THIS DOCUMENT HAVE BEEN BASED ON PCSE-500-ET-Y-106 REV A (DATED ON 17-SEP-2010)

0	ISSUE FOR CONSTRUCTION	17-oct-01	BIR /IMR	RR/IMR	FCC
C	ISSUE FOR APPROVAL (REVIEWED AS NOTED)	24-ago-11	SJB /IMR	RR/IMR	
B	ISSUE FOR APPROVAL	7-jun-11	BIR /IMR		
A	ORIGINAL ISSUE	5-abr-11	BIR /IMR	RR/IMR	FCC
REV.	DESCRIPTION	DATE	EXEC.	REV.	APPR.

OHL Industrial Chile

Ingeniería y Construcción

TECHINT Nº 3411-I-CA-2500501

pluspetrol Perú Corp. S.A.

INGENIERIA DE PROYECTO

TITLE:

CAUSE AND EFFECT MATRIX

TECHNICAL SPECIFICATION

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SCALE N/A

DOCUMENT Nr: PCSE-500-MC-K-506

Revision 0

REPLACE:

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0	ISSUE FOR CONSTRUCTION	17-oct-01	BIR /IMR	RR/IMR	FCC
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SCALE N/A

DOCUMENT Nr: PCSE-500-MC-K-506

Revision 0

REPLACE:

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2	NOTES TO SSS
3	SHUTDOWN LEVELS 3 & 4
4	SPHERE STORAGE & METERING
5	FRACTIONATION UNIT 1_Existing
6	FRACTIONATION UNIT 2_Existing
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8	TOPPING UNIT 1_Existing
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10	TOPPING UNIT 3_New
11	HOT OIL UNIT 1_Existing
12	HOT OIL UNIT 2_Existing
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14	MAP-15000 Naphtha_Existing
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20	REFRIG 3_KBA-22015_25 New
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22	PRECHILLING 1_KBA-19000_01 Exis
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25	VAPOR RECOVERY UNIT_Existing
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ABBREVIATIONS	
AL	Alarm
BMS	Burner Management System
BN	BENTLEY NEVADA
CCR	CENTRAL CONTROL ROOM
CURR	Current
D.P.	Differential pressure
DIFF	Differential
HI	High
HI HI	High high
HSC	Heat Sensitive Cable
LBV	Line Break Valve
LCS	Truck Loading Control System
LO	Low
LO LO	Low low
MCC	MOTOR CONTROL CENTER
NC	Normally close
NO	Normally open
PCS	PROCESS CONTROL SYSTEM
PLC	PROGRAMMABLE LOGIC CONTROLLER
PRESS	Pressure
S.D.	Shutdown
SDV	Shutdown valve
SSS	SAFETY SHUTDOWN SYSTEM
TEMP	Temperature
TGP	Transportadora de Gas del Perú
VIB	Vibration
A	Start equipment (In Spanish: **A**rrancar)
C	Close valve
D	De-energize solenoid or equipment
E	Energize solenoid or equipment
N	NO. Equimpent can't be used.
O	Open valve
S	Stop equipment
X	Miscellaneous
Y	YES. Equipment can be used.
VRU	VAPOR RECOVERY UNIT

REFERENCES

REFERENCES FROM EPC2-PISCO PLANT

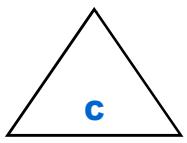
PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)
PCAM-520-PL-Y-8206 Revision 5 (HOWE-BAKER JOB #1915)

REFERENCES FROM BLOCK 56 - CAMISEA EXPANSION PROJECT

PPAG-500-ET-Y-606 Revision B (Techint - Basic Engineering)
PPAG-0520-MC-Y-560 Revision 2 (AESA-TECNA)
PPAG-0525-P2-K-527 Revision 1 (FLARGENT. AESA-TECNA)
PPAG-0610-P2-K-526 Revision 1 (FLARGENT. AESA-TECNA)
PPAG-500-ET-Y-607 Revision 2 (YORK)
PPAG-500-MC-K-104 FUNCTIONAL DESCRIPTION OF INTERLOCKS (CPF)
PPAG-500-MC-K-102 CONTROL NARRATIVE (CPF)

REFERENCES FROM PERU CAMISEA SECOND EXPANSION PROJECT

PPAG-500-MC-K-106 Revision 6 (BLOCK 56-CAMISEA EXPANSION PROJECT)



NOTES TO SSS

When an automatic valve located at suction of a pump is shutdown, the pump should be stopped first.

SHUTDOWN LEVELS

SHUTDOWN LEVEL 2

Shutdown Level 2 means shutdown of a process unit without blowing down the unit.

SHUTDOWN LEVEL 3

Shutdown Level 3 comprises the shutdown of all the plant, with exception of the Vapor Recovery Units and Refrigeration Area, and with exception of the foundation heaters, power generators and fuel gas.

SHUTDOWN LEVEL 4

Shutdown Level 4 comprises the shutdown of all the plant, including the Vapor Recovery Units and Refrigeration Area, but with exception of the foundation heaters, power generators and fuel gas

Shutdown of foundation heaters, power generators and fuel gas is done by its respectively HS (hand switch) in the Central Control Room.

MANUAL SHUTDOWN

Unless otherwise stated, electric equipment may be remotely shutdown by means of dedicated soft hand switches configured in the PCS and linked to the SSS interlocks.

Shutdown valves may also be remotely actuated through dedicated soft hand switches configured in the PCS and linked to the SSS interlocks.

GENERAL NOTES

The shutdown of valves that depends of stops of pumps must have a delay of 30 seconds.

In all cases when the stops of pumps occur for shutdown of valves, it must be done when the ZSO (switch position open) is deactivated.

If any valve receives order of open and close simultaneously must have priority the closure order.

All valves XV and SDV shall alarm if they do not reach the position ordered by PCS/SSS after certain time, or if they change their position without being ordered by PCS/SSS

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CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)
AND PPAG-500-MC-K-606 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT)
BLOCK 56 - CAMISEA EXPANSION PROJECT
SHUTDOWN LEVELS 3 & 4_Existing & New

No.	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low	1 PLANT SHUTDOWN LEVEL 3	2 PLANT SHUTDOWN LEVEL 4
		PLANT GENERAL SHUTDOWNS																	
1		PLANT SHUTDOWN LEVEL 3 (Shutdown Level 3 comprises the shutdown of all the plant, with exception of the Vapor Recovery Units and Refrigeration Area, and with exception of the foundation heaters, power generators and fuel gas).		Note 1															
2	ESD - 6801	Plant Shutdown Level 3 Manual HARD Push Button in EP-F North Side Area	680-416-1	Note 3								X						X	
3	ESD - 6802	Plant Shutdown Level 3 Manual HARD Push Button in EP-F South Side Area	680-416-1	Note 3								X						X	
4	ESD - 6803	Plant Shutdown Level 3 Manual HARD Push Button in MAU-6010 Area	680-416-1	Note 3								X						X	
5	ESD - 6804	Plant Shutdown Level 3 Manual HARD Push Button in Control Room Area	680-416-1	Note 3								X						X	
6	ESD - 6805	Plant Shutdown Level 3 Manual HARD Push Button in Control Room Door	680-416-1	Note 3								X						X	
7	ESD - 6806	Plant Shutdown Level 3 Manual HARD Push Button in VRU's 1 Area	680-416-1	Note 3								X						X	
8	ESD - 6819	Plant Shutdown Level 3 Manual HARD Push Button in Generator's Area	680-416-1	Note 3								X						X	
9	ESD - 6810	Plant Shutdown Level 3 Manual SOFT Push Button in Control Room (Control System)		Note 3								X						X	
10	ESD - 16801	Plant Shutdown Level 3 Manual HARD Push Button in PROPANE STORAGE TANK AREA	680-719	Note 3								X						X	
11	ESD - 16802	Plant Shutdown Level 3 Manual HARD Push Button in DIESEL STORAGE TANK AREA	680-719	Note 3								X						X	
12	ESD - 16803	Plant Shutdown Level 3 Manual HARD Push Button in NAPHTHA STORAGE TANK AREA	680-719	Note 3								X						X	
13	ESD - 16804	Plant Shutdown Level 3 Manual HARD Push Button in FRACTIONATION UNIT 2 NORTH SIDE	680-719	Note 3								X						X	
14	ESD - 16805	Plant Shutdown Level 3 Manual HARD Push Button in FRACTIONATION UNIT 2 AIR COOLERS AREA	680-719	Note 3								X						X	
15	ESD - 16806	Plant Shutdown Level 3 Manual HARD Push Button in VRUs 2 AREA	680-719	Note 3								X						X	
16	ESD - 26802	Plant Shutdown Level 3 Manual HARD Push Button in DIESEL STORAGE TANK AREA	680-797	Note 3								X						X	
17	ESD - 26804	Plant Shutdown Level 3 Manual HARD Push Button in FRACTIONATION UNIT 3 WEST SIDE	680-797	Note 3								X						X	
18	ESD - 26805	Plant Shutdown Level 3 Manual HARD Push Button in FRACTIONATION UNIT 3 COOLERS AREA	680-797	Note 3								X						X	
19	ESD - 26806	Plant Shutdown Level 3 Manual HARD Push Button in NEW PROPANE VRU AREA	680-797	Note 3								X						X	
20	LSHH - 3255	VBA-3255 Process Area Flare Scrubber	630-8045	Note 3	in			72						X				X	
21	LT - 3261	VBF-3260 LP Flare Scrubber	630-406	Note 3	in			23,6						X				X	
22	LSH - 6000	HP Flare Main Header Boot	630-407	Note 3	in				29,4						X			X	
23																			
24		PLANT SHUTDOWN LEVEL 4 (Shutdown Level 4 comprises the shutdown of all the plant, including the Vapor Recovery Units and Refrigeration Area, but with exception of the foundation heaters, power generators and fuel gas).		Note 2														X	
25	PSLL - 3276	Instrument Air Supply Header	650-412	Notes 3, 4	psig						70						X		X
26	ESD - 6919	Plant Shutdown Level 4 Manual HARD Push Button CCR		Notes 3, 4								X							X
27	ESD - 6918	Plant Shutdown Level 4 Manula SOFT Push Button in Control Room (Control System)		Notes 3, 4								X							X
28																			
29		EMERGENCY SHUTDOWN OF FOUNDATION HEATERS, POWER GENERATORS AND FUEL GAS																	
30	HS - 3007	Shutdown of TKBJ-3005 Foundation Heat System Shutdown push button in CCR	533-208	Note 6								X							
31	HS - 13007	Shutdown of TKBJ-13005 Foundation Heat System Shutdown push button in CCR	533-608	Note 6								X							
32	HS - 23007	Shutdown of TKBJ-23005 Foundation Heat System Shutdown push button in CCR	533-609	Note 6								X							
33	HS - 3012	Shutdown of TKBJ-3010 Foundation Heat System Shutdown push button in CCR	533-210	Note 6								X							
34	HS - 13012	Shutdown of TKBJ-13010 Foundation Heat System Shutdown push button in CCR	533-610	Note 6								X							
35	HS - 23012	Shutdown of TKBJ-23010 Foundation Heat System Shutdown push button in CCR	533-611	Note 6								X							
36	HS - 6105	Power Generator 1. MAN-6105 Emergency shutdown push button in CCR	620-417-1									X							
37	HS - 6110	Power Generator 2. MAN-6110 Emergency shutdown push button in CCR	620-417-2									X							
38	HS - 6115	Power Generator 3. MAN-6115 Emergency shutdown push button in CCR	620-417-3									X							
39	HS - 16105	Power Generator 4. MAN-16105 Emergency shutdown push button in CCR	620-717									X							
40	HS - 16110	Power Generator 5. MAN-16110 Emergency shutdown push button in CCR	620-718									X							
41	HS - 26105	Power Generator 6. MAN-26105 Emergency shutdown push button in CCR	620-777									X							
42	HS - 26110	Power Generator 7. MAN-26110 Emergency shutdown push button in CCR	620-778									X							
43	HS - 3103	Shutdown of High Pressure Fuel Gas Supply	615-403	Note 6								X							
44	HS - 3271	Shutdown of Low Pressure Fuel Gas Supply	615-404	Note 6								X							

