



# 16<sup>th</sup> Chemical Process Safety Sharing (CPSS)

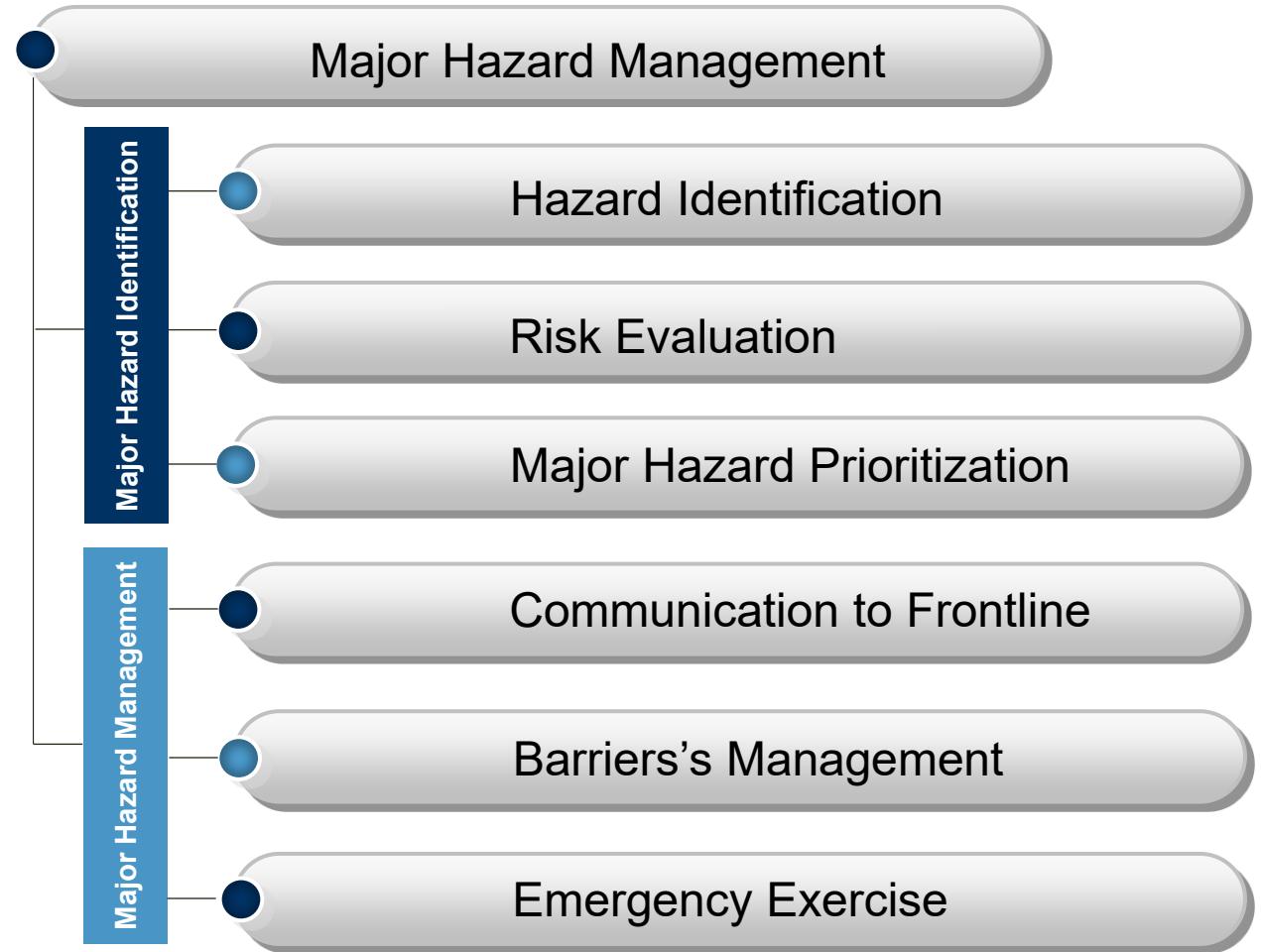
## Major Hazard Management

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Process Technical Safety  
Thai oil





