

7th CPSS

Chemical Process Safety Sharing

Webinar (Zoom)

May 7th, 2021



GC Major Accident Event (MAE) Management Process



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Technical Safety Service Division





Presenter Biography



Company : PTT Global Chemical Public Company Limited (GC)



Current Position : Senior Technical Safety Engineer

Working Experience : 13 years

Presentation Abstract:

An Major Accident Event (MAE; also known as a ‘Top Risk’) is defined as an event that could result in

- (1) multiple fatalities or severe injuries; and/or**
- (2) extensive damage to structure, installation or plant; and/or**
- (3) large-scale impact on the environment.**

To promote Zero PSE Tier 1, the effective management of MAEs is integrated into GC’s Operational Risk Management (ORM) both in engineering design practices and safe operation management. Robust arrangements must be in place to identify and evaluate MAEs systematically, and to specify control measures required to ensure that MAEs are well-managed and associate risk is reduced to an Acceptance Level or ‘As Low As Reasonably Practicable – ALARP’.



**Nattakarn
Kanyaprasarnkit**



Contents



- Major Accident Event (MAE) Definition



- MAE Identification

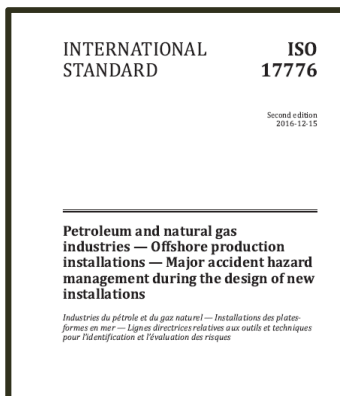
- Bow-Tie Implementation in GC

- Barrier Validation Process

- Practice Sharing & Q&A Sessions



Major Accident Event (MAE)



Major Accident Event (MAE) is defined as hazard event that results in:

- (1) Multiple fatalities or severe injuries; and/or
- (2) Extensive damage to structure, installation or plant; and/or
- (3) Large-scale impact on the environment.



BUSINESS :

- Large scale hydrocarbon processing
- Petrochemical value chain & Thailand energy security



LOSS & DAMAGE :

- Loss of life(s)
- Massive impact on environment
- License to operate & Reputation
- Increased insurance premium

Simplified MAE Management Process



4. Barrier Management & Risk Communication

Findings and risk reduction will be reported and linked into 'ORM Workflow'

3. Barrier Validation

Perform Barrier Functional and Site Compliance Validations for barrier health check



1. MAEs Identification

Identify potential MAEs by using PHA Techniques, with severity-based ranking

2. Develop Bow-Ties

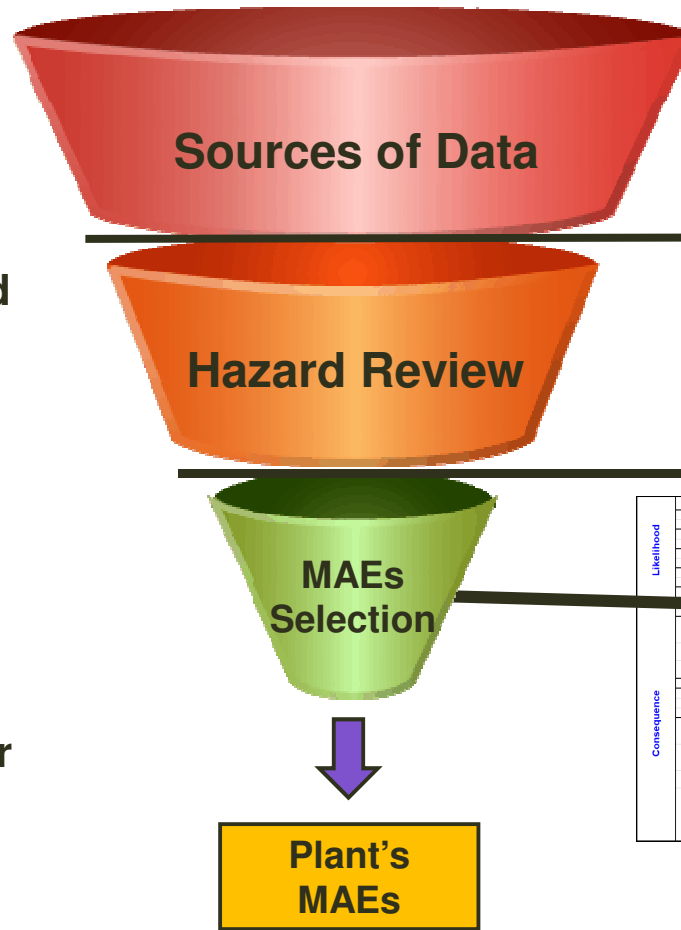
Brainstorming workshop will be applied for constructing a Bow-Tie Diagram

MAE Identification



Gap Closure:

- Insurance mentioned which method we apply for MAEs Identification (no criteria & hazard register documentation)
- How many MAEs shall be identified for each specific plant?