No.	3 Alarm to Loading Control (LCS) SDA-6842	4 Shutdown to Berth SDA-6800	5 Alarm to Pipeline (TGP) SDA-6840	6 Alarm to Malvinas CCR SDA-6841	7 Surge Storage & Metering Shutdown Level 2	8 Fractionation Unit 1 Shutdown Level 2	9 Fractionation Unit 2 Shutdown Level 2	10 NEW Fractionation Unit 3 Shutdown Level 2	11 Topping Unit 1 Shutdown Level 2	12 Topping Unit 2 (includes MAP-15000) Shutdown Level 2	13 NEW Topping Unit 3 Shutdown Level 2	14 Pressurized Butane Storage Shutdown Level 2	15 Pressurized Propane Storage Shutdown Level 2	16 Refrigerated Butane Storage & Pumping Shutdown Level 2	17 Refrigerated Propane Storage & Pumping Shutdown Level 2	18 Exisiting Refrigeration Unit 1 Area. REFRIGERANT SIDE.	19 Existing Refrigeration Unit 2 Area (KBA-12015/25). REFRIGERANT	20 NEW Refrigeration Unit 3 Area (KBA-22015/25). REFRIGERANT SIDE.	21 Existing Prechilling Unit 1 Area (KBA-19000/01) REFRIGERANT SIDE.	22 New Prechilling Unit 2 Area (KBA-29000) REFRIGERANT SIDE.
1	X	X	X	X	D	D	D	D	D	D	D	D	D	D	D				X	X
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No.	23 EXISTING Vapor Recovery Area (Unit 1) Shutdown Level 2	24 Existing Propane VRU 2 Area (KBA-12000) Shutdown Level 2	25 New Propane VRU 3 Area (KBA-22000) Shutdown Level 2	26 523-613 Propane from VRUS to Prechilling and Refrigeration XY-13288 on XV-13288	27 534-214 Propane from VRUs to bullets XY-13292 on XV-13292	28 533-208 Propane from VRUs to Refrigerated Propane Storage Tanks XY-13007 on XV-13007	29 Existing Butane VRU 2 Area (KBA-12010) Shutdown Level 2	30 523-613 Butane from VRUS to Prechilling and Refrigeration XY-13289 on XV-13289	31 534-214 Butane from VRUs to bullets XY-13293 on XV-13293	32 533-210 Butane from VRUs to Refrigerated Propane Storage Tanks XY-13016 on XV-13016	33 TKBJ-3000 Condensate Storage & Pumping Shutdown Level 2	34 TKBJ-13000 Condensate Storage & Pumping Shutdown Level 2	35 TKBJ-23000 Condensate Storage & Pumping Shutdown Level 2	36 Naphtha Storage & Pumping Shutdown Level 2	37 Diesel Storage & Pumping Shutdown Level 2	38 EXISTING Hot Oil Unit 1 Shutdown Level 2	39 Existing Hot Oil Unit 2 Shutdown Level 2	40 NEW Hot Oil Unit 3 Shutdown Level 2	41 0520-502 CBA-13065 Depropanizer Blowdown Valve NOTE 7 SDY-13065	42 520-733 CBA-23065 Depropanizer Blowdown Valve NOTE 8 SDY-23065
1					D (CLOSE)	D (OPEN)			D (CLOSE)	D (OPEN)	D	D	D	D	D	D	D	D		
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23																				
24	X	X	X	D (CLOSE)			X	D (CLOSE)												
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No.	43 Shutdown Signal to LCS (Truck Loading Control System) ESD-6815	44 XZ-9002 Plant Horn	45 533-208 Foundation Heat System Control Panel TKBJ-3005 Foundation Heat System Shutdown	46 533-608 Foundation Heat System Control Panel TKBJ-13005 Foundation Heat System Shutdown	47 533-609 Foundation Heat System Control Panel TKBJ-23005 Foundation Heat System Shutdown	48 533-210 Foundation Heat System Control Panel TKBJ-3010 Foundation Heat System Shutdown	49 533-610 Foundation Heat System Control Panel TKBJ-13010 Foundation Heat System Shutdown	50 533-611 Foundation Heat System Control Panel TKBJ-23010 Foundation Heat System Shutdown	51 620-417-1 Gas engine generator MAN-6105	52 620-417-2 Gas engine generator MAN-6110	53 620-417-3 Gas engine generator MAN-6115	54 620-717 Gas engine generator MAN-16105	55 620-718 Gas engine generator MAN-16110	56 620-777 Gas engine generator MAN-26105	57 620-778 Gas engine generator MAN-26110	58 615-403 Natural Gas Feed to FG System Note 4 SDY-3103	59 615-404 Low Pressure Fuel Gas Header Note 5 SDY-3271	60 550-236-1 Propane Return Line XY-3013
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24		X	~~X~~ (Delete this interlock)			~~X~~ (Delete this interlock)												
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26																		
27																		
28																		
29																		
30			D															
31				D														
32					D													
33						D												
34							D											
35								D										
36									Stop									
37										Stop								
38											Stop							
39												Stop						
40													Stop					
41														Stop				
42															Stop			
43																D		
44																	D	

NOTES

Note 1 Shutdown Level 3 comprises the shutdown of all the plant, with exception of the Vapor Recovery Units and Refrigeration Area, and with exception of the foundation

Note 2 Shutdown Level 4 comprises the shutdown of all the plant, but with blowdown, including the Vapor Recovery Units and Refrigeration Area, and with exception of the

Note 3 Warn Operator that Fuel Gas to High Pressure Users (Generators) and Fuel Gas to Low Pressure Header is still energized when level 3 shutdown is activated.

Note 4 Warn operator that High Pressure Fuel Gas Supply can be Shutdown with HS-3103 if necessary.

Note 5 Warn operator that Low Pressure Fuel Gas Supply can be Shutdown with HS-3271 if necessary.

Note 6 SIGNAL FROM PCS THAT GOES TO THE SSS

NOTE 7 BDV-13065 can be opened only if EMERGENCY SHUTDOWN LEVEL 2 of Fractionating Unit # 2 was activated. This action shall be performed by operator only from PCS.

NOTE 8 BDV-23065 can be opened only if EMERGENCY SHUTDOWN LEVEL 2 of Fractionating Unit # 3 was activated. This action shall be performed by operator only from PCS.

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)
AND PPAG-500-MC-K-606 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT)
BLOCK 56 - CAMISEA EXPANSION PROJECT
SHUTDOWN LEVELS 3 & 4_Existing & New

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low	1 PLANT SHUTDOWN LEVEL 3	2 PLANT SHUTDOWN LEVEL 4
PLANT GENERAL SHUTDOWNS																			
1	PLANT SHUTDOWN LEVEL 3 (Shutdown Level 3 comprises the shutdown of all the plant, with exception of the Vapor Recovery Units and Refrigeration Area, and with exception of the foundation heaters, power generators and fuel gas).			Note 1															
2	ESD - 6801	Plant Shutdown Level 3 Manual HARD Push Button in EP-F North Side Area	680-416-1	Note 3								X						X	
3	ESD - 6802	Plant Shutdown Level 3 Manual HARD Push Button in EP-F South Side Area	680-416-1	Note 3								X						X	
4	ESD - 6803	Plant Shutdown Level 3 Manual HARD Push Button in MAU-6010 Area	680-416-1	Note 3								X						X	
5	ESD - 6804	Plant Shutdown Level 3 Manual HARD Push Button in Control Room Area	680-416-1	Note 3								X						X	
6	ESD - 6805	Plant Shutdown Level 3 Manual HARD Push Button in Control Room Door	680-416-1	Note 3								X						X	
7	ESD - 6806	Plant Shutdown Level 3 Manual HARD Push Button in VRU's 1 Area	680-416-1	Note 3								X						X	
8	ESD - 6819	Plant Shutdown Level 3 Manual HARD Push Button in Generator's Area	680-416-1	Note 3								X						X	
9	ESD - 6810	Plant Shutdown Level 3 Manual SOFT Push Button in Control Room (Control System)		Note 3								X						X	
10	ESD - 16801	Plant Shutdown Level 3 Manual HARD Push Button in PROPANE STORAGE TANK AREA	680-719	Note 3								X						X	
11	ESD - 16802	Plant Shutdown Level 3 Manual HARD Push Button in DIESEL STORAGE TANK AREA	680-719	Note 3								X						X	
12	ESD - 16803	Plant Shutdown Level 3 Manual HARD Push Button in NAPHTHA STORAGE TANK AREA	680-719	Note 3								X						X	
13	ESD - 16804	Plant Shutdown Level 3 Manual HARD Push Button in FRACTIONATION UNIT 2 NORTH SIDE	680-719	Note 3								X						X	
14	ESD - 16805	Plant Shutdown Level 3 Manual HARD Push Button in FRACTIONATION UNIT 2 AIR COOLERS AREA	680-719	Note 3								X						X	
15	ESD - 16806	Plant Shutdown Level 3 Manual HARD Push Button in VRUs 2 AREA	680-719	Note 3								X						X	
16	ESD - 26802	Plant Shutdown Level 3 Manual HARD Push Button in DIESEL STORAGE TANK AREA	680-797	Note 3														X	
17	ESD - 26804	Plant Shutdown Level 3 Manual HARD Push Button in FRACTIONATION UNIT 3 WEST SIDE	680-797	Note 3														X	
18	ESD - 26805	Plant Shutdown Level 3 Manual HARD Push Button in FRACTIONATION UNIT 3 COOLERS AREA	680-797	Note 3														X	
19	ESD - 26806	Plant Shutdown Level 3 Manual HARD Push Button in NEW PROPANE VRU AREA	680-797	Note 3														X	
20	LSHH - 3255	VBA-3255 Process Area Flare Scrubber	630-8045	Note 3	in			72						X				X	
21	LT - 3261	VBF-3260 LP Flare Scrubber	630-406	Note 3	in			23,6						X				X	
22	LSH - 6000	HP Flare Main Header Boot	630-407	Note 3	in				29,4						X			X	
23																			
24	PLANT SHUTDOWN LEVEL 4 (Shutdown Level 4 comprises the shutdown of all the plant, including the Vapor Recovery Units and Refrigeration Area, but with exception of the foundation heaters, power generators and fuel gas).			Note 2														**X**	
25	PSLL - 3276	Instrument Air Supply Header	650-412	Notes 3, 4	psig						70						X		X
26	ESD - 6919	Plant Shutdown Level 4 Manual HARD Push Button CCR		Notes 3, 4								X							X
27	ESD - 6918	Plant Shutdown Level 4 Manula SOFT Push Button in Control Room (Control System)		Notes 3, 4								X							X
28																			
29	EMERGENCY SHUTDOWN OF FOUNDATION HEATERS, POWER GENERATORS AND FUEL GAS																		
30	HS - 3007	Shutdown of TKBJ-3005 Foundation Heat System Shutdown push button in CCR	533-208	Note 6								X							
31	HS - 13007	Shutdown of TKBJ-13005 Foundation Heat System Shutdown push button in CCR	533-608	Note 6								X							
32	HS - 23007	Shutdown of TKBJ-23005 Foundation Heat System Shutdown push button in CCR	533-609	Note 6								X							
33	HS - 3012	Shutdown of TKBJ-3010 Foundation Heat System Shutdown push button in CCR	533-210	Note 6								X							
34	HS - 13012	Shutdown of TKBJ-13010 Foundation Heat System Shutdown push button in CCR	533-610	Note 6								X							
35	HS - 23012	Shutdown of TKBJ-23010 Foundation Heat System Shutdown push button in CCR	533-611	Note 6								X							
36	HS - 6105	Power Generator 1. MAN-6105 Emergency shutdown push button in CCR	620-417-1									X							
37	HS - 6110	Power Generator 2. MAN-6110 Emergency shutdown push button in CCR	620-417-2									X							
38	HS - 6115	Power Generator 3. MAN-6115 Emergency shutdown push button in CCR	620-417-3									X							
39	HS - 16105	Power Generator 4. MAN-16105 Emergency shutdown push button in CCR	620-717									X							
40	HS - 16110	Power Generator 5. MAN-16110 Emergency shutdown push button in CCR	620-718									X							
41	HS - 26105	Power Generator 6. MAN-26105 Emergency shutdown push button in CCR	620-777									X							
42	HS - 26110	Power Generator 7. MAN-26110 Emergency shutdown push button in CCR	620-778									X							
43	HS - 3103	Shutdown of High Pressure Fuel Gas Supply	615-403	Note 6								X							
44	HS - 3271	Shutdown of Low Pressure Fuel Gas Supply	615-404	Note 6								X							

	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
P&ID	550-236-1	550-236-1	550-236-1	550-236-1	550-236-3	550-236-3	665-410-1	665-710	665-782	665-410-3	665-410-3	665-410-3	665-410-3	665-410-3	665-410-3	665-410-3	665-410-5	680-413	680-413
Service	Propane Ship Loading Line	Propane Return Line	Butane Ship Loading Line	Butane Return Line	Diesel/MDBS Ship Loading Line	Naphtha Ship Loading Line	Close Drain Pump	Close Drain Pump	Close Drain Pump	PBB-6120 Retention Pond Pump	PBB-6125 Retention Pond Pump	PBB-6170 / 6175 / 6180 Local Control Panel	PBB-1210 Skimmer Oil Pump	PBB-1215 Skimmer Oil Pump	PBB-26130 Water Pump	PBB-26135 Water Pump	Non Pressurized Drain Pump	Potable Water System	Water Well #1 Pump
Tag	XY-3006	XY-3004	XY-3011	XY-3016	XY-21410	XY-21155	Motor PBB-1250	Motor PBB-11250	Motor PBB-21250	SV-6120	SV-6125	UCS-6170	SV-1210	SV-1215	SV-26130	SV-26135	Motor PBB-1485	MZZ-6160 UCS-6160	Motor PBE-1575
1	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	Stop	**Stop**	Stop	D	D	Stop	D	D	D	D	Stop	Stop	Stop
24																			

