



Toase-e Park Sanati Gohar Ofogh
 Petrochemical Co.
**CONCEPTUAL, BASIC and DETAIL DESIGN
 ENGINEERING OF STYRENE PARK OFFSITE**



Document Title: Cause & Effect Diagram

Document No.: EI027-HSE-VD – IN– DIG– 001-R0

Rev. R0

Page 1 of 3

STYRENE PARK OFFSITE

Document Title:
Cause & Effect Diagram

Rev.	Issued Date	DESCRIPTION	PREPARED	CHECKED	APPROVED
R0	22-09-2024	IFA	F.SH	M.O	A.M



Toase-eh Park Sanati Gohar Ofogh
Petrochemical Co.
**CONCEPTUAL, BASIC and DETAIL DESIGN
ENGINEERING OF STYRENE PARK OFFSITE**



Document Title: Cause & Effect Diagram

Document No.: EI027-HSE-VD – IN– DIG– 001-R0

Rev. R0

Page 2 of 3

REVISION RECORD SHEET

Page Page	Revisions							Page	Revisions						
	R0	R1	R2	R3	R4	R5	R6		R0	R1	R2	R3	R4	R5	R6
1	X							41							
2	X							42							
3	X							43							
4								44							
5								45							
6								46							
7								47							
8								48							
9								49							
10								50							
11								51							
12								52							
13								53							
14								54							
15								55							
16								56							
17								57							
18								58							
19								59							
20								60							
21								61							
22								62							
23								63							
24								64							
25								65							
26								66							
27								67							
28								68							
29								69							
30								70							
31								71							
32								72							
33								73							
34								74							
35								75							
36								76							
37								77							
38								78							
39								79							



Toase-eh Park Sanati Gohar Ofogh
Petrochemical Co.
CONCEPTUAL, BASIC and DETAIL DESIGN ENGINEERING
OF STYRENE PARK OFFSITE