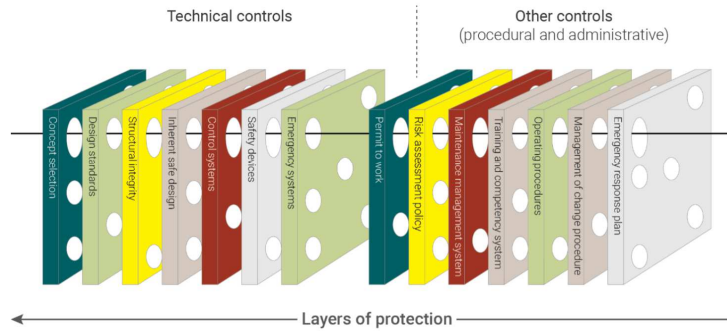
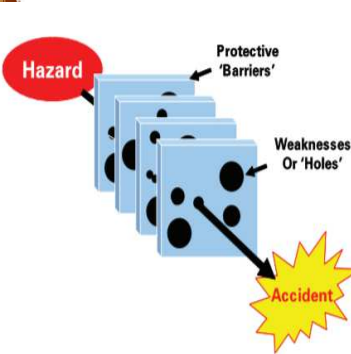
- o PHA (i.e. HAZID, HAZOP)
- o Formal Safety Studies
- o Plants Experiences
- o Past Incidents & EML

o Process Hazard Index (scoring)

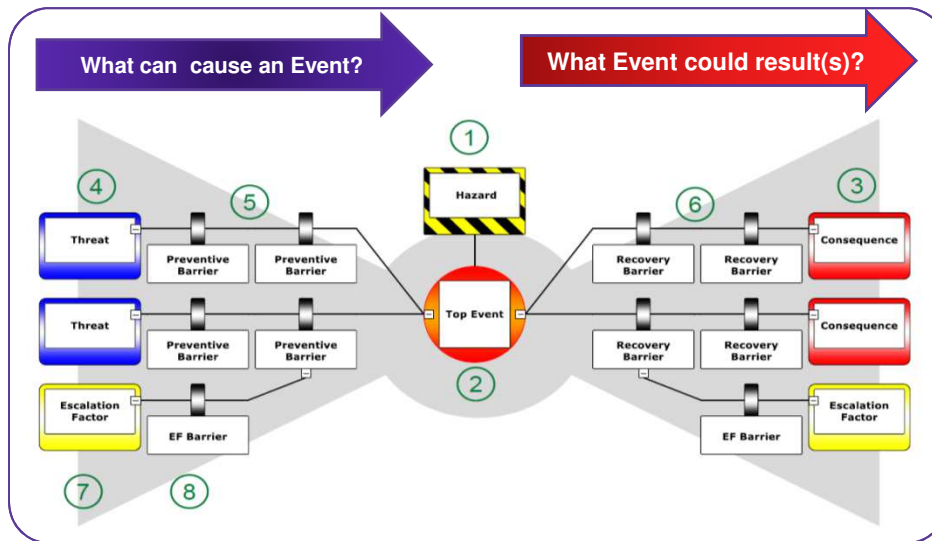
General Term (No.)		How often?	Hazard Severity Rating				
			Low	Medium	High	Extreme	Excessive
Frequent	5	Has happened more than once per year in the Location	Low	Medium	High	Extreme	Excessive
Likely	4	Has happened once per year in the Location	Low	Medium	High	High	Excessive
Possible	3	Has happened once per year in the PTGC group or more than once in the location	Low	Low	Medium	High	High
Unlikely	2	Possible to occur in the vicinity (or has occurred)	Very Low	Low	Low	Medium	Medium
Improbable	1	Unlikely to occur in the vicinity (or has occurred)	Very Low	Very Low	Low	Low	Low

