TOP PROJECT NO. :

CTCI PROJECT NO. :

HAZOP STUDY REPORT
EPC MAIN WORK
FOR
CFP CRUDE OIL TANK PROJECT

FOR FINAL

						Thai Oil Public Company Limited
						CERTIFIED
0	Issue For Final					PROJ.
Z0	Issue For Design					MGR. DATE
A	Issue For Review					
REV.	DESCRIPTION	BY	CHK.	APPR.	DATE	Rev. 0

วัตถุประสงค์การศึกษาและขอบเขตงาน **(Study Objective and Work Scope)**

รายชื่อผู้เข้าร่วม (Attendee list)														
No.	Name	Company	Date of attendance											
			31 Aug 20	2 Mar 23	3 Mar 23	4 Mar 23	5 Mar 23	6 Mar 23	7 Mar 23	8 Mar 23	9 Mar 23	10 Mar 23	11 Mar 23	12 Mar 23
1	Dungrat (TOP-XX)		X											
2	TOP CMDP-Jaruwat P.		X											
3	Nuttsuda (ADB)		X											
4	Nitinai (Dev)		X											

เอกสารอ้างอิง (Drawing & Reference)				
No.	**Document Name**	**Drawing No**	**Document File**	**Comment**
1				

Node List (PID / PFD และ NODE Marked)							
No.	**Node**	**Design Intent**	**Design Conditions**	**Operating Conditions**	**Node Boundary**	**Drawing No**	**Drawing Page (From-To)**

RECCOMENDATION STATUS TRACKING TABLE					
REF.	**NODE**	**RR**	**Recommendation**	**Status**	**Action By** (Response & Signature)

Major Accident Event (MAE)			
No.	**Node**	**Causes**	**Risk Asseessment Matrix (R)**
1	'nodexx1	x1	H

Safety Critical Equipment (SCE)
TBA

HAZOP STUDY WORKSHEET

Project:	d3	**NODE**	'nodexx1
Design Intent :	xxx	**System**	
Design Conditions:		**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 No.	Action by
				(P/A/E/R/Q)	S	L	R	(Y/N)		S	L	R			
Less/Low Flow	Less of	x1			4	4	H	Y	xxxx	4	1	L	xx		suda (ADB)
MisdirectedFlow	Misdirected	x2											k		MDP-Jaruwat P.
More/HighFlow	More of	xxx3													
No Flow	None	x1													
Reverse Flow	Reverse														
MLess/Low Pressure	Less of														
More/High Pressure	More of														

ภาคผนวก ก
ข้อมูลและตารางอ้างอิงสำหรับการประเมินความเสี่ยง
APPENDIX A
PHA -WORKSHEETS

ตารางการประเมินความเสี่ยง (Risk Assessment Matrix (RAM))

ระดับความรุนแรง	โอกาสในการเกิดความเสี่ยง 4	3	2	1
4	มากที่สุด 4	มากที่สุด 4	มาก 3	ปานกลาง 2
3	มากที่สุด 4	มาก 3	ปานกลาง 2	ปานกลาง 2
2	มาก 3	ปานกลาง 2	ปานกลาง 2	น้อย 1
1	ปานกลาง 2	ปานกลาง 2	น้อย 1	น้อย 1

Risk Assessment Matrix : 4X4

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

ภาคผนวก - PIDs / PFDs