# Contents



# Major Hazard Management

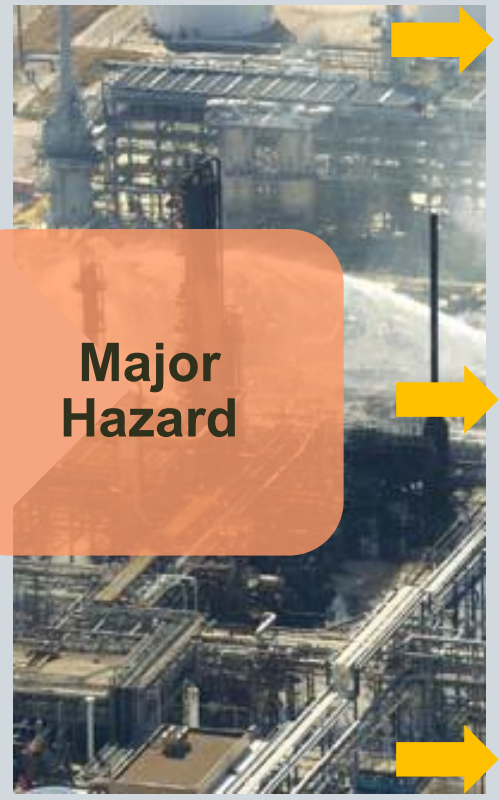


**1. Hazard Identification**

**2. Risk Evaluation**  
 - Consequence Assessment  
 - Barrier Validation  
 - Tolerable/ALARP checking

**3. Major Hazard Prioritization**

## Major Hazard Management



**A. Communication to Frontline**

**B. Barriers's Management**

- Ensure the functionality of barriers at all times.
- Cover implementing, maintaining, monitoring, and improving barriers.
- Consist of SCE (Safety Critical Equipment) and SCA (safety critical activity)

**C. Emergency Exercise**

Ensure emergency team preparedness including:

- Validate emergency response plans
- Improve Team coordination and communication
- Identify resource needs and gaps

# Hazard Identification



- **HAZARD** : A hazard is an agent with the potential to cause harm to People, damage to Assets and impact on the Environment or Reputation/Community.
- Identify and recognize hazards is very first and critical step to manage the hazards and prevent incidents.
- Hazard characteristic
  - Material with Dangerous Properties
  - Dangerous Conditions – States of Energy or Forces

## Why Hazards were not recognized before incident.

- Non-Linear – cannot extrapolate in straight proportion
- Hazards may be hidden
- Hazards may build up slowly
- Desensitizing – detection ability is lost or brew normalization
- Need collaborating agents to cause consequence and the collaborating agents may or may not be present every time
- Severity of consequence may be magnified by other contributing factors

Recognition of these hazards requires **deliberate attention and efforts.**





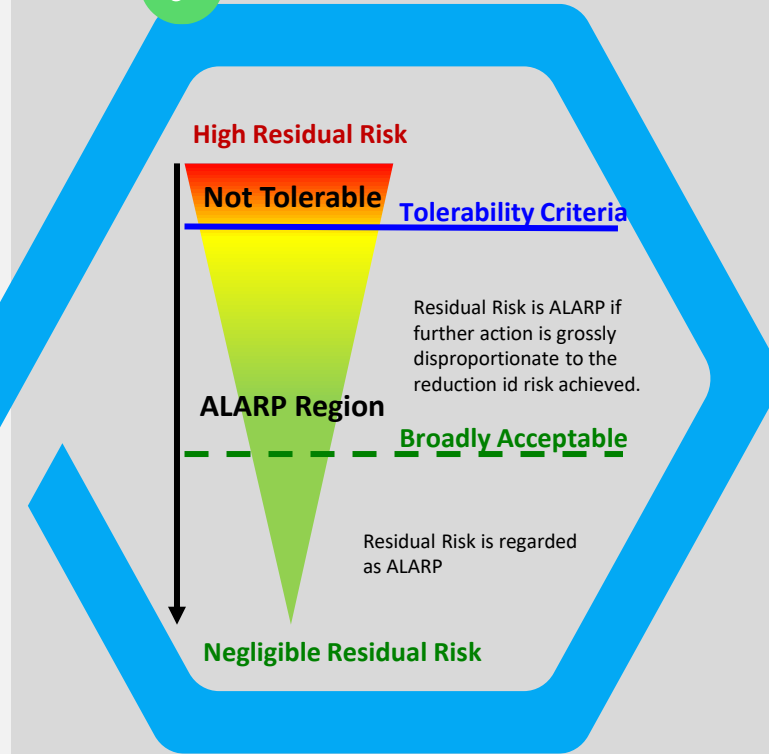
## Consequence Assessment



## Barrier Validation

- Effective**
  - Big Enough, Fast Enough, Strong Enough
- Independent**
  - Independent from cause/initiating event
- Auditable**
  - Verify that it can operate correctly when it is called upon