Likelihood		Consequence					
People	No injury or First Aid cases (Safety, Health, Morals)	No injury or First Aid cases	Medical treatment or RestRICT to work	Less time injury	Minor first aid disabilities	Minor first aid disabilities	Minor first aid disabilities
	No or very low health effect	No or very low health effect	Low health effect	Medium health effect	High health effect	High health effect	High health effect
	No or Minimal morale impact	No or Minimal morale impact	Short-term morale impact	Long-term morale impact	Protestors rally	Protestors rally	Protestors rally
	No or Minimal morale impact	No or Minimal morale impact	Minor Effect	Minor Effect	Minor Effect	Minor Effect	Minor Effect
Economic (Total Loss)	Small BU (Tbds)	< 0.1 M	0.1 - < 1 M	1 - < 10 M	10 - < 100 M	≥ 100 M	≥ 100 M
	Medium BU (Tbds)	< 0.1 M	0.1 - < 1 M	1 - < 10 M	10 - < 100 M	≥ 100 M	≥ 100 M
	Large BU (Tbds)	< 0.1 M	0.1 - < 1 M	1 - < 10 M	10 - < 100 M	≥ 100 M	≥ 100 M
	Very Large BU (Tbds)	< 0.1 M	0.1 - < 1 M	1 - < 10 M	10 - < 100 M	≥ 100 M	≥ 100 M
Social (Community, Reputation, Customer, Law/Regulator)	No or slight impact to Community, Reputation and Customer	No or slight impact to Community, Reputation and Customer	Minor impact with long term recovery	Minor impact with long term recovery	Major impact with international concern	Major impact with international concern	Major impact with international concern
	No fault or insignificant fault of complying with laws/articles of association	No fault or insignificant fault of complying with laws/articles of association	Local media	Regional media	National media	International media	International media
	Partly comply with laws/articles of association	Partly comply with laws/articles of association	Verbal complaints	Official letter complaint	Customer loss	Customer loss	Customer loss
	Partly comply with laws/articles of association	Partly comply with laws/articles of association	Partly comply with laws/articles of association	Non-compliance with laws/articles of association	Violate the laws/articles of association	Violate the laws/articles of association	Violate the laws/articles of association