Document Title: Cause & Effect Diagram

Document No.: EI027-HSE-VD – IN– DIG– 001-R0

Rev. R0

Page 3 of 3

REFRIGERATION PACKAGE RU-0001A

EFFECT

CAUSE

NOTES	CUSTOMER P&ID No. EI027-HSE-VD-PR-PID-002 (SHEET No.)	INSTRUMENT	DESCRIPTION	CLASSIFICATION	CONDITION OF ACTIVATION	PLACE OF GENERATION SOURCE	TAG No.	EQUIPMENT TAG No.	DESCRIPTION	ACTION	CUSTOMER P&ID No. EI027-HSE-VD-PR-PID-002 (SHEET No.)	Rev.
9	7	HSS-RU0001A-01	Emergency stop (local panel RU0001A-LCP-01)	Unit trip	1	LCP	HSSHH-RU0001A-01	RU0001A-M01	Compressor shutdown trip	Immediate stop of compressor	7	
9	7	ESD-RU0001A-01	ESD emergency shutdown	Unit trip	1	UCP	ESDHH-RU0001A-01	RU0001A-P-01	Oil pump RU0001A-P-01 shutdown trip	Immediate stop of oil pump	7	
			ESD emergency shutdown CLIENT	Unit trip	1	UCP	ESDHH-RU0001A-02		Separator oil heater stop	Immediate stop of separator oil heater	7	5
	2	PIT-RU0001A-01	Compressor Suction pressure low low	Unit trip	1.3	UCP	PISALL-RU0001A-01	RU0001A-M01	Controlled stop compressor	Sequential stop of compressor	7	
	2	PIT-RU0001A-01	Compressor Suction pressure high high	Unit trip	1.3	UCP	PISAH-RU0001A-01	RU0001A-P-01	Controlled stop of pumps	Sequential stop of oil pump	7	
	3	PIT-RU0001A-03	Compressor Discharge pressure high high	Unit trip	1	UCP	PISAH-RU0001A-03	LCY-RU0001A-01	Stop controlling Control valves	Initiating to standby position	6	
	2	PDI-RU0001A-01	Compressor Oil supply header diff. press. low low	Unit trip	1,3,4	UCP	PDISALL-RU0001A-01		Close compressor capacity control body	Initiating to standby position	2	7
	2	TIT-RU0001A-02	Oil header temperature High High	Unit trip	1	UCP	TISAHH-RU0001A-02		Cleaning unloader valves Refrigeration package	Initiating to standby position	6	
	4	PDI-RU0001A-03	Oil Filter differential pressure high high	Unit trip	1	UCP	PDISAHH-RU0001A-03		Return to home position command	Unloading slide valve before stop oil pumps	7	
10	3	TIT-RU0001A-03	Compressor Discharge temperature high high	Unit trip	1	UCP	TISAH-RU0001A-03		Head limiter of compressor capacity control	Force load command of compressor capacity control	7	
	2	XL-RU0001A-01	Compressor motor operation failure	Unit trip	1.7	MCC	XLHH-RU0001A-01		Unload limiter of compressor capacity control	Force unload compressor capacity control	7	
3.6	2	IR-RU0001A-01	Compressor motor high High Amperage	Unit trip	1	MCC	IRHH-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
1.3,9	2	XF-RU0001A-01	Compressor motor fault	Unit trip	10	MCC	XFHH-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
3.6	2	PTC-RU0001A-13	Compressor main motor winding U temp. high high	Unit trip	1	MCC	TSAHH-RU0001A-13		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
3.6	2	PTC-RU0001A-14	Compressor main motor winding V temp. high high	Unit trip	1	MCC	TSAHH-RU0001A-14		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
3.6	2	PTC-RU0001A-15	Compressor main motor winding W temp. high high	Unit trip	1	MCC	TSAHH-RU0001A-15		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	6	LIT-RU0001A-01	Chiller Liquid level high high	Unit trip	1	UCP	LISAHH-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	6	LIT-RU0001A-01	Chiller Liquid level low low	Unit trip	1.2	UCP	LISALH-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	2	PIT-RU0001A-01	Compressor Suction pressure high	Unit Alarm	1.6	UCP	PISAH-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	2	PIT-RU0001A-01	Compressor Suction pressure low	Unit Alarm	1.6	UCP	PISAL-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	3	PIT-RU0001A-03	Discharge pressure high	Unit Alarm	1	UCP	PISAH-RU0001A-03		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	3	PIT-RU0001A-03	Discharge pressure low	Unit Alarm	1	UCP	PISAL-RU0001A-03		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	2	PDI-RU0001A-01	Compressor Oil supply header diff. press. low	Unit Alarm	1.4	UCP	PDISALH-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	2	PDI-RU0001A-01	Compressor Oil supply header diff. press. High	Unit Alarm	1.4	UCP	PDISAHH-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	3	PDI-RU0001A-02	Oil separator section differential pressure high	Unit Alarm	1	UCP	PDISAH-RU0001A-02		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	4	PDI-RU0001A-03	Oil Filter differential pressure high	Unit Alarm	1	UCP	PDISAHH-RU0001A-03		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	3	TIT-RU0001A-03	Compressor Discharge temperature high	Unit Alarm	1	UCP	TISAH-RU0001A-03		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	2	TIT-RU0001A-02	Oil supply temperature high	Unit Alarm	1	UCP	TISAHH-RU0001A-02		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	2	TIT-RU0001A-02	Oil supply temperature low	Unit Alarm	1	UCP	TISALH-RU0001A-02		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	3	LS-RU0001A-01	Oil separator level low	Unit Alarm	1	UCP	LISAL-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	4	XL-RU0001A-03	Oil pump RU0001A-P-01 motor operation failure	Unit Alarm	1.7	MCC	XLH-RU0001A-03		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	4	XF-RU0001A-02	Oil pump RU0001A-P-01 motor fault	Unit Alarm	1.7	MCC	XFH-RU0001A-03		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	3	XL-RU0001A-02	Separator oil heater operation failure	Unit Alarm	1.7	MCC	XLH-RU0001A-02		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
2,3,9	3	XF-RU0001A-02	Separator oil heater fault	Unit Alarm	10	MCC	XFH-RU0001A-02		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	6	LIT-RU0001A-01	Chiller liquid level high	Unit Alarm	1	UCP	LISAH-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	6	LIT-RU0001A-01	Chiller liquid level low	Unit Alarm	1	UCP	LISAL-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
4,9	3	TS-RU0001A-01B	Separator oil heater over temp. limit switch	Interlock	1	UCP & FIELD	TSHH-RU0001A-01B		Alarm indication	Alarm indication on HMI (individual)	7	
	2	IR-RU0001A-01	Compressor High motor current hold limit	Interlock	1	MCC	IR-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	2	IR-RU0001A-01	Compressor High motor current unload limit	Interlock	1	MCC	IR-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	3	PI-RU0001A-03	High discharge pressure hold limit	Interlock	1	UCP	PI-RU0001A-03		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	3	PI-RU0001A-03	High discharge pressure unload limit	Interlock	1	UCP	PI-RU0001A-03		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	2	PI-RU0001A-01	Low suction pressure hold limit	Interlock	1	UCP	PI-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	2	PI-RU0001A-01	Low suction pressure unload limit	Interlock	1	UCP	PI-RU0001A-01		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	5	VS-RU0001A-01A	Condenser motor RU0001A-M-02 vibration high high	Interlock	1	UCP	VSHH-RU0001A-01A		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	5	VS-RU0001A-01B	Condenser motor RU0001A-M-03 vibration high high	Interlock	1	UCP	VSHH-RU0001A-01B		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	5	XL-RU0001A-04A	Condenser motor RU0001A-M-02 motor operation failure	Unit Alarm	1.7	MCC	XLH-RU0001A-04A		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	5	XF-RU0001A-04A	Condenser motor RU0001A-M-02 motor fault	Unit Alarm	10	MCC	XFH-RU0001A-04A		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	5	XL-RU0001A-04B	Condenser motor RU0001A-M-03 motor operation failure	Unit Alarm	1.7	MCC	XLH-RU0001A-04B		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	
	5	XF-RU0001A-04B	Condenser motor RU0001A-M-03 motor fault	Unit Alarm	10	MCC	XFH-RU0001A-04B		Alarm indication	Alarm indication on LCP (common) and HMI (individual)	7	