	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98
P&ID	680-413	680-413	680-413	680-413	680-413	680-414	630-8045	630-8045	620-419	533-208	533-208	533-608	533-608	533-609	533-609	533-210	533-610	533-611	
Service	Water Well #2 Pump	Water Well #3 Pump	Water Well #4 Pump	Water Well #5 Pump	Water Well #6 Pump	Sewage Treatment Package	PBB-1200 Process Area Scrubber Pump	PBB-1205 Process Area Scrubber Pump	TKBJ-3045 Utility Diesel Storage Tank Inlet	TKBJ-3005 Propane Storage Tank Inlet	TKBJ-3005 Propane Storage Tank Inlet	TKBJ-13005 Propane Storage Tank Inlet	TKBJ-13005 Propane Storage Tank Inlet	TKBJ-23005 Propane Storage Tank Inlet	TKBJ-23005 Propane Storage Tank Inlet	TKBJ-3010 Butane Storage Tank Inlet	TKBJ-13010 Butane Storage Tank Inlet	TKBJ-23010 Butane Storage Tank Inlet	Refrigeration Area Lube Oil Drain Pump
Tag	Motor PBE-1580	Motor PBE-1585	Motor PBE-1590	Motor PBE-1595	Motor PBE-1600	Sewage Treatment Package Control Panel UCS-6101	Motor PBB-1200	Motor PBB-1205	SV-3045 on HV-3045	XY-13008 on XV-13008	XY-23028 on XV-23028	XY-13004 on XV-13004	XY-23024 on XV-23024	XY-23006 on XV-23006	XY-23026 on XV-23026	XY-13014 on XV-13014	XY-13011 on XV-13011	XY-23011 on XV-23011	MOTOR PBB-11495
1	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	D										STOP
24										D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	

NOTES
Note 1 Shutdown Level 3 comprises the shutdown of all the plant, with exception of the Vapor Recovery Units and Refrigeration Area, and with exception of the foundation
Note 2 Shutdown Level 4 comprises the shutdown of all the plant, but with blowdown, including the Vapor Recovery Units and Refrigeration Area, and with exception of the
Note 3 Warn Operator that Fuel Gas to High Pressure Users (Generators) and Fuel Gas to Low Pressure Header is still energized when level 3 shutdown is activated.
Note 4 Warn operator that High Pressure Fuel Gas Supply can be Shutdown with HS-3103 if necessary.
Note 5 Warn operator that Low Pressure Fuel Gas Supply can be Shutdown with HS-3271 if necessary.
Note 6 SIGNAL FROM PCS THAT GOES TO THE SSS
NOTE 7 BDV-13065 can be opened only if EMERGENCY SHUTDOWN LEVEL 2 of Fractionating Unit # 2 was activated. This action shall be performed by operator only from PCS.
NOTE 8 BDV-23065 can be opened only if EMERGENCY SHUTDOWN LEVEL 2 of Fractionating Unit # 3 was activated. This action shall be performed by operator only from PCS.

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT) and
PPAG-500-MC-K-106 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT) SPHERE STORAGE & METERING EXISTING AND NEW

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
SURGE STORAGE & METERING																	
1	**SURGE STORAGE & METERING SHUTDOWN LEVEL 2**			12													
2	ESD - 13105	Spheres Storage Shutdown Manual SOFT Push Button in CCR		12								X					
3	ESD - 6814	Shutdown Signal from TGP				X						X					
4	PSHH - 3106A	Plant Inlet	505-202	5	psig			150						X			
5	~~PSHH - 3106B~~	~~Plant Inlet (EXISTING SWITCH TO BE DISMANTLED)~~	~~505-202~~	~~1~~	~~psig~~			~~150~~						~~X~~			
6	PSHH - 13107	Plant Inlet (PNEUMATIC SWITCH)	505-202	1	psig			150									
7	ZIC - 3106	SDV-3106 Plant Inlet	505-202	6		X						X					
8	~~ZIC - 3105~~	~~VBA-3105 Outlet is CLOSE~~	~~510-203~~	~~2~~								~~X~~					
9	ZIO - 3105	VBA-3105 Outlet is OPEN	510-203	3								X					
10	ZIO - 13109	VBA-3105 Recirculation is OPEN	510-203									X					
11	ZIO - 13105	VBA-13105 Outlet is OPEN	510-603	3								X					
12	ZIO - 13107	VBA-13105 Recirculation is OPEN	510-603									X					
13	ZIO - 23105	VBA-23105 Outlet is OPEN	510-604	3								X					
14	ZIO - 23107	VBA-23105 Recirculation is OPEN	510-604									X					
15	ZIO - 13106	VBA-13105 INLET is OPEN	510-603	3								X					
16	ZIO - 13108	VBA-3105 INLET is OPEN	510-203									X					
17	ZIO - 23106	VBA-23105 INLET is OPEN	510-604									X					
18	LSHH - 3105	VBA-3105 Feed Surge Vessel	510-203	7, 16	in			712						X			
19	LAHH - 3105B	VBA-3105 Feed Surge Vessel	510-203	7, 16	in			712						X			
20	LAH - 3105B	VBA-3105 Feed Surge Vessel	510-203		in				612								
21	LAL - 3105B	VBA-3105 Feed Surge Vessel	510-203		in					16							
22	LALL - 3105B	VBA-3105 Feed Surge Vessel	510-203	~~9~~	in						8						X
23	~~SSC - 3105~~	~~LAHH-3105 + LAH-3105B~~	~~510-203~~	~~3~~								~~X~~					
24	LSHH - 13105	VBA-13105 Feed Surge Vessel	510-603	8, 16	in			712						X			
25	LAHH - 13110	VBA-13105 Feed Surge Vessel	510-603	8, 16	in			712						X			
26	LAH - 13110	VBA-13105 Feed Surge Vessel	510-603		in				612								
27	LAL - 13110	VBA-13105 Feed Surge Vessel	510-603		in					16							
28	LALL - 13110	VBA-13105 Feed Surge Vessel	510-603	~~10~~	in						8						X
29	LSHH - 23105	VBA-23105 Feed Surge Vessel	510-604	15, **16**	in			712						X			
30	LAHH - 23110	VBA-23105 Feed Surge Vessel	510-604	15, **16**	in			712						X			X
31	LAH - 23110	VBA-23105 Feed Surge Vessel	510-604		in				612								
32	LAL - 23110	VBA-23105 Feed Surge Vessel	510-604		in					16							
33	LALL - 23110	VBA-23105 Feed Surge Vessel	510-604	~~14~~	in						8						X

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		505-202	505-202	510-203	510-603	510-604	510-203	510-603	510-604	510-203	510-603	510-604	510-203	510-203	510-603
		Pipeline Feed to Fractionation Facility	Shutdown signal to TGP Pipeline	VBA-3105 Inlet	VBA-13105 Inlet	VBA-23105 Inlet	VBA-3105 Outlet	VBA-13105 Outlet	VBA-23105 Outlet	VBA-3105 Recirculation	VBA-13105 Recirculation	VBA-23105 Recirculation	PBB-1000 Depropanizer Feed Pump	PBB-1005 Depropanizer Feed Pump	PBB-11000 Depropanizer Feed Pump
				7, 8,14	7, 8	7,8							3,11	3,11	3,11
SURGE STORAGE & METERING SHUTDOWN LEVEL 2		SDY-3106 on SDV-3106	SDA-6840	XY-13108 on XV-13108	XY-13106 on XV-13106	XY-23106 on XV-23106	XY-3105 on XV-3105	XY-13105 on XV-13105	XY-23105 on XV-23105	XY-13109 on XV-13109	XY-13107 on XV-13107	XY-23107 on XV-23107	Motor Pump PBB-1000	Motor Pump PBB-1005	Motor Pump PBB-11000
SURGE STORAGE & METERING															
1															
2	X	D	X	E (CLOSE)	E (CLOSE)	E (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	E (CLOSE)	E (CLOSE)	E (CLOSE)	S	S	S
3		D													
4		D	X												
5		~~D~~	~~X~~												
6		D													
7			X												
8													~~S~~	~~S~~	~~S~~
9													Permissive to start pumps (NOTE 3)		
10															
11															
12															
13															
14															
15															
16															
17															
18				E (Close)	D (Open) according to selected sequence (note 16)	D (Open) according to selected sequence (note 16)					D (Open) according to selected sequence (note 16)	D (Open) according to selected sequence (note 16)			
19										E (Close)					
20															
21															
22							D (CLOSE)							STOP PUMPS IF XV-3105 IS OPEN (Note 9)	
23		~~D~~	~~X~~												
24				D (Open) according to selected sequence (note 16)	E (Close)	D (Open) according to selected sequence (note 16)				D (Open) according to selected sequence (note 16)	E (Close)	D (Open) according to selected sequence (note 16)			
25															
26															
27															
28								D (CLOSE)						STOP PUMPS IF XV-13105 IS OPEN (Note 10)	
29				D (Open) according to selected sequence (note 16)	D (Open) according to selected sequence (note 16)	E (Close)				D (Open) according to selected sequence (note 16)	D (Open) according to selected sequence (note 16)	E (Close)			
30															
31															
32															
33									D (CLOSE)					STOP PUMPS IF XV-23105 IS OPEN (Note 14)	

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT) and
PPAG-500-MC-K-106 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT) SPHERE STORAGE & METERING EXISTING AND NEW

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
34	LALL - 3105B	VBA-3105 Feed Surge Vessel	510-203	17	in						8						X (2oo3) (Note 17)
35	LALL - 13110	VBA-13105 Feed Surge Vessel	510-603		in						8						
36	LALL - 23110	VBA-23105 Feed Surge Vessel	510-604		in						8						
37	PSHH - 1000	PBB-1000 Depropanizer Feed Pump Seal Pot	510-203		psig			12									
38	LSLL - 1000	PBB-1000 Depropanizer Feed Pump Seal Pot	510-203								X						
39	~~XY - 1000~~	~~PBB-1000 Depropanizer Feed Pump Seal Pot~~	~~510-203~~	4								~~X~~					
40	PSHH - 1005	PBB-1005 Depropanizer Feed Pump Seal Pot	510-203		psig			12									
41	LSLL - 1005	PBB-1005 Depropanizer Feed Pump Seal Pot	510-203								X						
42	~~XY - 1005~~	~~PBB-1005 Depropanizer Feed Pump Seal Pot~~	~~510-203~~	4								~~X~~					
43	PSHH - 11000	PBB-11000 Depropanizer Feed Pump Seal Pot	510-603		psig			12									
44	LSLL - 11000	PBB-11000 Depropanizer Feed Pump Seal Pot	510-603								X						
45	AHH - 6806	Gas Detector in PBB-1000/1005 Area	680-416-1		%									40			
46	AHH - 16821	PBB-11000 DEPROPANIZER FEED PUMP	680-719		%									40			
47	SSC -	PBB-1000/1005/11000 Depropanizer Feed Pumps Seal Pot (PSHH-1000 OR PSHH-1005 OR PSHH-11000) AND (AHH-6806 OR AHH-16821)	510-603	13								X					
48	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																
49	HS - 3106	Pipeline Feed to Fractionation Facility	505-202														
50	HS - 13108	VBA-3105 Inlet	510-203														
51	HS - 13106	VBA-13105 Inlet	510-603														
52	HS - 23106	VBA-23105 Inlet	510-604														
53	HS - 3105	VBA-3105 Outlet	510-203														
54	HS - 13105	VBA-13105 Outlet	510-603														
55	HS - 23105	VBA-23105 Outlet	510-604														
56	HS - 13109	VBA-3105 Recirculation	510-203														
57	HS - 13107	VBA-13105 Recirculation	510-603														
58	HS - 23107	VBA-23105 Recirculation	510-604														

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		505-202	505-202	510-203	510-603	510-604	510-203	510-603	510-604	510-203	510-603	510-604	510-203	510-203	510-603
		Pipeline Feed to Fractionation Facility	Shutdown signal to TGP Pipeline	VBA-3105 Inlet	VBA-13105 Inlet	VBA-23105 Inlet	VBA-3105 Outlet	VBA-13105 Outlet	VBA-23105 Outlet	VBA-3105 Recirculation	VBA-13105 Recirculation	VBA-23105 Recirculation	PBB-1000 Depropanizer Feed Pump	PBB-1005 Depropanizer Feed Pump	PBB-11000 Depropanizer Feed Pump
				7, 8,14	7, 8	7,8							3,11	3,11	3,11
	SURGE STORAGE & METERING SHUTDOWN LEVEL 2	SDY-3106 on SDV-3106	SDA-6840	XY-13108 on XV-13108	XY-13106 on XV-13106	XY-23106 on XV-23106	XY-3105 on XV-3105	XY-13105 on XV-13105	XY-23105 on XV-23105	XY-13109 on XV-13109	XY-13107 on XV-13107	XY-23107 on XV-23107	Motor Pump PBB-1000	Motor Pump PBB-1005	Motor Pump PBB-11000
34							D (CLOSE)	D (CLOSE)	D (CLOSE)				STOP PUMPS		
35															
36															
37									~~D~~						
38															
39							~~D~~						~~S~~	~~S~~	
40									~~D~~						
41															
42							~~D~~						~~S~~	~~S~~	
43															
44															
45									~~D~~						
46									~~D~~						
47							D	D	D				S	S	S
48															
49		C/O													
50				C/O											
51					C/O										
52						C/O									
53							C/O								
54								C/O							
55									C/O						
56										C/O					
57											C/O				
58												C/O			

NOTES

Note 1 This switch is pneumatic.There is no signal to the SSS nor to the PCS

~~Note 2 If XV-3105 and XV-13105 are close then pumps PBB-1000/1005/11000 cannot be started.~~

Note 3 PROVIDE INTERLOCK SO THAT PUMPS PBB-1000/1005/11000 CAN ONLY STARTS IF AT LEAST ONE OF THE FOLLOWING SETS OF THREE VALVES IS OPEN: (XV-3105 OR XV-13105 OR XV-23105) AND (XV-13108 OR XV-13106 OR XV-23106) AND (XV-13109 OR XV-13107 OR XV-23107). IF THE PUMP ARE RUNNING AND NONE OF THESE SETS OF THREE VALVES IS OPEN, THEN THE PUMPS MUST BE STOPPED.