Bow-Tie Implementation



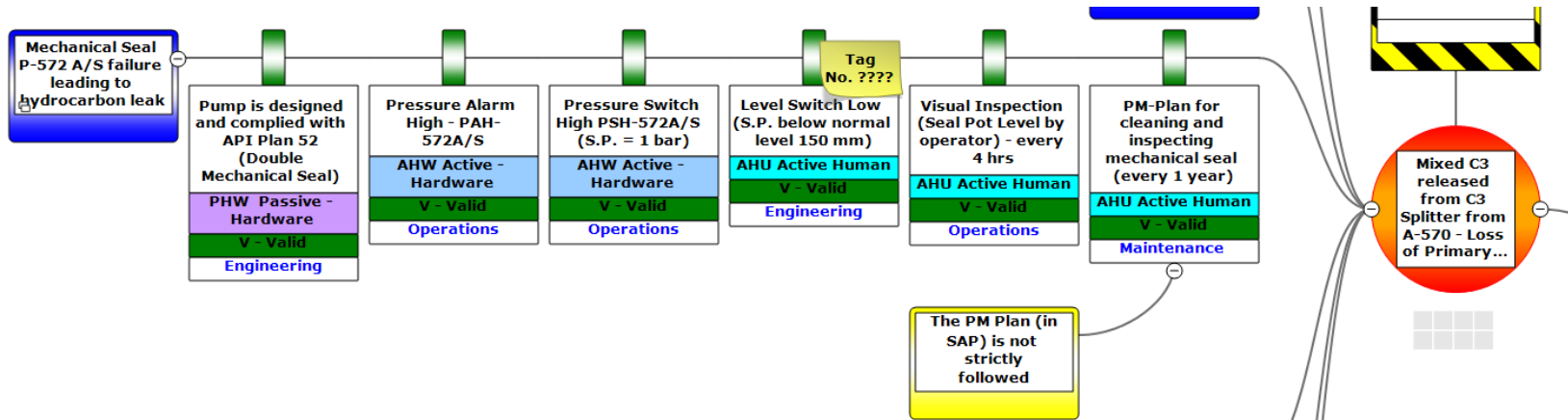
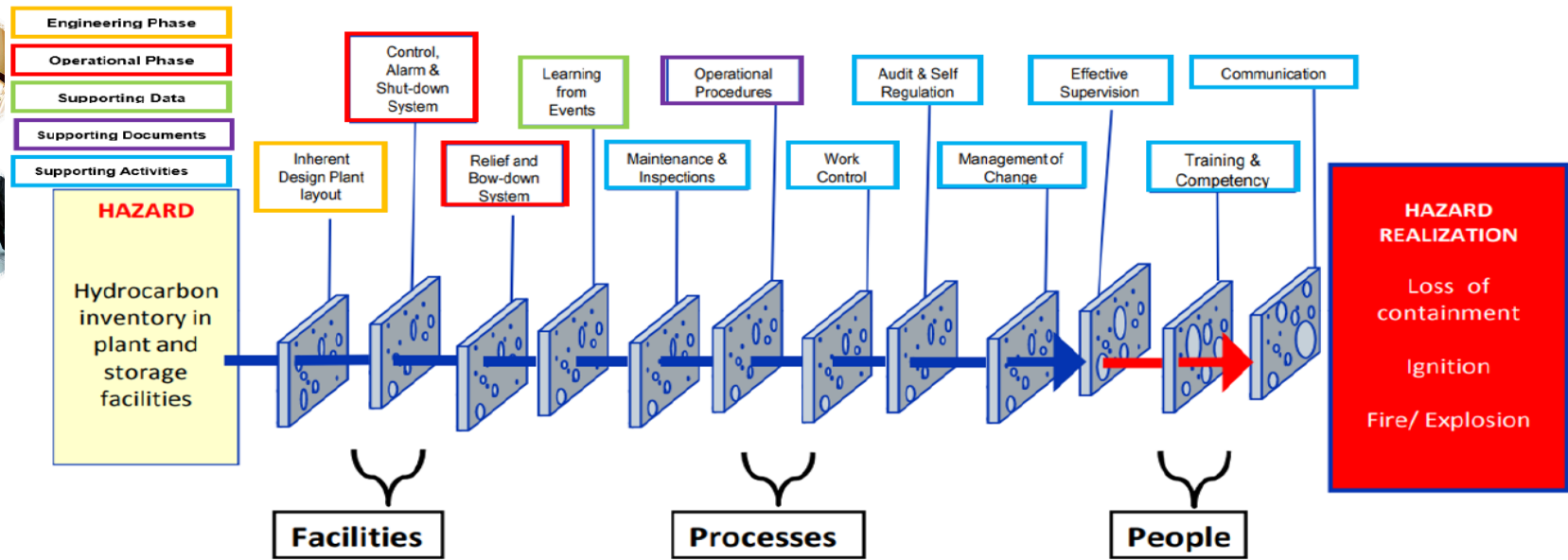
1. Do you know:
What can go wrong?
2. Do you know:
What are your preventions?
3. Do you know:
How to ensure that your preventions are enough and working effectively?