## Tolerability & ALARP Checking



# Major Hazard Prioritization



1

**Collect Potential Major Hazard Scenario**

- Collect process safety scenario in HAZOP or PSA scenario
- Screen Major Hazard by using criteria of **RAM Red** or **Yellow** with high severity

2

**Estimate Magnitude of Consequence**

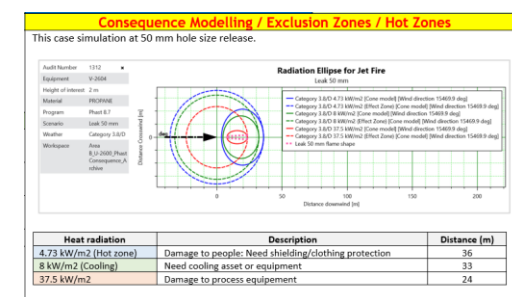
- Estimate the magnitude of consequences by using consequence model e.g. Phast

3

**Major Hazard Prioritization**

- Prioritize based on magnitude of consequences and effect.
- Select Major Hazards Top 10 in each area

Severity	People	Assets	Environment	Reputation	Product Quality	Increasing Likelihood					
						A	B	C	D	E	
						Improbable	Unlikely	Possible	Likely	High	
5	Multiple fatalities	Extensive damage > 10 M USD	Major effect, pervasive severe damage	International impact	Major effect	M	M	M	M	M	
4	Permanent Total Disability of 1-3	Major damage 1-10 M USD	Major effect, breach or wide spread nuisance	National impact	Major effect	L	M	M	M	M	
3	Major health effect injury (LWC)	Localized damage > 1-1 M USD	Localized effect, repeated breaches or nuisances	Considerable impact, Regional media	Considerable effect	L	L	M	M	M	
2	Minor health effect injury (AMTC)	Minor damage < 1-100 K USD	Minor effect, single breach or complaint	Localized impact, Local media	Localized effect	L	L	L	M	M	
1	Slight health effect injury (FAC)	Slight damage < 10 K USD	Slight effect, within fence	Slight impact	Slight effect	L/N	L/N	L	L	L	
0	No health effect injury	No damage	No effect	No impact	No effect	L/N	L/N	L/N	L/N	L/N	



**LIST OF HIGH RISK FOR PRE-INCIDENT PLAN**

Item	HAZ	APY	Area	Equipment Tag No.	Hazard	Pre-incident Plan	Pre-incident Plan (PP) Y/N
1	HAZ	APY	SOCA	SOCA	Crack oil	✓	PP-L1-Pre-incident Plan 10 to 10 Har
2	HAZ	APY	SOCA	SOCA	Crack oil	✓	PP-L1-Pre-incident Plan 10 to 10 Har
3	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
4	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
5	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
6	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
7	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
8	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
9	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
10	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
11	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
12	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
13	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
14	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
15	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
16	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
17	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
18	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har
19	HAZ	APY	SOCA	SOCA	Highly toxic and BLE	✓	PP-L1-Pre-incident Plan 10 to 10 Har

# Communication to Frontline



## ➤ Communication Major Hazard in Bow Tie to frontline





# Barriers's Management



- An incident doesn't occur solely because a hazard is present; it occurs when all the protective measures have failed.
- Barriers's Management is the critical process in Major Hazard Management

## 1. Implementing

- Identify SCE and register in CMMs system
- Develop SCE work process and performance standard