~~Note 4 Both LSLL and PSHH must be in alarm condition to activate SD.~~

Note 5 PAHH shall be sent to TGP Pipeline.

Note 6 ZIC-3106 shall be sent to TGP Pipeline. If ZIC-3106 is activated XVs upstream cannot be opened.

Note 7 UPON ACTIVATION OF LAHH-3105 OR LAHH-3105 B, FIRST OPEN (XV-13106 AND XV-13107) OR (XV-23106 AND XV-23107) AND 15 SECONDS AFTER LAHH ACTIVATION CLOSE XV-13108 AND XV-13109.

Note 8 UPON ACTIVATION OF LAHH-13105 OR LAHH-13110,0 FIRST OPEN(XV-13108 AND XV-13109) OR (XV-23106 AND XV-23107), AND 15 SECONDS AFTER LAHH ACTIVATION CLOSE XV-13106 AND XV-13107.

~~Note 9 IF XV-3105 IS OPEN (MEANING THAT VBA-3105 IS BEING UNLOADED) AND LALL-3105B IS ACTIVATED, THEN STOP PBB-1000/1005/11000.~~

~~Note 10 IF XV-13105 IS OPEN (MEANING THAT VBA-13105 IS BEING UNLOADED) AND LALL-13110 IS ACTIVATED, THEN STOP PBB-1000/1005/11000.~~

Note 11 Provide interlock in the PCS with the following logic and controls:
A) One pump operating: if one pump is running and flow through FE-1005 is lower than the minimum thermal flow, 520 USGPM (FALL=520 USGPM), during 30 seconds, then stop the pump.
B) Two pumps operating: if two pumps are running and flow through FE-1005 is lower than the minimum thermal flow for two pumps, 1040 USGPM (FALL: 1040 USGPM), during 30 seconds, then one pump must be stopped with the following condition: Verify if PBB-1000 is running, and if this pump is running, then stop this pump, if not must be stopped the PBB-1005.
The timer must be restarted when one pump stops and begins to count again when the alarm (FALL=1040 USGPM) is activated with at least two pumps running.
C) Two pumps operating: if two pumps are running and flow through FE-1005 is lower than 1700 USPG (FAL=1700 USGPM) during 1 hour, then one pump must be stopped with the following condition: Verify if PBB-1000 is running, and if this pump is running, then stop this pump, if not must be stopped the PBB-1005.
The timer must be restarted when one pump stops and begins to count again when the alarm (FAL=1700 USGPM) is activated with at least two pumps running.
If the third pump is started, provide 2 minutes delay of low and low-low flow alarms to allow change of operating pumps.
FIC-1005 set point must be changed automatically according to the number of pumps in service.

Note 12 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST SHUTDOWN THE PUMP OR PUMPS, 2ND CLOSE THE SHUTDOWN VALVE.

Note 13 IF (PSHH-1000 OR PSHH-1005 OR PSHH-11000) AND (AHH-6806 OR AHH-16821) ARE ACTIVE THEN STOP PBB-1000, PBB-1005 AND PBB-11000,

~~Note 14 IF XV-23105 IS OPENED (MEANING THAT VBA-23105 IS BEING UNLOADED) AND LALL-23110 IS ACTIVATED, THEN STOP PBB-1000/1005/11000.~~

Note 15 UPON ACTIVATIION OF LAHH-23105 OR LAHH-23110.FIRST OPEN (XV-13108 AND XV-13109) OR (XV-13106 AND XV-13107), AND THEN 15 SECOND AFTER LAHH ACTIVATION XV-23106 AND XV-23107 CLOSE.

Note 16 PROVIDE A SELECTOR SWITCH FOR THE OPERATOR TO CHOOSE WHAT SPHERE IS THE NEXT TO BE LOADED. ALARM THE OPERATOR TO CHOOSE THE NEXT SPHERE TO BE LOADED. WHEN THE FILLING SPHERE IS EQUAL TO THE SELECTED NEXT SPHERE, AN ALARM MUST BE ACTIVATED TO ADVICE THE OPERATOR TO CHOOSE A DIFERENT NEXT SPHERE. IN CASE OF ACTIVATION OF THE LAHH OF THE FILLING SPHERE, OPEN THE INLET VALVES AND THE PUMP RETURN VALVE OF THE NEXT SPHERE (PREVIOUSLY SELECTED BY OPERATOR), AND 15 SECONDS AFTER LAHH ACTIVATION CLOSE THE INLET VALVES AND THE PUMP RETURN VALVE OF THE FILLING SPHERE.

~~Note 17 IF only 2 spheres are being unloaded the logic 2oo3 changes to 1oo2.~~

CAUSE AND EFFECT MATRIX (EXISTING)

PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (based on PCAM-520-PL-Y-8206 Revision 5) (EPC2-PISCO PLANT)
FRACTIONATION UNIT 1_Existing

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
1																	

REFERENCE: PPAG-0520-MC-Y-560 Revision 2 (AESA-TECNA)

BLOCK 56 - CAMISEA EXPANSION PROJECT
PISCO PLANT
CAUSE AND EFFECT MATRIX
Reference: PPAG-500-MC-K-106 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT)
FRACTIONATION UNIT 2 (Existing)
For set points and alarm values, see PPAG-0520-LI-K-505.

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS						INTERLOCKS					
						ON	OFF	High High	High	Low	Low Low	ON	OFF	High High	High	Low	Low Low
1		**FRACTIONATION UNIT 2 SHUTDOWN LEVEL 2**		11													
2	ESD - 16809	Fractionation Unit Shutdown Manual SOFT Push Bottom in CCR				X						X					
3	HS - 13065	Depresurization of Depropanizer CBA-13065 Manual SOFT Push Bottom in CCR	0520-502	1								X					
4	VSHH - 14520 A	EAL-14520 Debutanizer Bottoms Cooler Fan A	0520-501					X						X			
5	VSHH - 14520 B	EAL-14520 Debutanizer Bottoms Cooler Fan B	0520-501					X						X			
6	TAHH - 14520 A	EAL-14520 Debutanizer Bottoms Cooler Outlet	0520-501		°F			135						X			
7	PSHH - 11001	PBB-11001 Debutanizer Bottoms Rerun Pump (seal) (Unit 2)	0520-501		psig			26						X			
8	LSLL - 11002	PBB-11001 Debutanizer Bottoms Rerun Pump (seal) (Unit 2)	0520-501		in						16						
9																	
10	PSLL - 11001 A	PBB-11001 Suction Pressure	0520-501		psig						5						X
11	ZSO - 11001	PBB-11001 Suction Valve	0520-501	2			X						X				
12	VSHH - 14500 A	EAL-14500A Depropanizer Condenser Fan A	0520-502					X						X			
13	VSHH 14500 B	EAL-14500A Depropanizer Condenser Fan B	0520-502					X						X			
14	VSHH - 14500 C	EAL-14500B Depropanizer Condenser Fan C	0520-502					X						X			
15	VSHH - 14500 D	EAL-14500B Depropanizer Condenser Fan D	0520-502					X						X			
16	VSHH - 14500 E	EAL-14500C Depropanizer Condenser Fan E	0520-502					X						X			
17	VSHH - 14500 F	EAL-14500C Depropanizer Condenser Fan F	0520-502					X						X			
18	VSHH - 14500 G	EAL-14500D Depropanizer Condenser Fan G	0520-502					X						X			
19	VSHH - 14500 H	EAL-14500D Depropanizer Condenser Fan H	0520-502					X						X			
20	LAHH - 14003	EBC-14000 Depropanizer Reboiler	0520-502		in			70									
21	LALL - 14003	EBC-14000 Depropanizer Reboiler	0520-502		in						8						X
22	LAHH - 13130 A	VBA-13130 Depropanizer Reflux Accumulator	0520-503		in			78									
23	LALL - 13130 A	VBA-13130 Depropanizer Reflux Accumulator	0520-503		in						10						X
25	LSLL - 11010	PBB-11010 Depropanizer Reflux Pump (seal)	0520-503		in						16						
24	PSHH - 11010	PBB-11010 Depropanizer Reflux Pump (seal)	0520-503	8	psig			26									
	AHH - 16806	PBB-11010/15 DEPROPANIZER REFLUX PUMPS	0680-719	8	%									40			
26	XY - 11010	PBB-11010 Depropanizer Reflux Pump (seal)	0520-503	5, 8,9								X					
27	PSLL - 11010 A	PBB-11010 Suction Pressure	0520-503		psig						240						X
29	LSLL - 11015	PBB-11015 Depropanizer Reflux Pump (seal)	0520-503		in						16						
28	PSHH - 11015	PBB-11015 Depropanizer Reflux Pump (seal)	0520-503	8	psig			26									
	AHH - 16806	PBB-11010/15 DEPROPANIZER REFLUX PUMPS	0680-719	8	%									40			
30	XY - 11015	PBB-11015 Depropanizer Reflux Pump (seal)	0520-503	5, 8,9								X					
31	PSLL - 11015 A	PBB-11015 Suction Pressure	0520-503		psig						240						X
32	ZSO - 11015	PBB-11010 /11015 Suction Valve	0520-503	3			X						X				
33	VSHH - 14510 A	EAL-14510A Debutanizer Condenser Fan A	0520-504					X						X			
34	VSHH - 14510 B	EAL-14510A Debutanizer Condenser Fan B	0520-504					X						X			
35	VSHH 14510 C	EAL-14510B Debutanizer Condenser Fan C	0520-504					X						X			
36	VSHH - 14510 D	EAL-14510B Debutanizer Condenser Fan D	0520-504					X						X			
37	VSHH - 14510 E	EAL-14510C Debutanizer Condenser Fan E	0520-504					X						X			
38	VSHH - 14510 F	EAL-14510C Debutanizer Condenser Fan F	0520-504					X						X			
39	VSHH - 14510 G	EAL-14510D Debutanizer Condenser Fan H	0520-504					X						X			
40	VSHH - 14510 H	EAL-14510D Debutanizer Condenser Fan G	0520-504					X						X			
41	LAHH - 14015	EBC-14015 Debutanizer Reboiler	0520-504		in			39									
42	LALL - 14015A	EBC-14015 Debutanizer Reboiler (Low-low alarm to be configured in the PCS on LIC-14015A)	0520-504	5	in						6 (in PCS)						X (signal from PCS to SSS)
43	LALL - 14015	EBC-14015 Debutanizer Reboiler	0520-504	5	in						6						X
44	LAHH - 13135 A	VBA-13135 Debutanizer Reflux Accumulator	0520-505		in			55									
45	LALL - 13135 A	VBA-13135 Debutanizer Reflux Accumulator	0520-505		in						8						X
46	LSLL - 11020 A	PBB-11020 Debutanizer Reflux Pump (seal)	0520-505		in						16						
47	PSHH - 11020	PBB-11020 Debutanizer Reflux Pump (seal)	0520-505	8	psig			26									
	AHH - 16807	PBB-11020/25 DEBUTANIZER REFLUX PUMPS	0680-719	8	%									40			
48	XY - 11020	PBB-11020 Debutanizer Reflux Pump (seal)	0520-505	5, 8, 10								X					
49	PSLL - 11020 A	PBB-11020 Suction Pressure	0520-505		psig						71						X
51	LSLL - 11025 A	PBB-11025 Debutanizer Reflux Pump (seal)	0520-505		in						16						
50	PSHH - 11025	PBB-11025 Debutanizer Reflux Pump (seal)	0520-505	8	psig			26									
	AHH - 16807	PBB-11020/25 DEBUTANIZER REFLUX PUMPS	0680-719	8	%									40			
52	XY - 11025	PBB-1025 Debutanizer Reflux Pump (seal)	0520-505	5, 8, 10								X					
53	PSLL - 11025 A	PBB-11025 Suction Pressure	0520-505		psig						71						X
54	ZSO - 11025	PBB-11020 / 11025 Suction Valve	0520-505	4			X						X				
55	ZSO - 13279	Rerun (OFF-SPEC) (Unit 2) of Propane Product to Feed Surge Vessel	520-605	6		X											
56	ZSO - 13278	Rerun (OFF-SPEC) (Unit 2) of Butane Product to Feed Surge Vessel	520-605	7		X											
57	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																
58	HS - 11008	Inlet to Fractionation Unit 2	520-605														
59	HS - 11001	Debutanizer Bottoms to Feed Surge Tank and/or Condensate Tank	0520-501														
60	HS - 14000	EBC-14000 Depropanizer Reboiler Hot Oil Supply	0520-502														
61	HS - 14025	EBC-14025 Depropanizer Side Reboiler Outlet	0520-502														
62	HS - 11015	PBB-11010/11015 Depropanizer Reflux Pumps Suction	0520-503														
63	HS - 14015	EBC-14015 Debutanizer Reboiler Hot Oil Supply	0520-504														
64	HS - 11025	PBB-11020/11025 Debutanizer Reflux Pumps Suction	0520-505														
65	HS - 13130B	Propane to Refrigeration or Pressurized storage or OFF-SPEC (inside Fractionation Unit 2)	0520-506														
66	HS - 13135A	Butane to Refrigeration or Pressurized storage or OFF-SPEC (inside Fractionation Unit 2)	0520-506														
67	HS - 13280	Propane Product (Unit 2) to Precooling System	520-605														
68	HS - 13284	Propane Product (Unit 2) to Pressurized Storage	520-605														
69	HS - 13279	Rerun (OFF-SPEC) (Unit 2) of Propane Product to Feed Surge Vessel	520-605	6													
70	HS - 13281	Butane Product (Unit 2) to Precooling System	520-605														
71	HS - 13285	Butane Product (Unit 2) to Pressurized Storage	520-605														
72	HS - 13278	Rerun (OFF-SPEC) (Unit 2) of Butane Product to Feed Surge Vessel	520-605	7													

