RECCOMENDATION STATUS TRACKING TABLE					
REF.	**NODE**	**RR**	**Recommendation**	**Status**	**Action By (Response & Signature)**
1	Node: (1)	M	r1	Open	TOP CMDP-Jaruwat P.

HAZOP STUDY WORKSHEET

Project:	project-start- a1	**NODE**	**n1**
Design Intent :	x1	**System**	
Design Conditions:	x3	**HAZOP Boundary**	
Operating Conditions:			
PFD, PID No. :		**Date**	

Guide Word	Deviation	Causes	Consequences	CAT	Unmitigated Risk Assessment			Major Accident Event	Existing Safeguards	Mitigated Risk Assessment Matrix			Recommendations	Action by
				(P/A/E/R/Q)	S	L	R	(Y/N)		S	L	R		
Less/Low Flow MisdirectedFlow More/HighFlow No Flow Reverse Flow MLess/Low Pressure More/High Pressure	Less of Misdirected More of None Reverse Less of More of	x1	x1	P	5	A	M	N	e1				r1	ГОР CMDP-Jaruwat P

HAZOP RECOMMENDATION RESPONSE SHEET			
Project Title:project-start- a1 **Project No:HAZOP-2023-0000010** **Node:n1**			
Action By:	TOP CMDP-Jaruwat P.	**Response By:**	TOP CMDP-Jaruwat P.
Action No.	1		
Drawing and Documents	doc no1 (messageImage_1691651937550.jpg)		
Action Description			
Deviation:	x1		
Cause:	x1		
Consequences:	e1		
Safeguards:	r1		
Recommendation:			
Action Response:			

Action Close-out Details	By whom	Signature	Date
Response			
Ownner Approval			

Severity	Consequences					Increasing Likelihood					Opportunity	Opportunity
	People	Assets	Environment	Reputation	Product Quality	A	B	C	D	E	Positive consequence	
						Improbable	Unlikely	Possible	Likely	High		
						Never heard of in Petrochemical/Refinery Industry	Heard of in Petrochemical/Refinery Industry	Incident has occurred in Thailand/Asia	Happens several times per year in Thailand/Asia	Happens several times per year in Thaioil		
						> 50.0 y	20.0-50.0 y	5.0-20.0y	1.0-5.0y	0.0-1.0y		
5	Multiple fatalities	Extensive damage > 10 MUSD	Massive effect, persistent severe damage	International impact	Massive effect	5 M (Priority 2)	10 M (Priority 2)	15 H (Priority 1)	20 H (Priority 1)	25 H (Priority 1)	Exceptional Profit increase or cost reduce > 10%	5
4	Permanent Total Disability or 1 to 3 fatalities	Major damage 1-10 MUSD	Major effect, extended breach or wide spread nuisance	National impact	Major effect	4 L (Priority 3)	8 M (Priority 2)	12 M (Priority 2)	16 H (Priority 1)	20 H (Priority1)	Major Profit increase or cost reduce 5% - 10%	4
3	Major health effect/injury (LWC)	Localised damage 0.1-1 MUSD	Localised effect, repeated breaches or many complaints	Considerable impact, Regional media	Considerable effect	3 L (Priority 3)	6 L (Priority 3)	9 M (Priority 2)	12 M (Priority 2)	15 H (Priority 1)	Significant Profit increase or cost reduce 2.5% - 5%	3
2	Minor health effect/injury (MTC)	Minor damage 10-100 KUSD	Minor effect, single breach or complaint	Limited impact, Local Media	Limited effect	2 L (Priority 3)	4 L (Priority 3)	6 L (Priority 3)	8 M (Priority 2)	10 M (Priority 2)	Minor Profit increase or cost reduce 1% - 2.5%	2
1	Slight health effect/injury (FAC)	Slight damage ≤ 10 KUSD	Slight effect, within fence	Slight impact	Slight effect	1 L/N (Priority 4)	2 L/N (Priority 4)	3 L (Priority 3)	4 L (Priority 3	5 L (Priority 3)	Insignificant Profit increase or cost reduce < 1%	1
0	No health effect/injury	No damage	No effect	No impact	No effect	L/N (Priority 4)	L/N (Priority 4)	L/N (Priority 4)	L/N (Priority 4)	L/N (Priority 4)	-	0

Risk Assessment Matrix : 5X5

HAZOP Guide Words

Deviations	Guide Word	Process Deviation (Examples of Cause)	Area of Application
Flow			
Less of	Less/Low Flow	Line blockage– filter blockage – fouling in vessels – defective pumps – restrictor or orifice plates –etc.	System
Misdirected	MisdirectedFlow	Flow directed to stream other than intended due to misalignment of valves –etc.	System
More of	More/HighFlow	Increased pumping capacity – reduced delivery head increased suction pressure – static generation under high velocity – pump gland leaks –etc.	System
None	No Flow	Incorrect routing – blockage – burst pipe – large leak – equipment failure (C.V., isolation valve, pump, vessel, etc.) – incorrect pressure differentia	System
Reverse	Reverse Flow	Incorrect pressure differential – two-way flow – emergency venting – incorrect operation – in-line spare equipment –etc.	System
Temperature			
Less of	Less/Low Temperatu	Ambient conditions – reducing pressure – loss of heating – depressurisation of liquefied gas – Joule Thompsoneffect – line freezing –etc.	System
Less of	MLess/Low Pressure	Generation of vacuum condition – restricted pump/ compressor suction line – vessel drainage –etc.	System
More of	More/High Pressure	Surge problems (line and flange sizes) – relief philosophy (process / fire etc.) – connection to high pressure system – gas breakthrough (inadequa	System
More of	More/High Temperat	Ambient conditions – fire situation – high than normal temperature – fouled cooler tubes – cooling water temperature wrong –cooling water failure	System