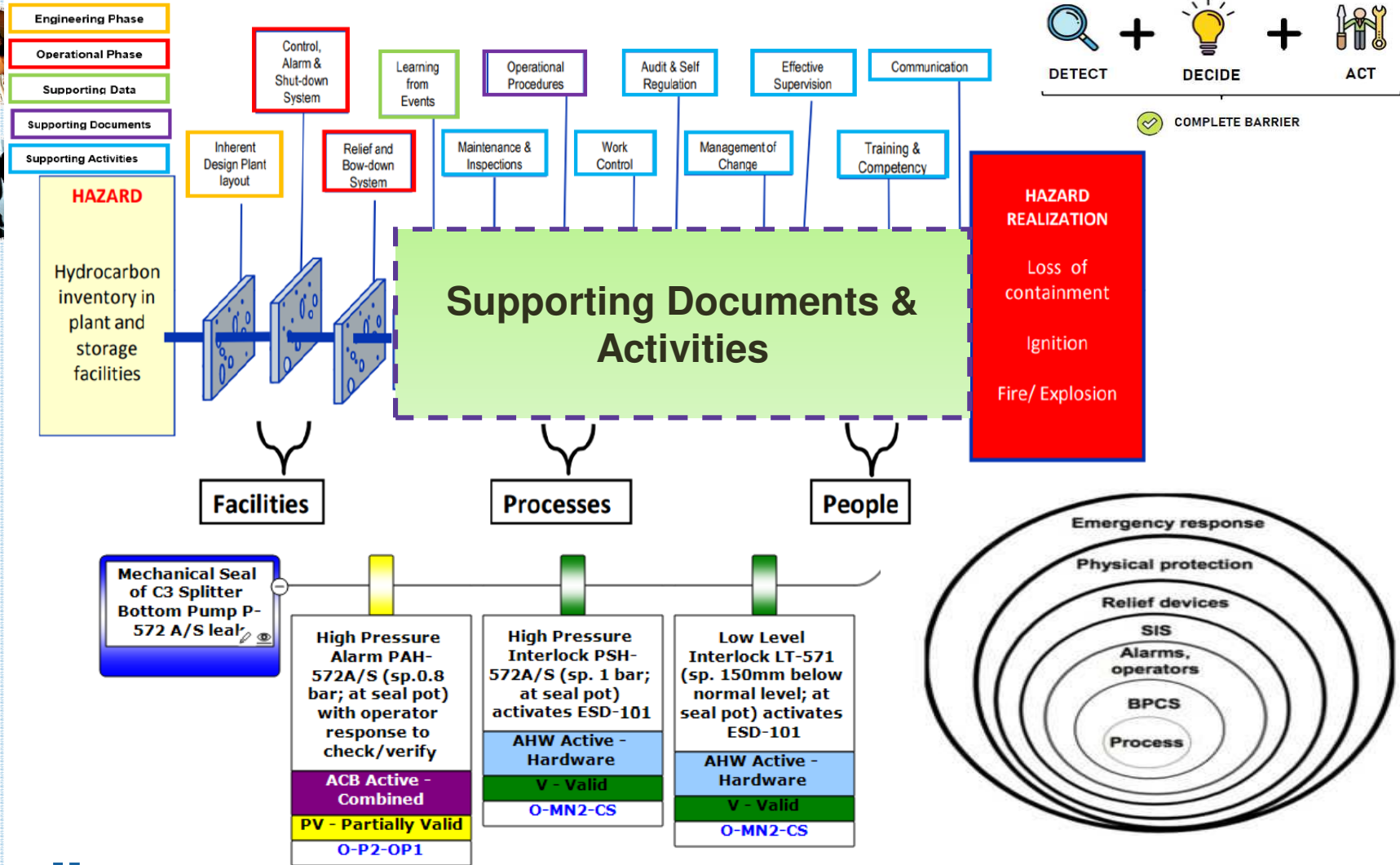
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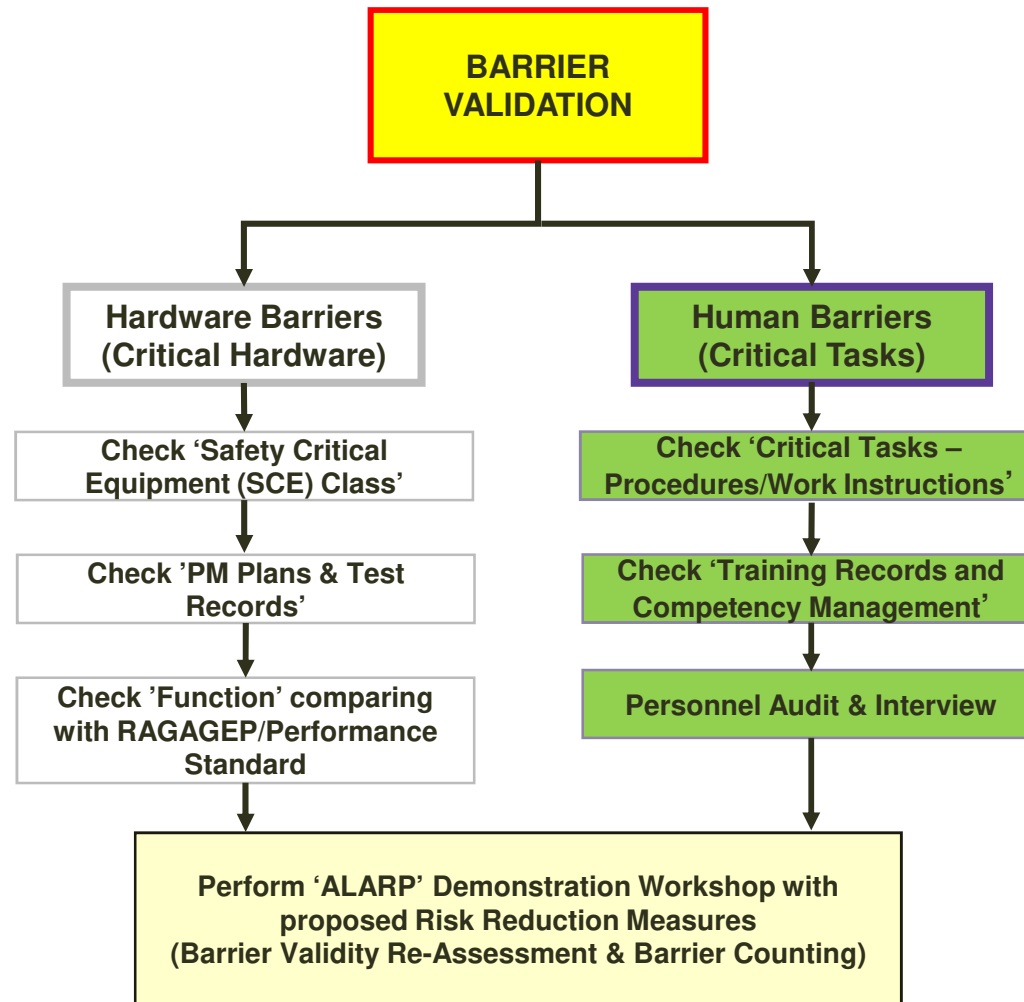
Bow-Tie Implementation – No Barrier Rules Set