Column	P&ID	Description	Note	Effect
1		FRACTIONATION UNIT SHUTDOWN LEVEL 2		
2	520-605	Inlet to Fractionation Unit 2		XY-11008 on XV-11008
3	0520-502	CBA-13065 Depropanizer Blowdownn valve		SDY-13065 on BDV-13065
4	0520-501	EAL-14520 Debutanizer Bottoms Cooler Fan A		Motor M-EAL-14520A
5	0520-501	EAL-14520 Debutanizer Bottoms Cooler Fan B		Motor M-EAL-14520B
6	0520-501	Debutanizer Bottoms (Unit 2) to Feed Surge Tank and/or Condensate Tank	NOTE 5	SDY-11001 on SDV-11001
7	0520-501	PBB-11001 Debutanizer Bottoms Rerun Pump (Unit 2)		Motor M-PBB-11001
8	520-606	TKBJ-13000 Inlet		XV-13003 on XV-13003
9	0520-502	EAL-14500A Depropanizer Condenser Fan A		Motor M-EAL-14500A A
10	0520-502	EAL-14500A Depropanizer Condenser Fan B		Motor M-EAL-14500A B
11	0520-502	EAL-14500B Depropanizer Condenser Fan C		Motor M-EAL-14500B C
12	0520-502	EAL-14500B Depropanizer Condenser Fan D		Motor M-EAL-14500B D
13	0520-502	EAL-14500C Depropanizer Condenser Fan E		Motor M-EAL-14500C E
14	0520-502	EAL-14500C Depropanizer Condenser Fan F		Motor M-EAL-14500C F
15	0520-502	EAL-14500D Depropanizer Condenser Fan G		Motor M-EAL-14500D G
16	0520-502	EAL-14500D Depropanizer Condenser Fan H		Motor M-EAL-14500D H
17	0520-502	EBC-14000 Debutanizer Reboiler Hot Oil Supply		SDY-14000 on FV-14000
18	0520-502	EBC-14025 Depropanizer Side Reboiler Outlet		SDY-14025 on SDV-14025
19	0520-503	PBB-11010 Depropanizer Reflux Pump		Motor M-PBB-11010
20	0520-503	PBB-11015 Depropanizer Reflux Pump		Motor M-PBB-11015
21	0520-503	PBB-11010/11015 Depropanizer Reflux Pumps Suction	NOTE 5	SDY-11015 on SDV-11015
22	0520-504	EAL-14510A Debutanizer Condenser Fan A		Motor M-EAL-14510A A
23	0520-504	EAL-14510A Debutanizer Condenser Fan B		Motor M-EAL-14510A B
24	0520-504	EAL-14510B Debutanizer Condenser Fan C		Motor M-EAL-14510B C
25	0520-504	EAL-14510B Debutanizer Condenser Fan D		Motor M-EAL-14510B D
26	0520-504	EAL-14510C Debutanizer Condenser Fan E		Motor M-EAL-14510C E
27	0520-504	EAL-14510C Debutanizer Condenser Fan F		Motor M-EAL-14510C F
28	0520-504	EAL-14510D Debutanizer Condenser Fan G		Motor M-EAL-14510D G
29	0520-504	EAL-14510D Debutanizer Condenser Fan H		Motor M-EAL-14510D H
30	0520-504	EBC-14015 Debutanizer Re		SDY-14015 on FV-14015
31	0520-505	PBB-11020 Debutanizer Re		Motor M-PBB-11020
32	0520-505	PBB-11025 Debutanizer Re	NOTE 5	Motor M-PBB-11025
33	0520-505	PBB-11020/11025 Debutanizer Reflux Pumps Suction	NOTE 5	SDY-11025 on SDV-11025
34	0520-506	Propane to Refrigeration or Pressurized storage or OFF-SPEC (inside Fractionation Unit 2)		SDY-13130B on LV-13130B
35	0520-506	Butane to Refrigeration or Pressurized storage or OFF-SPEC (inside Fractionation Unit 2)		SDY-13135A on LV-13135A
36	520-605	Propane Product (Unit 2) to Precooling System	NOTE 6	XY-13280 on XV-13280
37	520-605	Propane Product (Unit 2) to Pressurized Storage	NOTE 6	XY-13284 on XV-13284
38	520-605	Rerun (OFF-SPEC) (Unit 2) of Propane Product to Feed Surge Vessel	NOTE 6	XY-13279 on XV-13279
39	520-605	Butane Product (Unit 2) to Precooling System	NOTE 7	XY-13281 on XV-13281
40	520-605	Butane Product (Unit 2) to Pressurized Storage	NOTE 7	XY-13285 on XV-13285
41	520-605	Rerun (OFF-SPEC) (Unit 2) of Butane Product to Feed Surge Vessel	NOTE 7	XY-13278 on XV-13278

#	TAG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
1			D (Close)		S	S	D	S		S	S	S	S	S	S	S	S	D	D	S	S	D	S	S	S	S	S	S	S	S	D	S	S	D	D	D	D (Close)	D (Close)	D (Close)	D (Close)	D (Close)	D (Close)
2	ESD - 16809	X																																								
3	HS - 13065			D																																						
4	VSHH - 14520 A				S																																					
5	VSHH - 14520 B					S																																				
6	TAHH - 14520 A						D	S																																		
7	PSHH - 11001						D	S																																		
8	LSLL - 11002																																									
9																																										
10	PSLL - 11001 A							S																																		
11	ZSO - 11001							S																																		
12	VSHH - 14500 A									S																																
13	VSHH 14500 B										S																															
14	VSHH - 14500 C											S																														
15	VSHH - 14500 D												S																													
16	VSHH - 14500 E													S																												
17	VSHH - 14500 F														S																											
18	VSHH - 14500 G															S																										
19	VSHH - 14500 H																S																									
20	LAHH - 14003																																									
21	LALL - 14003																		D																							
22	LAHH - 13130 A																																									
23	LALL - 13130 A																			S	S																					
25	LSLL - 11010																																									
24	PSHH - 11010																																									
	AHH - 16806																																									
26	XY - 11010																			S	S	D																				
27	PSLL - 11010 A																			S																						
29	LSLL - 11015																																									
28	PSHH - 11015																																									
	AHH - 16806																																									
30	XY - 11015																			S	S	D																				
31	PSLL - 11015 A																				S																					
32	ZSO - 11015																			S	S																					
33	VSHH - 14510 A																						S																			
34	VSHH - 14510 B																							S																		
35	VSHH 14510 C																								S																	
36	VSHH - 14510 D																									S																
37	VSHH - 14510 E																										S															
38	VSHH - 14510 F																											S														
39	VSHH - 14510 G																												S													
40	VSHH - 14510 H																													S												
41	LAHH - 14015																																									
42	LALL - 14015A						D	S																																		
43	LALL - 14015						D	S																																		
44	LAHH - 13135 A																																									
45	LALL - 13135 A																															S	S									
46	LSLL - 11020 A																																									
47	PSHH - 11020																																									
	AHH - 16807																																									
48	XY - 11020																															S	S	D								
49	PSLL - 11020 A																															S										
51	LSLL - 11025 A																																									
50	PSHH - 11025																																									
	AHH - 16807																																									
52	XY - 11025																															S	S	D								
53	PSLL - 11025 A																																S									
54	ZSO - 11025																															S	S									
55	ZSO - 13279																																									
56	ZSO - 13278																																									
57																																										
58	HS - 11008		C/O																																							
59	HS - 11001						C/O																																			
60	HS - 14000																	C/O																								
61	HS - 14025																		C/O																							
62	HS - 11015																					C/O																				
63	HS - 14015																														C/O											
64	HS - 11025																																	C/O								
65	HS - 13130B																																		C/O							
66	HS - 13135A																																			C/O						
67	HS - 13280																																				C/O					
68	HS - 13284																																					C/O				
69	HS - 13279																																						C/O (NOTE 6)			
70	HS - 13281																																							C/O		
71	HS - 13285																																								C/O	
72	HS - 13278																																									C/O (NOTE 7)

NOTES

NOTE 1 BDV can be opened only if EMERGENCY SHUTDOWN LEVEL 2 of Fractionating Unit_New ESD-16809 was activated. This action shall be performed by operator only from PCS.
NOTE 2 If the ZSO-11001 is not activated (SDV-11001 valve OFF position) the pump PBB-11001 can not be started or if it is running it must be stopped.
NOTE 3 If the ZSO-11015 is not activated (SDV-11015 valve OFF position) the pump PBB-11010 / 15 can not be started or if it is running it must be stopped.
NOTE 4 If the ZSO-11025 is not activated (SDV-11025 valve OFF position) the pump PBB-11020 / 25 can not be started or if it is running it must be stopped.
NOTE 5 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST SHUTDOWN THE PUMP OR PUMPS, 2ND CLOSE THE SHUTDOWN VALVE.
NOTE 6 THE OPERATOR SHALL DECIDE IF HE SENDS PROPANE PRODUCT TO PRESSURIZED TANKS, PRECHILLING OR TO RERUN.
NOTE 7 THE OPERATOR SHALL DECIDE IF HE SENDS BUTANE PRODUCT TO PRESSURIZED TANKS, PRECHILLING OR TO RERUN.
NOTE 8 Both PSHH (seal) and AHH (gas detector) must be in alarm condition to activate Shutdown of the pumps and suction SDV.
NOTE 9 If the PSHH-11010 or the PSHH-11015 is in alarm condition and also the AT-16806 (Gas Detector) is in alarm condition, both pump must be stopped (PBB-11010 & PBB-11015) and the suction valve must be closed (SDY-11015 deenergize).
NOTE 10 If the PSHH-11020 or the PSHH-11025 is in alarm condition and also the AT-16807(Gas Detector) is in alarm condition, both pump must be stopped (PBB-11020 & PBB-11025) and the suction valve must be closed (SDY-11025 deenergize).

