

The logo for Huntsman, featuring the word "HUNTSMAN" in a bold, white, sans-serif font, underlined by a white horizontal bar. The background of the entire slide is a photograph of an industrial facility with large silver pipes, blue structural beams, and a blue sky with white clouds.

**HUNTSMAN**

Enriching lives through innovation

# Huntsman PHA Revalidation

PHR vs HazOp - What is Best Practice?

# Who are Huntsman?

## History

- Founded in 1970 as Huntsman Container Corporation
- Expanded into Chemical Sector in 80's & 90's through multiple acquisitions, notably Texaco Chemicals & ICI
- Huntsman Corporation founded in 1996, consolidating all previous Huntsman businesses

## Now

- 3 Divisions – Polyurethanes, Advanced Materials & Performance Products
- 60+ Facilities globally, 6,000 associates
- Global Headquarters at The Woodlands, Texas

## Products

- Polyurethanes Division – Leading global producer of MDI-based polyurethanes
- Advanced Materials Division – Speciality epoxy, acrylic and PU based polymer resin systems for aerospace, automotive & construction
- Performance Products Division – Manufactures amines, maleic anhydride and carbonates serving consumer and industrial markets

# Huntsman Integrated PS “Map”

## Management Commitment

**Common Risk Matrix**

		Event Frequency (per year)							
		H	G	F	E	D	C	B	A
Consequence Severity Category	5	EHS-4	EHS-3	EHS-2	EHS-2	EHS-2	EHS-2	EHS-2	EHS-2
	4	EHS-4	EHS-3	EHS-2	EHS-2	EHS-2	EHS-2	EHS-2	EHS-2
	3	EHS-4	EHS-3	EHS-2	EHS-2	EHS-2	EHS-2	EHS-2	EHS-2
	2	EHS-4	EHS-3	EHS-2	EHS-2	EHS-2	EHS-2	EHS-2	EHS-2
	1	EHS-4	EHS-3	EHS-2	EHS-2	EHS-2	EHS-2	EHS-2	EHS-2

Pressure Relief System Design  
Design & Maintenance of Safety Instrumented Functions (SIFs)  
Area Classification  
Process Safety Information  
Design Requirements for Process Equipment

