

## 12th Chemical Process Safety Sharing (CPSS)

### **Process Safety Assessment (PSA)**



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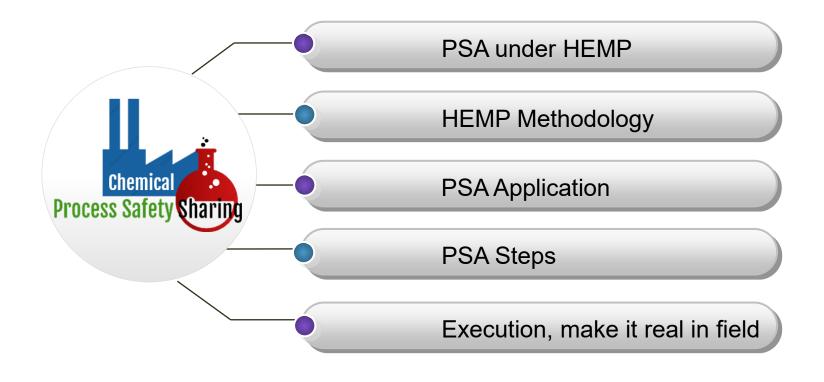




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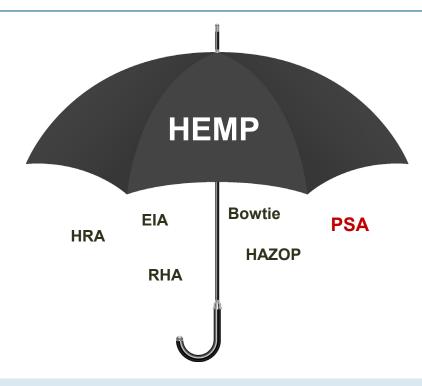




### **PSA** under HEMP







### Hazard and Effects Management Process (HEMP), Refer Shell Global Solution

A structured risk analysis methodology that involves Hazard identification, Risk assessment, selection of Controls and Recovery Measures, and comparison with tolerability and As Low As Reasonably Practicable(ALARP) criteria. Example; HAZOP, PSA, Bowtie, RHA, FSR, QRA, HRA, EIA, ...













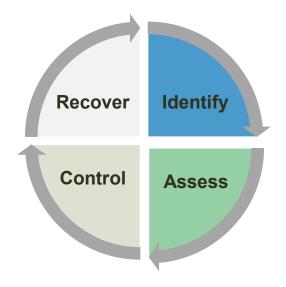


## HEMP Methodology





**HEMP – 4 Major steps**A Circular Quality Control Process



#### Identify

- What is hazards are present?
- Are People, Environment, Reputation or Assets exposed to these Hazard?

#### **Assess**

- Can the hazard be eliminated or minimized?
- What are Threats that can release the Hazard?
- What are the credible scenarios and how likely are they?
- What are the potential consequence?
- What is the potential likelihood of the hazardous event?
- What is the risk?

#### Control

- How are the hazards and their risks managed?
- What are the controls are barriers?
- How effective are the barriers and control?

#### Recover

- When a hazard is released, what are the recovery measures in place?
- How can the consequences be mitigated or minimized?















# PSA Application



### **Process Safety Assessment**



- It is used to assess existing assets.
- It uses the Risk Assessment Matrix (RAM) to assess the risk of each hazard present in the unit and focuses on system and units with RAM **High risk and High severity**.
- It is conducted by P&ID and field reviews.
- It assesses scenarios using Tolerability and ALARP criteria for consequences to people, assets, environment and reputation (PAER).







Assess the Safety, Integrity and Operability for compliance with Current Practices, Standard and Regulation.

















# PSA Step



**Collect Data** 

01

02 Hazard & **Effect** 

Register

03 Scenario & Barrier Identification

04 Barrier

05 **Tolerability** and ALARP **Assessment** 

06 **Prioritize** Recommendation

- Prioritize

**Peer Review** & Report

07

08 **Gap Closure** 



- Process Safety Information (PSI)
- MOC/Project in past 5 years
- Incident history/learning from incident

- Specify Hazard, Top Event, Consequence
- Assess risk ranking for Hazard and their consequence
- Walk through P&ID, line by line and check possible scenario and analyze worst credible final consequence
- Check design intent and design data for each scenario
- Check Effective. Independent. Auditable complying with LOPA DEP
- Check overpressure scenario to comply with ASME, API 521, DEP Overpressure
- Check specific barrier e.g ROV

- Assess standard and good practice compliance
- If scenario deviate from standard. ensure if barriers are enough
- Discuss **ALARP**

- Technical High/Medium/ quality check by Low criticality team and Process SME
  - Handshake result and recommendation to Unit owners and management
- Close recommendation to reduce risk in meet Tolerability criteria or make the barrier valid















### Execution, make it real in field





1.HAZOP/PSA

2.Select
High Risk or
Medium risk
with high
severity
scenario

### **Major Accident Event (MAE) Management**



#### A. Bowtie

Communicate MAE in Bowtie form to frontline

#### **B. Safety Critical Barrier (SCE & SCA)**

- SCE (safety critical equipment): Handled in the maintenance management systems, and performance standard required for availability and repair of SCE
- SCA (safety critical activity):
- Action after detection : Handle by operation and action recorded in Alarm Narrative and Abnormal procedure
- Preventive maintenance action following SCE performance standard

#### C. Pre-Incident Plan: PIP

• Emergency exercise to ensure plan to evacuate people, instruct people, activate fire protection system and mobilize emergency response team















Thank you for your attention

