## 2. Maintaining

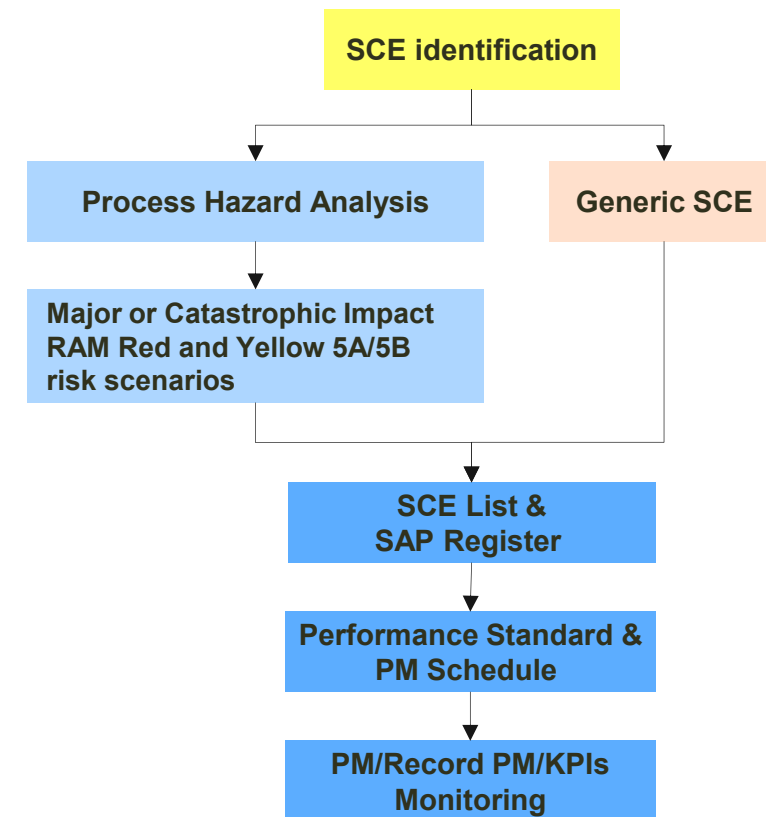
- Inspect and test accordance with engineering practices as schedule
- If de-efficiency, contingency plan will be temporarily developed and implemented

## 3. Monitoring

- Track performance to ensure the barrier effectiveness
- Management review in relevant SCE KPIs
- Conduct annually review of Barrier management system

## 4. Improving

- Any abnormalities detected shall be promptly investigated and corrected.

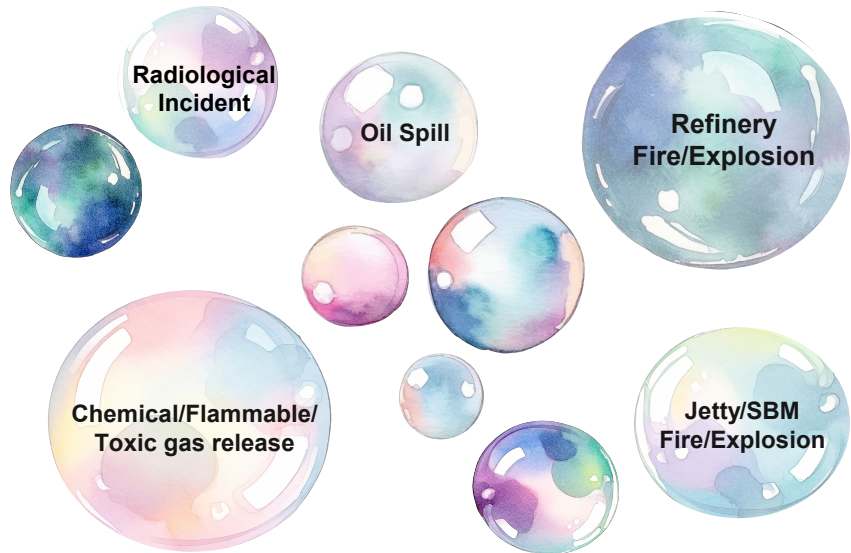
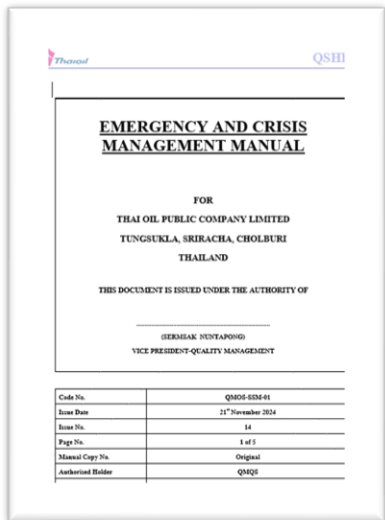