CAUSE AND EFFECT MATRIX (NEW)

PERU - CAMISEA SECOND EXPANSION PROJECT
PISCO PLANT
CAUSE AND EFFECT MATRIX
FRACTIONATION UNIT 3 (NEW)
For set points and alarm values, see PCSE-500-LI-K-101

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low	1 FRACTIONATION UNIT SHUTDOWN LEVEL 2
1		**FRACTIONATION UNIT 3 SHUTDOWN LEVEL 2**																
2	ESD - 26804	Fractionation Unit Shutdown Manual SOFT Push Bottom in CCR	680-797			X						X						X
3	HS - 23065	Depresurization of Depropanizer CBA-23065 Manual SOFT Push Bottom in CCR	520-733	1								X						
4	VSHH - 24520 A	EAL-24520 Debutanizer Bottoms Cooler Fan A	520-732					X						X				
5	VSHH - 24520 B	EAL-24520 Debutanizer Bottoms Cooler Fan B	520-732					X						X				
6	TAHH - 24520 A	EAL-24520 Debutanizer Bottoms Cooler Outlet	520-732		°F			135						X				
7	TAL - 24002D	EBC-24002 Debutanaizer Side Reboiler Tube Inlet	520-735		°F					275						X		
8	PSHH - 21001	PBB-21001 Debutanizer Bottoms Rerun Pump (seal) (Unit 3)	520-732	~~12~~	psig			26						~~X~~				
9	LSLL - 21002	PBB-21001 Debutanizer Bottoms Rerun Pump (seal) (Unit 3)	520-732	11	in						16						**X**	
10	PSLL - 21001 A	PBB-21001 Suction Pressure	520-732		psig						5						X	
11	ZSO - 21001	PBB-21001 Suction Valve	520-732	2			X						X					
12	VSHH - 24500 A	EAL-24500A Depropanizer Condenser Fan A	520-733-2					X						X				
13	VSHH 24500 B	EAL-24500A Depropanizer Condenser Fan B	520-733-2					X						X				
14	VSHH - 24500 C	EAL-24500B Depropanizer Condenser Fan C	520-733-2					X						X				
15	VSHH - 24500 D	EAL-24500B Depropanizer Condenser Fan D	520-733-2					X						X				
16	VSHH - 24500 E	EAL-24500C Depropanizer Condenser Fan E	520-733-2					X						X				
17	VSHH - 24500 F	EAL-24500C Depropanizer Condenser Fan F	520-733-2					X						X				
18	VSHH - 24500 G	EAL-24500D Depropanizer Condenser Fan G	520-733-2					X						X				
19	VSHH - 24500 H	EAL-24500D Depropanizer Condenser Fan H	520-733-2					X						X				
20	LAHH - 24003	EBC-24000 Depropanizer Reboiler	520-733		in			70										
21	LALL - 24003	EBC-24000 Depropanizer Reboiler	520-733		in						8						X	
22	LAHH - 23130 A	VBA-23130 Depropanizer Reflux Accumulator	520-734		in			78										
23	LALL - 23130 A	VBA-23130 Depropanizer Reflux Accumulator	520-734		in						26						X	
24	LSLL - 21010	PBB-21010 Depropanizer Reflux Pump (seal)	520-734	~~13~~	in						16						**X**	
25	PSHH - 21010	PBB-21010 Depropanizer Reflux Pump (seal)	520-734	~~8~~	psig			26										
26	PSLL - 21010 A	PBB-21010 Suction Pressure	520-734		psig						225						X	
27	LSLL - 21015	PBB-21015 Depropanizer Reflux Pump (seal)	520-734	13	in						16						**X**	
28	PSHH - 21015	PBB-21015 Depropanizer Reflux Pump (seal)	520-734	~~8~~	psig			26										
29	PSLL - 21015 A	PBB-21015 Suction Pressure	520-734	~~15~~	psig						225						X	
30	ZSO - 21015	PBB-21010 /21015 Suction Valve	520-734	3			X						X					
31	AHH - 26806	GAS DETECTOR @ PBB-21010/15	680-797	8	%			40										
32	XY - 21010	LSLL-21010 + AT-26806	520-734	5, 8,9								X						
33	XY - 21015	LSLL-21015 + AT-26806	520-734	5, 8,9								X						
34	VSHH - 24510 A	EAL-24510A Debutanizer Condenser Fan A	520-735					X						X				
35	VSHH - 24510 B	EAL-24510A Debutanizer Condenser Fan B	520-735					X						X				
36	VSHH 24510 C	EAL-24510B Debutanizer Condenser Fan C	520-735					X						X				
37	VSHH - 24510 D	EAL-24510B Debutanizer Condenser Fan D	520-735					X						X				
38	VSHH - 24510 E	EAL-24510C Debutanizer Condenser Fan E	520-735					X						X				
39	VSHH - 24510 F	EAL-24510C Debutanizer Condenser Fan F	520-735					X						X				
40	VSHH - 24510 G	EAL-24510D Debutanizer Condenser Fan H	520-735					X						X				
41	VSHH - 24510 H	EAL-24510D Debutanizer Condenser Fan G	520-735					X						X				
42	LAHH - 24015	EBC-24015 Debutanizer Reboiler	520-735		in			39										
43	LALL - 24015	EBC-24015 Debutanizer Reboiler	520-735	5	in						6						X	
45	LAHH - 23135 A	VBA-23135 Debutanizer Reflux Accumulator	520-736		in			55						X				
46	LALL - 23135 A	VBA-23135 Debutanizer Reflux Accumulator	520-736		in						8						X	
47	LSLL - 21020 A	PBB-21020 Debutanizer Reflux Pump (seal)	520-736	13	in						16						X	
48	PSHH - 21020	PBB-21020 Debutanizer Reflux Pump (seal)	520-736	~~8~~	psig			26						X				
49	PSLL - 21020 A	PBB-21020 Suction Pressure	520-736	~~16~~	psig						60						X	
50	LSLL - 21025 A	PBB-21025 Debutanizer Reflux Pump (seal)	520-736	13	in						16						X	
51	PSHH - 21025	PBB-21025 Debutanizer Reflux Pump (seal)	520-736		psig			26						~~X~~				
52	PSLL - 21025 A	PBB-21025 Suction Pressure	520-736		psig						60						X	
53	ZSO - 21025	PBB-21020 / 21025 Suction Valve	520-736	4			X						X					
54	AHH - 26807	GAS DETECTOR @ PBB-21020/25	680-797	8	%			40										
55	XY - 21020	LSLL-21020 + AT-26807	520-736	5, 8, 10								X						
56	XY - 21025	LSLL-21025 + AT-26807	520-736	5, 8, 10								X						
57	ZSO - 23279	Rerun (OFF-SPEC) (Unit 3) of Propane Product to Feed Surge Vessel	520-731	6		X												
58	ZSO - 23278	Rerun (OFF-SPEC) (Unit 3) of Butane Product to Feed Surge Vessel	520-731	7		X												
59	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																	
60	HS - 21008	Inlet to Fractionation Unit 3	520-731															
61	HS - 21001	Debutanizer Bottoms to Feed Surge Tank and/or Condensate Tank	520-732															
62	HS - 24000	EBC-24000 Depropanizer Reboiler Hot Oil Supply	520-733															
63	HS - 24025	EBC-24025 Depropanizer Side Reboiler Outlet	520-733															
64	HS - 21015	PBB-21010/21015 Depropanizer Reflux Pumps Suction	520-734															
65	HS - 24015	EBC-24015 Debutanizer Reboiler Hot Oil Supply	520-735															
66	HS - 21025	PBB-21020/21025 Debutanizer Reflux Pumps Suction	520-736															
67	HS - 23130B	Propane to Refrigeration or Pressurized storage or OFF-SPEC (inside Fractionation Unit 3)	520-737															
68	HS - 23135A	Butane to Refrigeration or Pressurized storage or OFF-SPEC (inside Fractionation Unit 3)	520-737															
69	HS - 23280	Propane Product (Unit 3) to Precooling System	520-731															
70	HS - 23284	Propane Product (Unit 2) to Pressurized Storage	520-731															
71	HS - 23279	Rerun (OFF-SPEC) (Unit 3) of Propane Product to Feed Surge Vessel	520-731	6														
72	HS - 23281	Butane Product (Unit 3) to Precooling System	520-731															
73	HS - 23285	Butane Product (Unit 3) to Pressurized Storage	520-731															
74	HS - 23278	Rerun (OFF-SPEC) (Unit 3) of Butane Product to Feed Surge Vessel	520-731	7														
75	HS - 24520	EAL-24520 oulet to condensate feed surge	520-732															

Effects (columns 2–17):

	2	3	4	5	6	7	10	11	12	13	14	15	16	17
P&ID	520-731	520-733	520-732	520-732	520-732	520-732	520-733	520-733	520-733	520-733	520-733	520-733	520-733	520-733
Service	Inlet to Fractionation Unit 3	CBA-23065 Depropanizer Blowdown valve	EAL-24520 Debutanizer Bottoms Cooler Fan A	EAL-24520 Debutanizer Bottoms Cooler Fan B	Debutanizer Bottoms (Unit 3) to Feed Surge Tank and/or Condensate Tank (NOTE 5)	PBB-21001 Debutanizer Bottoms Rerun Pump (Unit 3)	EAL-24500A Depropanizer Condenser Fan A	EAL-24500A Depropanizer Condenser Fan B	EAL-24500B Depropanizer Condenser Fan C	EAL-24500B Depropanizer Condenser Fan D	EAL-24500C Depropanizer Condenser Fan E	EAL-24500C Depropanizer Condenser Fan F	EAL-24500D Depropanizer Condenser Fan G	EAL-24500D Depropanizer Condenser Fan H
Device	XY-21008 on XV-21008	SDY-23065 on BDV-23065	Motor M-EAL-24520A	Motor M-EAL-24520B	SDY-21001 on SDV-21001	Motor M-PBB-21001	Motor M-EAL-24500A A	Motor M-EAL-24500A B	Motor M-EAL-24500B C	Motor M-EAL-24500B D	Motor M-EAL-24500C E	Motor M-EAL-24500C F	Motor M-EAL-24500D G	Motor M-EAL-24500D H
1	D (Close)		S	S	D	S	S	S	S	S	S	S	S	S
2														
3		D												
4			S											
5				S										
6					D	S								
7														
8					~~D~~	~~S~~								
9					D	S								
10					~~D~~	S								
11						S								
12							S							
13								S						
14									S					
15										S				
16											S			
17												S		
18													S	
19														S
20–42														
43					D	S								
45–59														
60	C/O													
61					C/O									
62–75														

Effects (columns 18–31):

	18	19	20	21	22	23	24	25	26	27	28	29	30	31
P&ID	520-733		520-733	520-734	520-734	520-734	520-735	520-735	520-735	520-735	520-735	520-735	520-735	520-735
Service	EBC-24000 Depropanizer Reboiler Hot Oil Supply	EAL-24520 OUTLET TO CONDENSATE FEED SURGE	EBC-24025 Depropanizer Side Reboiler Outlet	PBB-21010 Depropanizer Reflux Pump	PBB-21015 Depropanizer Reflux Pump	PBB-21010/21015 Depropanizer Reflux Pumps Suction (NOTE 5)	EAL-24510A Debutanizer Condenser Fan A	EAL-24510A Debutanizer Condenser Fan B	EAL-24510B Debutanizer Condenser Fan C	EAL-24510B Debutanizer Condenser Fan D	EAL-24510C Debutanizer Condenser Fan E	EAL-24510C Debutanizer Condenser Fan F	EAL-24510D Debutanizer Condenser Fan G	EAL-24510D Debutanizer Condenser Fan H
Device	SDY-24000 on FV-24000	SDY-24520 on FV-24520	SDY-24025 on SDV-24025	Motor M-PBB-21010	Motor M-PBB-21015	SDY-21015 on SDV-21015	Motor M-EAL-24510A A	Motor M-EAL-24510A B	Motor M-EAL-24510B C	Motor M-EAL-24510B D	Motor M-EAL-24510C E	Motor M-EAL-24510C F	Motor M-EAL-24510D G	Motor M-EAL-24510D H
1	D	D	D	S	S	D	S	S	S	S	S	S	S	S
2–6														
7		D												
8–20														
21			D											
22														
23				S	S									
24				S		~~D~~								
25				~~S~~		~~D~~								
26				S										
27					S	~~D~~								
28					~~S~~	~~D~~								
29					S									
30				S	S									
31														
32				S	**S**	D								
33				**S**	S	D								
34							S							
35								S						
36									S					
37										S				
38											S			
39												S		
40													S	
41														S
42–61														
62	C/O													
63			C/O											
64						C/O								
65–74														
75		C/O												

Effects (columns 32–43):

	32	33	34	35	36	37	38	39	40	41	42	43
P&ID	520-735	520-736	520-736	520-736	520-737	520-737	520-731	520-731	520-731	520-731	520-731	520-731
Service	EBC-24015 Debutanizer Reboiler Hot Oil Supply	PBB-21020 Debutanizer Reflux Pump	PBB-21025 Debutanizer Reflux Pump (NOTE 5)	PBB-21020/21025 Debutanizer Reflux Pumps Suction (NOTE 5)	Propane to Refrigeration or Pressurized storage or OFF-SPEC (inside Fractionation Unit 3)	Butane to Refrigeration or Pressurized storage or OFF-SPEC (inside Fractionation Unit 3)	Propane Product (Unit 3) to Precooling System (NOTE 6)	Propane Product (Unit 3) to Pressurized Storage (NOTE 6)	Rerun (OFF-SPEC) (Unit 3) of Propane Product to Feed Surge Vessel (NOTE 6)	Butane Product (Unit 3) to Precooling System (NOTE 7)	Butane Product (Unit 3) to Pressurized Storage (NOTE 7)	Rerun (OFF-SPEC) (Unit 3) of Butane Product to Feed Surge Vessel (NOTE 7)
Device	SDY-24015 on FV-24015	Motor M-PBB-21020	Motor M-PBB-21025	SDY-21025 on SDV-21025	SDY-23130B on LV-23130B	SDY-23135A on LV-23135A	XY-23280 on XV-23280	XY-23284 on XV-23284	XY-23279 on XV-23279	XY-23281 on XV-23281	XY-23285 on XV-23285	XY-23278 on XV-23278
1	D	S	S	D	D	D	D (Close)	D (Close)	D (Close)	D (Close)	D (Close)	D (Close)
2–45												
46		S	S									
47		S		~~D~~								
48		~~S~~		~~D~~								
49		S										
50			S	~~D~~								
51			~~S~~	~~D~~								
52			S									
53		S	S									
54												
55		S	S	D								
56		**S**	S	D								
57–64												
65	C/O											
66				C/O								
67					C/O							
68						C/O						
69							C/O					
70								C/O				
71									C/O (NOTE 6)			
72										C/O		
73											C/O	
74												C/O (NOTE 7)
75												