Document Title: CAUSE AND EFFECT DIAGRAM

NOTES:

- 1 Include any electrical faults detected by MCC. (e.g. over load, over current, low/high voltage, ground fault, open phase, reverse phase, etc.)
- 2 Include any electrical faults detected by MCC, and "Separator oil heater over temp. limit switch", status and "Separator oil heater box cut-out switch" status.
- 3 Activate by "fault signal" from MCC. Safety interlock to be created by MCC.
- 4 Activate "fault signal" to PLC. Alarm indication to be created commonly by "fault signal".
- 5 Local reset switch in the heater terminal box.
- 6 Cable directly connected to MCC from local equipment.
- 7 Caused by unit stop status and compressor stop status.
- 8 UCP: Unit control panel (PLC panel) / LCP: Local control panel / Local: Local equipment. MCC: Motor control centre / CCR: Central control room.
- 9 Source of trip must be cleared by reset , before possible reset on the HMI (UCP).
- 10 Only one compressor is able to operate at the same time. In case of indicated trip, stand-by compressor can be started
- 11 Main motor start permissive 3/2 cold/hot start-ups
- 12 This diagram is prepared for RU-0001A and is typical for RU-0001B with changing suffix of all tag numbers from "A" to "B". e.g. PG-RU0001B-01

Condition of activation:

- 1 Activate after delay timer has expired (if delay timer is applicable).
- 2 Activate when unit status is "in operation". ("In operation" = status from compressor started by start order until stop order has been received).
- 3 Activate when compressor motor running confirmation is activated.
- 4 Activate when oil pump motor running confirmation is activated.
- 5 Activate after 60 second from when unit status is "in operation".
- 6 Activate after 60 second from when compressor motor running confirmation is activated.
- 7 Activated by No running confirmation from MCC after start signal delivered, or Remaining running confirmation from MCC after stop signal delivered.
- 8 Activated by No running confirmation of oil pumps when compressor running.
- 9 Activated by both oil pump has motor fault and/or operation failure.
- 10 Activated by fault status signal from MCC.
- 11 Signal from Control room