# Emergency Exercise



- Pre-Incident Plan shall be developed for Major Hazard or other high-risk scenario.
- Emergency response teams and relevant persons shall be trained and regularly drilled on the emergency response plan.
- Essential equipment shall be inspected and tested in accordance with the defined schedule to ensure readiness.
- The emergency response plan and related procedures shall be reviewed periodically (yearly) to ensure they remain up to date.



	Business Unit: Thai Oil Refinery	Incident Specific location: V-2604	PIP Scenario: Jet fire	PIP Number: PIP-L2-FIRE-TOC-4- V-2604
<b>Scenario Description</b>			<b>Consequence Modelling / Exclusion Zones / Hot Zones</b>	
Overpressure at V-2604 (refer to bow-tie V-2604). LOC of propane at V-2604 (OP = 12.9 barg and OT = 198 degC) results in Fire/Explosion. (Release at inlet/outlet flange of vessel.)			This case simulation at 50 mm hole size release.	
<b>Product Properties</b>		<b>Supporting Documents</b>		
Flashpoint	-105 degC	Fire Water Systems	0000-0-08-65101	
Explosive Limits (LEL)	2.1% - 9.5%	Drainage Layout	-	
Auto Ignition Temperature	470 degC	Electrical/Instrumentation	-	
Toxicity	-	Operations Procedure <WI>	MROB-QWI-260201	
MSDS Ref:	Propane	Detection System	65QA-2037 65QA-2038 65QA-2039	
<b>Surrounding Exposure / Escalation Potential</b>				
<b>Potential Risk Area</b>	<b>Threat / Consequences</b>	<b>Timeline for Escalation</b>		
V-2601, V-2603, V-2604	Explosion/Fatalities/Asset damage	Immediate at ignition		
V-2603, F-2601/2/220/273	Jet fire/Fatalities/Asset damage	Immediate at ignition		
<b>Additional Information</b>				
			<b>Plot plan for deployment of Fire Fighting resource</b>	

Emergency Response / Production Units Actions					
ERT response		Production units response			
Task	Action by	Owner area	Action by	Impact to/from other area	Action by
1. Shift SSHE co. on Road B and Road M, 17.34 and 17.35 PIP Level 1 no.02 pressure 10 to 30 barg.					
2. Outside operator inform Panel man for fire case at V-2604 ASM Inform SM and POM to acknowledge the fire incident. Ops. wear SCBA.	Field OPS ASM	2.1 Outside Operator inform Panel man V-2604 fire case 2.2 ASM inform to SM to inform to upstream process and downstream process unit to be ready for emergency response	Outside Panel	3.1 in upstream process U-2100, OFF SITE 3.1 in Downstream process CCRs, MXU, TPX, Movement, HDT-1/2, HCU-1/2, ISOM	ASM, OPS TOC-4
3. ** Commander evaluates the situation on site. Fire team shall wear SCBA with Fire suit and personnel gas detector.	SM Fire team	2.3 Prepare panel man to inform to upstream process and downstream process unit to be ready for emergency response Fixed monitor & open spray water loop 65HS-2061 (65UZ-2180) FOR V-2604 65HS-7108 (65UZ-8980) FOR V-2601/03 65HS-2053 (65UZ-2150) FOR C-2601	Panel, Outside		
4. Maintain and adjust all cooling are effective for pipe rack structure and process equipment.	Fire team	2.4 Panel man S/D U-2600 (NHT-3) to inform to upstream process and downstream process unit to be ready for emergency response De-pressure Flare switch to Flare system (Flare switch 26HZ011)	Panel		
5. Provide 1 mobile monitor from FP to reduce impingement from Jet fire.	Fire team	2.5 Prepare foam cart or foam drum stand at site.			
6. Prepare Foam cart or foam drum stand at site.	Fire team	2.6 Prepare Abnormal Work Instruction MROB-QWI-260301	Outside Panel, Outside		
** SM consider to define CP and Staging area as per situation.	SM				



**Thank you for  
your attention**