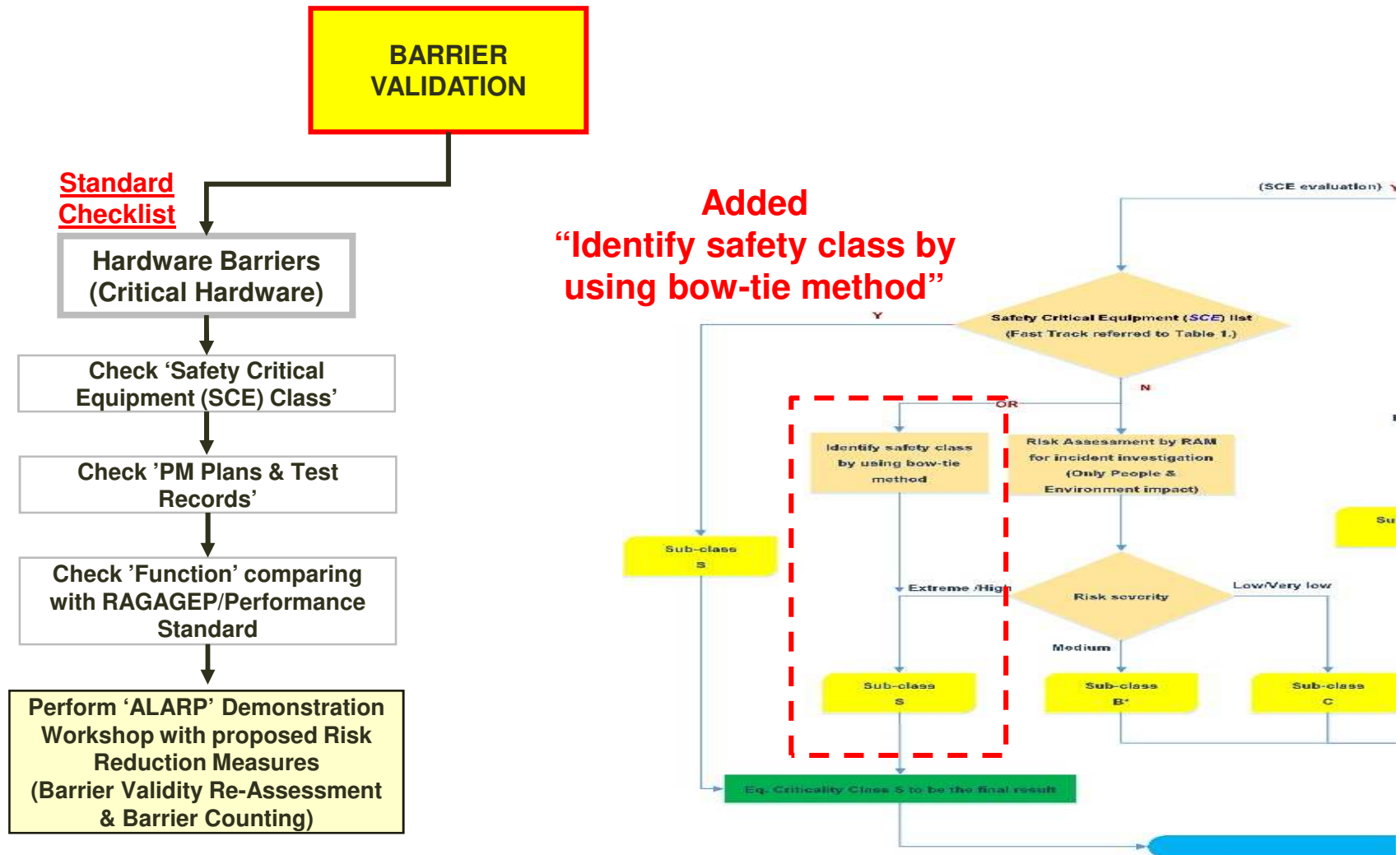
Bow-Tie Implementation – Barrier Rules Set



