for Loss ("L")
Prevention—Capital Projects (contd.)

• Keep management and key staff fully apprised
• Keep clear, organized project files with documents that support progress and decisions
• Keep in-house counsel informed and obtain guidance
• Budget time and money to implement the above
OSHA Violations

Violations

Count of violations

- Operating Procedures
- Process Hazard Analysis
- Process Safety Information
- Training
- Contractors
- Pre-startup safety review
- Mechanical Integrity
- Management of change
- Incident Investigation
- Emergency Planning and Response
- Compliance Audits
- Trade Secrets

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