NOTES

NOTE 1 BDV can be opened only if EMERGENCY SHUTDOWN LEVEL 2 of Fractionating Unit_New ESD-26809 was activated. This action shall be performed by operator only from PCS.
NOTE 2 If the ZSO-21001 is not activated (SDV-21001 valve OFF position) the pump PBB-21001 can not be started or if it is running it must be stopped.
NOTE 3 If the ZSO-21015 is not activated (SDV-21015 valve OFF position) the pump PBB-21010 / 15 can not be started or if it is running it must be stopped.
NOTE 4 If the ZSO-21025 is not activated (SDV-21025 valve OFF position) the pump PBB-21020 / 25 can not be started or if it is running it must be stopped.
NOTE 5 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST SHUTDOWN THE PUMP OR PUMPS, 2ND CLOSE THE SHUTDOWN VALVE.
NOTE 6 THE OPERATOR SHALL DECIDE IF HE SENDS PROPANE PRODUCT TO PRESSURIZED TANKS, PRECHILLING OR TO RERUN.
NOTE 7 THE OPERATOR SHALL DECIDE IF HE SENDS BUTANE PRODUCT TO PRESSURIZED TANKS, PRECHILLING OR TO RERUN.
NOTE 8 Both **LSLL (seal)** and AHH (gas detector) must be in alarm condition to activate Shutdown of the pumps and suction SDV.
NOTE 9 If the **LSLL**-21010 or the **LSLL**-21015 is in alarm condition and also the AT-26806 (Gas Detector) is in alarm condition, both pump must be stopped (PBB-21010 & PBB-21015) and the suction valve must be closed (SDY-21015 deenergize). MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED TO DEACTIVATE ALL INTERLOCKS ASSOCIATED TO THE PUMP THAT HAS BEEN STOPPED.
NOTE 10 If the **LSLL**-21020 or the **LSLL**-21025 is in alarm condition and also the AT-26807(Gas Detector) is in alarm condition, both pump must be stopped (PBB-21020 & PBB-21025) and the suction valve must be closed (SDY-21025 deenergize). MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED TO DEACTIVATE ALL INTERLOCKS ASSOCIATED TO THE PUMP THAT HAS BEEN STOPPED.
NOTE 11 After 10 min. that LSLL-21002 is actived , pump must be stopped (PBB-21001) and the suction valve must be closed (SDY-21001 deenergize). MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED TO DEACTIVATE ALL INTERLOCKS ASSOCIATED TO THE PUMP.
~~NOTE 12 If the PSHH-21001 is in alarm condition pump must be stopped, (PBB-21001) and the suction valve must be closed (SDY-21001 deenergize).~~
NOTE 13 After 10 min. that LSLL is actived, respective pump must be stopped. MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED TO DEACTIVATE ALL INTERLOCKS ASSOCIATED TO THE PUMP THAT HAS BEEN STOPPED.
~~NOTE 14 If the LSLL-21020A/21025A is actived , pump must be stopped (PBB-21020/25) and the suction valve must be closed (SDY-21025) deenergize.~~

CAUSE AND EFFECT MATRIX (EXISTING)

PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (based on PCAM-520-PL-Y-8206 Revision 5) (EPC2-PISCO PLANT)
TOPPING UNIT 1_Existing

	TAG	Loop Service	P&I D	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
	TOPPING UNIT 1			10													
1	**TOPPING UNIT 1 SHUTDOWN LEVEL 2**																
2	ESD - 6813	Topping Unit Shutdown Manual SOFT Push Bottom in CCR										X					
	ZSO - 11033	Manual block valve 207508 OPEN Jumpover between the discharge of PBB-1030/1035 Naphta Tower Feed Pumps and PBB-11030/11035.	525-207			X											
3	~~LSHH - 3000~~	~~TKBJ-3000 Condensate Surge Tank.~~ The interlocks related to High-High level on TKBJ-3000 CONDENSATE SURGE TANK are shown in worksheet "CONDENSATE STORAGE".	~~520-206~~		~~in~~			~~540~~						~~X~~			
11	FALL - 1038	Feed to Topping Unit	520-206		gpm						476						
13	PALL - 4040	EBG-4040 Diesel Feed Exchanger	525-8015		psig						100						X
14	PAHH - 4040	EBG-4040 Diesel Feed Exchanger	525-8015		psig			190						X			
15	TAHH - 5000A	MAP-5000 Naphtha Tower Feed Heater	525-8016		°F			570						X			
16	FALL - 5000J	PBB-1050/1055 Feed to MAP-5000	525-8016		gpm						351						
17	FAHH - 5000J	PBB-1050/1055 Feed to MAP-5000	525-8016	8	gpm			751						X			
18	SSC - 5000	FT-1038 + FT-5000J	525-8016		gpm						730						X
19	VSHH - 4530A	EAL-4530 Naphtha Tower Condenser Fan A	525-8018					X						X			
20	VSHH - 4530B	EAL-4530 Naphtha Tower Condenser Fan B	525-8018					X						X			
21	VSHH - 4530C	EAL-4530 Naphtha Tower Condenser Fan C	525-8018					X						X			
22	VSHH - 4530D	EAL-4530 Naphtha Tower Condenser Fan D	525-8018					X						X			
23	VSHH - 4530E	EAL-4530 Naphtha Tower Condenser Fan E	525-8018					X						X			
24	VSHH - 4530F	EAL-4530 Naphtha Tower Condenser Fan F	525-8018					X						X			
25	VSHH 4530G	EAL-4530 Naphtha Tower Condenser Fan G	525-8018					X						X			
26	VSHH - 4530H	EAL-4530 Naphtha Tower Condenser Fan H	525-8018					X						X			
27	**VSHH - 4530I**	**EAL-4530 Naphtha Tower Condenser Fan I**	**525-8018**					**X**						**X**			
28	**VSHH - 4530J**	**EAL-4530 Naphtha Tower Condenser Fan J**	**525-8018**					**X**						**X**			
29	LSLL - 3075A	CBA-3075 Naphtha Tower	525-8018		in						6						X
30	LSLL - 3075B	CBA-3075 Naphtha Tower	525-8018		in						6						X
31	LSLL - 3080	CBA-3080 Diesel Stripper	525-8019A		in						12						X
32	PSHH - 1080	PBB-1080 Stripper Feed Pump (seal)	525-8019B	3, 8	psig			12						X			
33	PSHH - 1085	PBB-1085 Stripper Feed Pump (seal)	525-8019B	3, 8	psig			12						X			
34	ZAC - 1080	PBB-1080/1085 Suction Valve	525-8019B	3								X					
35	LSLL - 3140	VBA-3140 Naphtha Tower Reflux Accumulator	525-8020		in						12						X
36	PSHH - 1040	PBB-1040 Naphtha Tower Reflux Pump (seal)	525-8020	7, 8	psig			12						X			
37	PSHH - 1045	PBB-1045 Naphtha Tower Reflux Pump (seal)	525-8020	7, 8	psig			12						X			
38	ZAC - 1045	PBB-1040 / 45 Suction Valve	525-8020	7								X					
39	PSHH - 1050	PBB-1050 Naphtha Tower Bottoms Pump (seal)	525-8021	2, 8	psig			12						X			
40	PSHH - 1055	PBB-1055 Naphtha Tower Bottoms Pump (seal)	525-8021	2, 8	psig			12						X			
41	ZAC - 1050	PBB-1050/1055 Suction Valve	525-8021	2								X					
42	PSHH - 1070	PBB-1070 Diesel Draw Pump (seal)	525-8021	4, 8	psig			12						X			
43	PSHH - 1075	PBB-1075 Diesel Draw Pump (seal)	525-8021	4, 8	psig			12						X			
44	ZAC - 1070	PBB-1070/1075 Suction valve	525-8021	4								X					
45	VSHH - 4550A	EAL-4550 Naphtha Product Cooler Fan A	525-8022					X						X			
46	VSHH - 4550B	EAL-4550 Naphtha Product Cooler Fan B	525-8022					X						X			
47	**VSHH - 4550C**	**EAL-4550 Naphtha Product Cooler Fan C**	**525-8022**					**X**						**X**			
48	**VSHH - 4550D**	**EAL-4550 Naphtha Product Cooler Fan D**	**525-8022**					**X**						**X**			
49	TAHH - 4550	EAL-4550 Naphtha Product Cooler	525-8022		°F			135						X			
50	VSHH - 4580A	EAL-4580 Residual Product Cooler Fan A	525-8022					X						X			
51	VSHH - 4580B	EAL-4580 Residual Product Cooler Fan B	525-8022					X						X			
52	TAHH - 4580B	EAL-4580 Residual Product Cooler	525-8022		°F			135						X			
53	TAHH - 4570	EAL-4570 Diesel Product Cooler	525-8022		°F			135						X			
54	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																
55	HS - 11031	Inlet to Topping Unit 1	525-207														

	1	2	3	4	~~5~~	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
		~~520-206~~	~~520-206~~	~~520-206~~	~~520-PL-8000~~	525-207	525-PL-Y-8016	525-PL-Y-8017	525-PL-Y-8018	525-PL-Y-8018	525-PL-Y-8018	525-PL-Y-8018	525-PL-Y-8018	525-PL-Y-8018	525-PL-Y-8018	525-PL-Y-8018	525-PL-Y-8018	**525-PL-Y-8018**	**525-PL-Y-8018**	525-PL-Y-8019A	525-PL-Y-8019B	525-PL-Y-8019B	525-PL-Y-8020	525-PL-Y-8020	525-PL-Y-8020	525-PL-Y-8021	525-PL-Y-8021	525-PL-Y-8021	525-PL-Y-8021	525-PL-Y-8021	525-PL-Y-8021	525-PL-Y-8022	525-PL-Y-8022	525-PL-Y-8022	**525-PL-Y-8022**	**525-PL-Y-8022**	525-PL-Y-8022	525-PL-Y-8022	525-PL-Y-8022	525-PL-Y-8022	525-PL-Y-8022	525-PL-Y-8022	525-PL-Y-8022	525-PL-Y-8022
	TOPPING UNIT SHUTDOWN LEVEL 2	~~TKBJ-3000 Outlet~~	~~Naphtha Tower Feed Pump~~	~~Naphtha Tower Feed Pump~~	~~Debutanizer Bottoms Cooler Outlet~~	Inlet to Topping Unit 1	MAP-5000 Naphtha Tower Feed Heater Inlet	MAP-5000 Naphtha Tower Feed Heater	EAL-4530 Naphtha Tower Condenser Fan A	EAL-4530 Naphtha Tower Condenser Fan B	EAL-4530 Naphtha Tower Condenser Fan C	EAL-4530 Naphtha Tower Condenser Fan D	EAL-4530 Naphtha Tower Condenser Fan E	EAL-4530 Naphtha Tower Condenser Fan F	EAL-4530 Naphtha Tower Condenser Fan G	EAL-4530 Naphtha Tower Condenser Fan H	**EAL-4530 Naphtha Tower Condenser Fan I**	**EAL-4530 Naphtha Tower Condenser Fan J**	EBC-4085 Diesel Stripper Reboiler Hot Oil Supply	PBB-1080 Stripper Feed Pump	PBB-1085 Stripper Feed Pump	PBB-1080/1085 Stripper Feed Pumps Suction	PBB-1040 Naphtha Tower Reflux Pump	PBB-1045 Naphtha Tower Reflux Pump	PBB-1040/1045 Naphtha Tower Reflux Pumps Suction	PBB-1050 Naphtha Tower Bottoms Pump	PBB-1055 Naphtha Tower Bottoms Pump	PBB-1050/1055 Naphtha Tower Bottoms Pumps Suction	PBB-1070 Diesel Draw Pump	PBB-1075 Diesel Draw Pump	PBB-1070/1075 Diesel Draw Pumps Suction	EAL-4550 Naphtha Product Cooler Fan A	EAL-4550 Naphtha Product Cooler Fan B	**EAL-4550 Naphtha Product Cooler Fan C**	**EAL-4550 Naphtha Product Cooler Fan D**	Naphtha Product to TKBJ-3020 Naphtha Storage Tank	Product Return to TKBJ-3000 Condensate Surge Tank	EAL-4580 Residual Product Cooler Fan B	EAL-4580 Residual Product Cooler Fan B	Naphtha Tower Bottoms to TKBJ-3060 Slop Tank	Diesel Product to TKBJ-3000 Condensate Surge Tank	Diesel Product to TKBJ-3030 Diesel Storage Tank	Diesel Product Return to CBA-3075 Naphtha Tower
		~~Note 5~~	~~Note 5~~	~~Note 5~~																Note 3	Note 3	Note 3, 8	Note 7	Note 7	Note 7, 8	Note 2	Note 2	Note 2,	Note 4	Note 4	Note 4, 8											
		~~XV-3000 on XV-3000~~	~~Motor PBB-1030~~	~~Motor PBB-1035~~	~~SDV-4520 on FV-4520~~	SDV-11031 on SDV-11031	SDV-5000 on SDV-5000	XS-29A Fuel Gas/ Diesel Fuel Supply	Motor A EAL-4530	Motor B EAL-4530	Motor C EAL-4530	Motor D EAL-4530	Motor E EAL-4530	Motor F EAL-4530	Motor FFEAL-4530	Motor H EAL-4530	**Motor I EAL-4530**	**Motor J EAL-4530**	SDV-4085 on FV-4085	Motor PBB-1080	Motor PBB-1085	SDV-1080 on SDV-1080	Motor PBB-1040	Motor PBB-1045	SDV-1045 on SDV-1045	Motor PBB-1050	Motor PBB-1055	SDV-1050 on SDV-1050	Motor PBB-1070	Motor PBB-1075	SDV-1070 on SDV-1070	Motor A EAL-4550	Motor B EAL-4550	**Motor C EAL-4550**	**Motor D EAL-4550**	SDV-4550A on FV-4550A	SDV-4550B on FV-4550B	Motor A EAL-4580	Motor B EAL-4580	SDV-3075 on LV-3075B	SDV-4570B on FV-4570B	SDV-4570A on FV-4570A	SDV-4570C on FV-4570C
1			D (Note	S	S		D	D	X	S	S	S	S	S	S	S	s	s	D	S	S	D	S	S	D	S	S	D	S	S	D	S	S	s	s	D	D	S	S	D	D	D	D
2																																											
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30								X																		S	S																
31																													S	S													
32																				S	S	D																					
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42																													S	S	D												
43																													S	S	D												
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NOTES