PS Variance  
Standard Operating Procedures/Training  
Alarm Management

**Identify Hazards**  
Process Hazard Analysis (PHA)  
PHA Revalidation  
Fire Risk Assessment  
Facility Siting

**Determine Safeguards**  
SIL Target Assessment

**Design Safeguards**

**Operate**

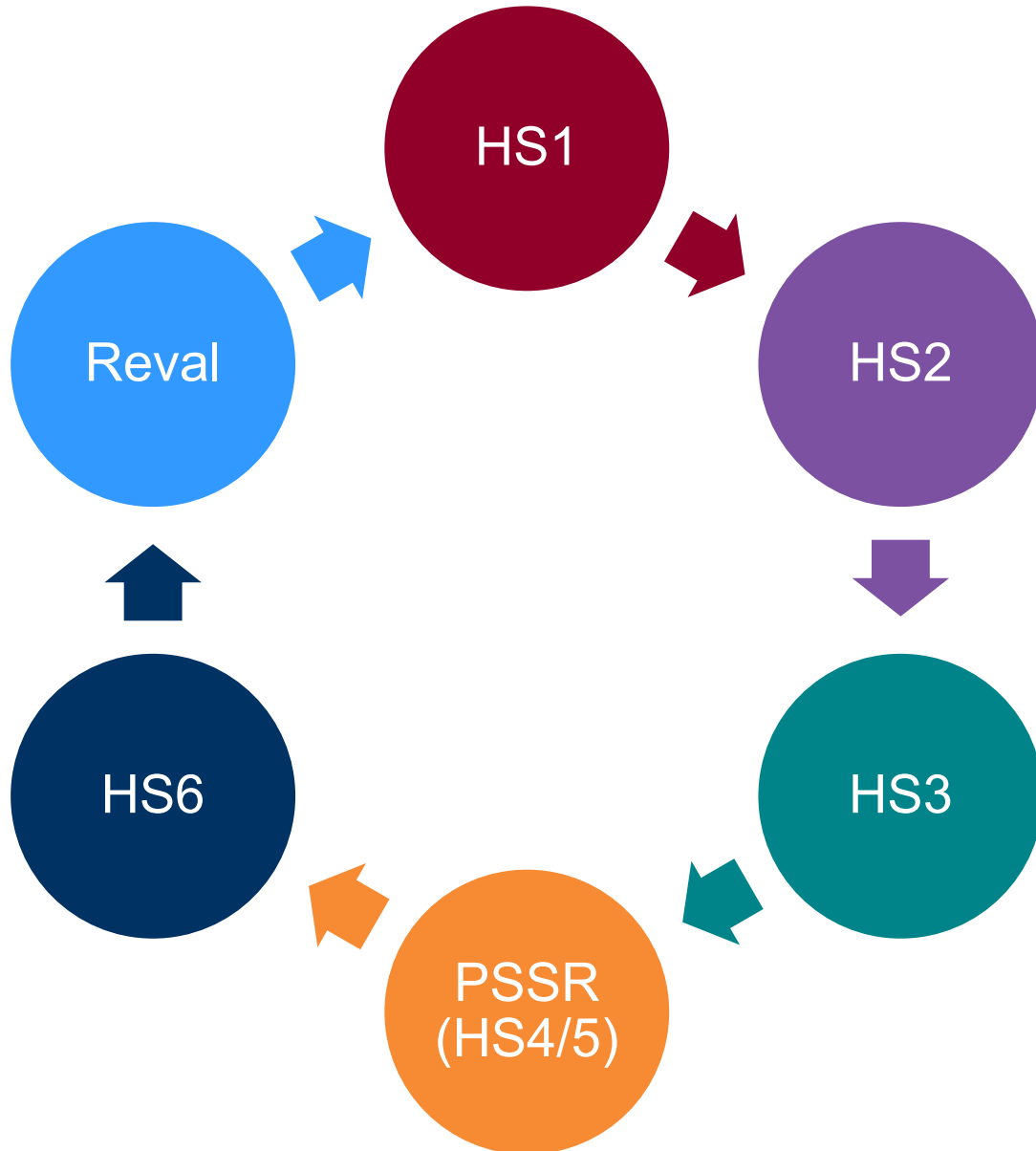
**Maintain**

**Maintain the Process**  
Qualified Persons  
Organisational Change Management  
Management of Change  
Pre-Start-Up Safety Review  
Incident Investigations  
Management of Actions

Mechanical Integrity

## System Effectiveness & Continuous Improvement

# Huntsman PHA Methodology



Identify chemicals & their hazards, consider removing / reducing hazards

Assessment of Major risks, elimination & minimisation where possible, specify protection layers

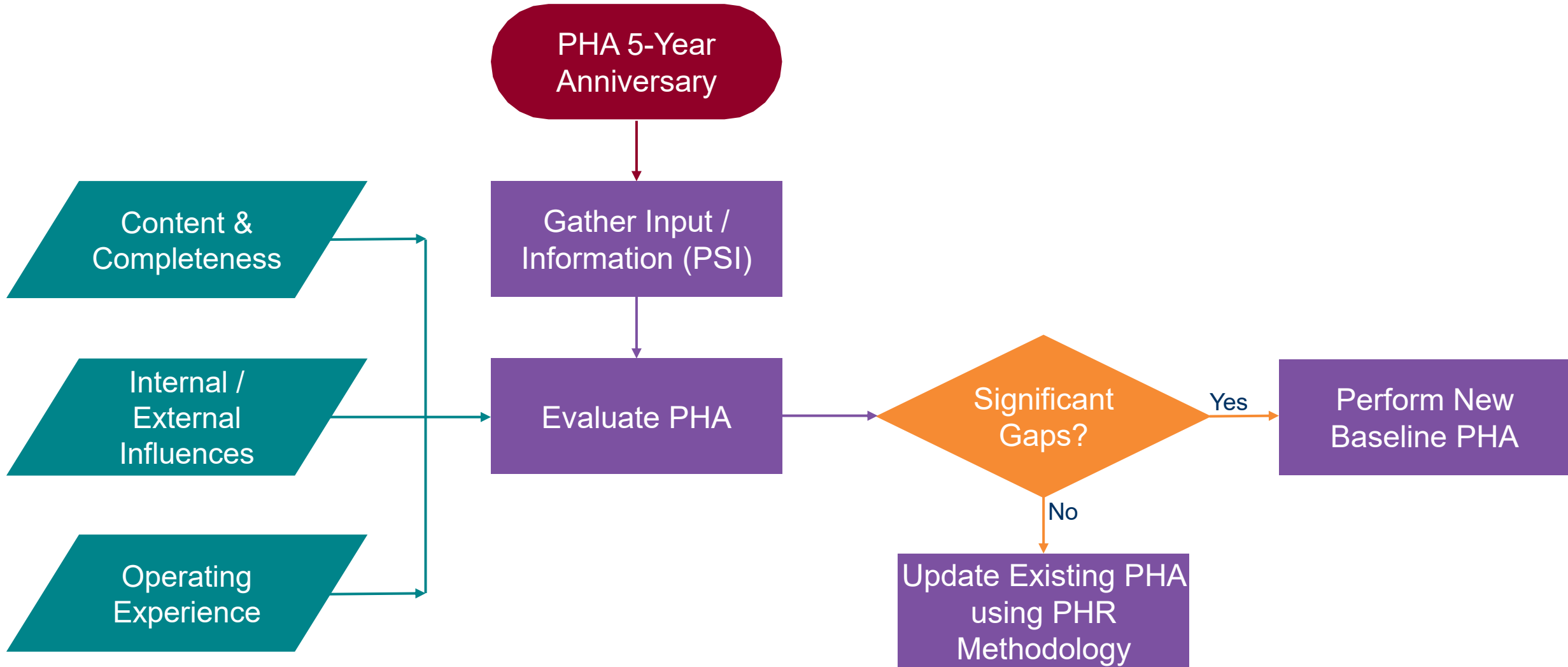
HazOp – identify consequences of deviation from design intent, refinement of firm design

Confirm installation is consistent with design intent. Pre-startup safety review

Post project verification – does the plant do what it's designed to do - safely

5-Year review of hazard studies for defined unit / plant. Use PHR methodology

# PHA Revalidation



# PHR Methodology

Process Hazard Review (PHR) starts with a review & update of the HS1 – Include consideration of MOC's & Incidents

Perform new PHR or update existing – HS2 style PHA but with modified guidewords for older plant & equipment. HS3 scenarios are grouped together and transferred to the new study

PHR guidewords: Internal Fire / Explosion, Excess or Inadequate Reaction, Extreme Pressure, Extreme temperature, Puncture / Impact, Excess loading, Long Term Weakening, Overfill, Openings, Leak, Manual Handling, Noise, Other.

Shorter, more focussed study aimed at identifying the most significant and high hazard scenarios rather than repeating lengthy HS3

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## Discussion – What do Others Do?

How do you manage revalidation of PHA's?