Barrier Management – Barrier Validation



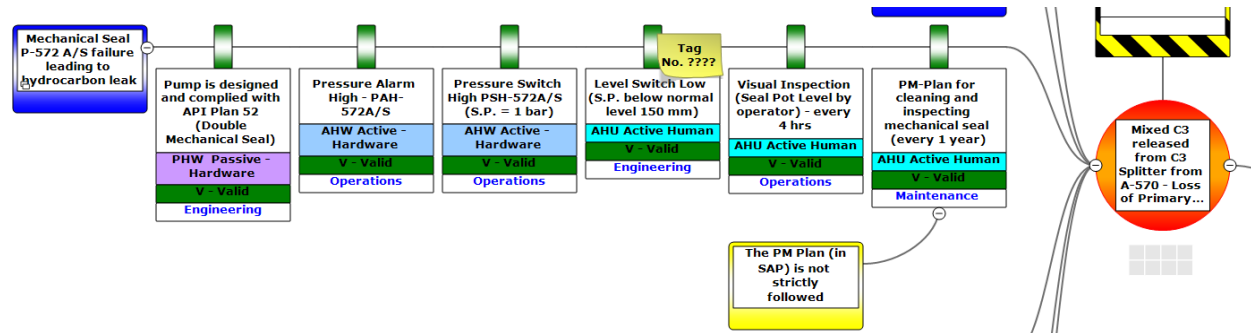
Barrier Management – Barrier Validation



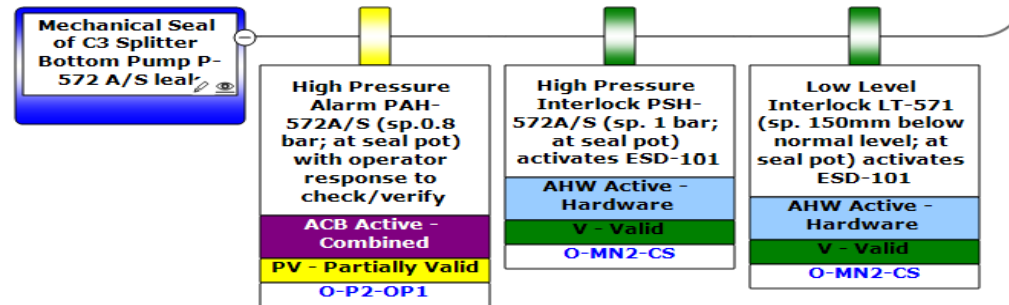
Barrier Management – Barrier Validation



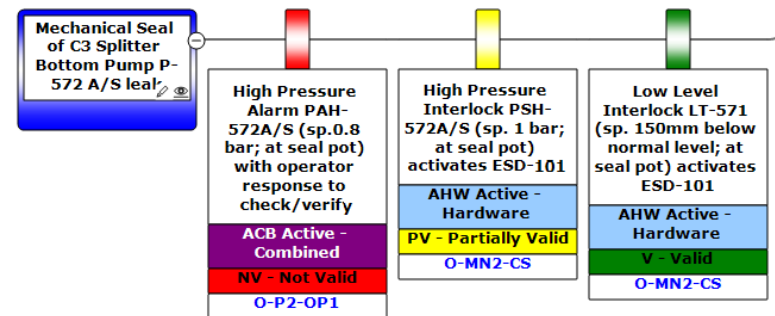
No Barrier Rules Set



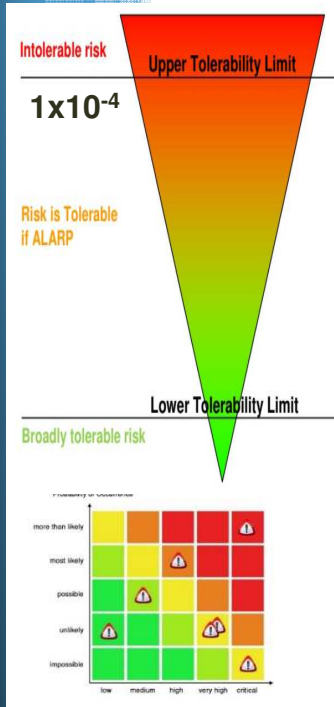
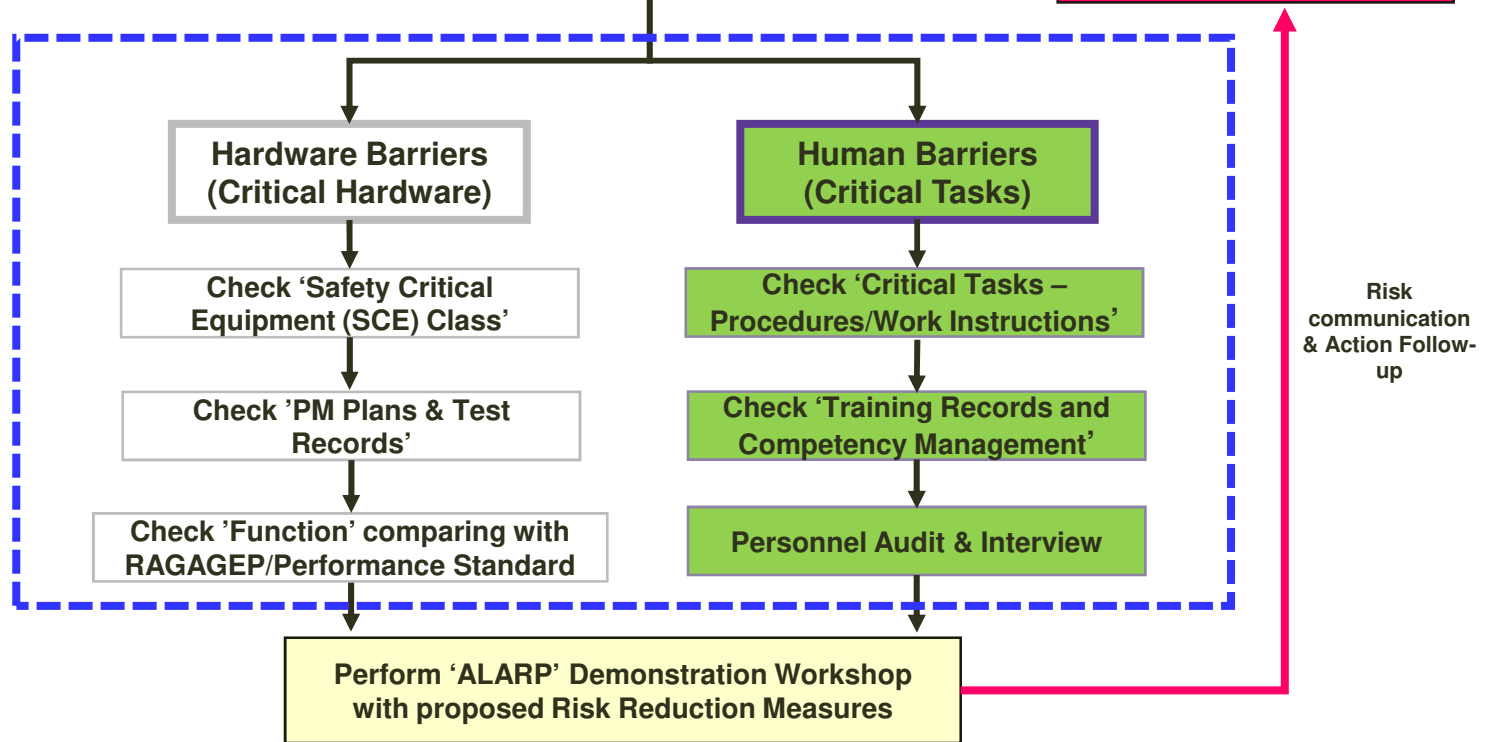
With Barrier Rules Set



With Barrier Validation Process



Conclusion - Barrier Management Process





Thank you for your attention



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