Note 1 Deleted.
Note 2 If the valve SDV-1050 is closed the pumps (PBB-1050/1055) cannot be started.
Note 3 If the valve SDV-1080 is closed the pumps PBB-1080/1085 cannot be started.
Note 4 If the valves SDV-1070 is closed, the corresponding pumps (PBB-1070/1075) cannot be started.
~~Note 5 If the valve XV-3000 is closed the pumps PBB-1030/1035 cannot be started.~~
~~Note 6 Both LSLL and PSHH must be in alarm condition to activate SD.~~
Note 7 If the valve SDV-1045 is close the pumps PBB-1040 / 45 cannot be started.
Note 8 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST SHUTDOWN THE PUMP OR PUMPS, 2ND CLOSE THE SHUTDOWN VALVE.
Note 9 MODIFY EXISTING INTERLOCK SO THAT XV-3000 DOES NOT CLOSE DUE TO THE TOPPING 1 SHUTDOWN.

REFERENCE: PPAG-0520-MC-Y-560 Revision 2 (AESA-TECNA)

BLOCK 56 - CAMISEA EXPANSION PROJECT
PISCO PLANT
CAUSE AND EFFECT MATRIX
TOPPING UNIT 2 (EXISTING)
For set points and alarm values, see PPAG-0520-LI-K-505.

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
1		TOPPING UNIT SHUTDOWN LEVEL 2															
2	ESD - 16813	Topping Unit Shutdown Manual SOFT Push Bottom in CCR				X						X					X
3	HS - 15000 A	MAP-15000 Shutdown Manual SOFT Push Bottom in CCR															
4	PAHH - 14040	EBG-14040 Diesel Feed Exchanger	0525-507		psig			180									
5	PALL - 14040	EBG-14040 Diesel Feed Exchanger	0525-507		psig						100						
6	TAHH - 15000 I	Outlet of MAP-15000 Naphtha Tower Feed Heater	0525-508S1		°F			540						X			
7	FALL - 15000 J	Naphtha Tower Bottoms to MAP-15000	0525-508S1		gpm						137	X					
8	FALL - 11038	Condensate to MAP-15000	525-607		gpm						244						
9	SSC - 15002	FT-15000J + FIT-11038	0525-508S1 and 525-607		gpm						381						X
10	FALL - 15001 A	Condensate to MAP-15000 to pass A	0525-508S1		gpm						72,75						
11	FALL - 15001 B	Condensate to MAP-15000 to pass B	0525-508S1		gpm						72,75						
12	FALL - 15001 C	Condensate to MAP-15000 to pass C	0525-508S1		gpm						72,75						
13	FALL - 15001 D	Condensate to MAP-15000 to pass D	0525-508S1		gpm						72,75						
14	FALL - 15001 E	Naphtha Tower Bottoms to MAP-15000 to pass A	0525-508S1		gpm						34,25						
15	FALL - 15001 F	Naphtha Tower Bottoms to MAP-15000 to pass B	0525-508S1		gpm						34,25						
16	FALL - 15001 G	Naphtha Tower Bottoms to MAP-15000 to pass C	0525-508S1		gpm						34,25						
17	FALL - 15001 H	Naphtha Tower Bottoms to MAP-15000 to pass D	0525-508S1		gpm						34,25						
18	SSC 15000	FT-15001E+FT-15001F+FT-15001G+FT-15001H (PBB-11050/11055 Feed to MAP-15000)	0525-508S1		gpm						137						
19	SSC 15001A	FT-15001A+FT-15001E (MAP-15000 feed to "pass A")	0525-508S1		gpm						107						X
20	SSC 15001B	FT-15001B+FT-15001F (MAP-15000 feed to "pass B")	0525-508S1		gpm						107						X
21	SSC 15001C	FT-15001C+FT-15001G (MAP-15000 feed to "pass C")	0525-508S1		gpm						107						X
22	SSC 15001D	FT-15001D+FT-15001H (MAP-15000 feed to "pass D")	0525-508S1		gpm						107						X
23	ZSO - 15000	Condensate to MAP-15000 Naphtha Heater	0525-508S1				X						X				
24	ZSO - 15003	PBB-11050/11055 Feed to MAP-15000	0525-508S1				X						X				
25	ZSO - 15001	Condensate+Naptha to tower CBA-13075	0525-508S1				X						X				
26	VSHH - 14530 A	EAL-14530A Naphtha Tower Condenser Fan A	0525-510					X						X			
27	VSHH - 14530 B	EAL-14530A Naphtha Tower Condenser Fan B	0525-510					X						X			
28	VSHH - 14530 C	EAL-14530B Naphtha Tower Condenser Fan C	0525-510					X						X			
29	VSHH - 14530 D	EAL-14530B Naphtha Tower Condenser Fan D	0525-510					X						X			
30	VSHH - 14530 E	EAL-14530C Naphtha Tower Condenser Fan E	0525-510					X						X			
31	VSHH - 14530 F	EAL-14530C Naphtha Tower Condenser Fan F	0525-510					X						X			
32	LAHH - 13075 F	CBA-13075 Naphtha Tower	0525-510		in			46									
33	LALL - 13075 F	CBA-13075 Naphtha Tower	0525-510		in						10						X
34	LAHH - 13075 G	CBA-13075 Naphtha Tower	0525-510		in			85									
35	LALL - 13075 G	CBA-13075 Naphtha Tower	0525-510		in						59						X
36	LAHH - 13080 A	CBA-13080 Diesel Stripper	0525-511		in			116									
37	LALL - 13080 A	CBA-13080 Diesel Stripper	0525-511		in						16						X
38	PSHH - 11080	PBB-11080 Stripper Feed Pump (seal)	0525-512	8	psig			26						X			
39	LSLL - 11080 B	PBB-11080 Stripper Feed Pump (seal)	0525-512		in						16						
40	PSLL - 11080 A	PBB-11080 Suction Pressure	0525-512		psig						27						X
41	PSHH - 11085	PBB-11085 Stripper Feed Pump (seal)	0525-512	8	psig			26						X			
42	LSLL - 11085 B	PBB-11085 Stripper Feed Pump (seal)	0525-512		in						16						
43	PSLL - 11085A	PBB-11085 Suction Pressure	0525-512		psig						27						X
44	ZSO - 11080	PBB-11080/11085 Suction Valve	0525-512	3			X						X				
45	LAHH - 13140	VBA-13140 Naphtha Tower Reflux Accumulato	0525-513		in			71									
46	LALL - 13140	VBA-13140 Naphtha Tower Reflux Accumulato	0525-513		in						8						X
47	PSHH - 11040	PBB-11040 Naphtha Tower Reflux Pump (seal)	0525-513	8	psig			26						X			
48	LSLL - 11040	PBB-11040 Naphtha Tower Reflux Pump (seal)	0525-513		in						16						
49	PSLL - 11040 A	PBB-11040 Suction Pressure	0525-513		psig						4						X
50	PSHH - 11045	PBB-11045 Naphtha Tower Reflux Pump (seal)	0525-513	8	psig			26						X			
51	LSLL - 11045	PBB-11045 Naphtha Tower Reflux Pump (seal)	0525-513		in						16						
52	PSLL - 11045 A	PBB-11045 Suction Pressure	0525-513		psig						4						X
53	ZSO - 11045	PBB-11040 / 45 Suction Valve	0525-513	5			X						X				
54	PSHH - 11050	PBB-11050 Naphtha Tower Bottoms Pump (seal)	0525-514	8	psig			26						X			
55	LSLL - 11050	PBB-11050 Naphtha Tower Bottoms Pump (seal)	0525-514		in						16						
56	PSLL - 11050 A	PBB-11050 Suction Pressure	0525-514		psig						28						X
57	PSHH - 11055 A	PBB-11055 Naphtha Tower Bottoms Pump (seal)	0525-514	8	psig			26						X			
58	LSLL - 11055 B	PBB-11055 Naphtha Tower Bottoms Pump (seal)	0525-514		in						16						
59	PSLL - 11055 A	PBB-11055 Suction Pressure	0525-514		psig						28						X
60	ZSO - 11050	PBB-11050/11055 Suction Valve	0525-514	2			X						X				
61	PSHH - 11070	PBB-11070 Diesel Draw Pump (seal)	0525-514	8	psig			26						X			
62	LSLL - 11070	PBB-11070 Diesel Draw Pump (seal)	0525-514		in						16						
63	PSLL - 11070 A	PBB-11070 Suction Pressure	0525-514		psig						27						X
64	PSHH - 11075	PBB-11075 Diesel Draw Pump (seal)	0525-514	8	psig			26						X			
65	LSLL - 11075	PBB-11075 Diesel Draw Pump (seal)	0525-514		in						16						
66	PSLL - 11075 A	PBB-11075 Suction Pressure	0525-514		psig						27						X
67	ZSO - 11070	PBB-11070/11075 Suction valve	0525-514	4			X						X				
68	VSHH - 14570 E	EAL-14550/14570/14580 Cooler Fan A	0525-515					X						X			
69	VSHH - 14570 D	EAL-14550/14570/14580 Cooler Fan B	0525-515					X						X			
70	TAHH - 14550 E	EAL-14550 Naphtha Product Cooler	0525-515		°F			135						X			
71	TAHH - 14570 E	EAL-14570 Diesel Product Cooler	0525-515		°F			135						X			
72	TAHH - 14580 D	EAL-14580 Residual Product Cooler	0525-515		°F			135						X			
73		**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**															
74	HS - 11032	Inlet to Topping Unit 2	525-607														
75	HS - 15000	Condensate from EBG-14040 (Inlet to MAP-15000)	0525-508S1														
76	HS - 15003	Naphtha from PBB-11055/55 (Inlet to MAP-15000)	0525-508S1														
77	HS - 15001	Condensate+Naphtha to Tower CBA-13075 (Outlet of MAP-15000	0525-508S1														
78	HS - 15002	Fuel Gas to Naphtha Heater MAP-15000	0615-521														
79	HS - 14085	EBC-14085 Diesel Stripper Reboiler Hot Oil Supply	0525-511														
80	HS - 11080	PBB-11080/11085 Stripper Feed Pumps Suction	0525-512														
81	HS - 11045	PBB-11040/11045 Naphtha Tower Reflux Pumps Suction	0525-513														
82	HS - 11050	PBB-11050/11055 Naphtha Tower Bottoms Pumps Suction	0525-514														
83	HS - 11070	PBB-11070/11075 Diesel Draw Pumps Suction	0525-514														
84	HS - 14550 A	Naphtha Product to TKBJ-3020 Naphtha Storage Tank	0525-515														
85	HS - 14550 B	Product Rerun to TKBJ-3000 Condensate Surge Tank	0525-515														
86	HS - 14570 A	Diesel Product to TKBJ-3030 Diesel Storage Tank	0525-515														
87	HS - 14570 B	Diesel Product to TKBJ-3000 Condensate Surge Tank	0525-515														
88	HS - 14570 C	Diesel Product Return to CBA-13075 Naphtha Towe	0525-515														
89	HS - 13075 B	Naphtha Tower Bottoms to TKBJ-3060 Slop Tank	0525-515														

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
		525-607	0525-508S1	0525-508S1	0525-508S1	0525-509	0615-521	0525-510	0525-510	0525-510	0525-510	0525-510	0525-510	0525-511	0525-512	0525-512	0525-512	0525-513	0525-513	0525-513	0525-514	0525-514	0525-514	0525-514	0525-514	0525-514	0525-515	0525-515	0525-515	0525-515	0525-515	0525-515	0525-515	0525-515	0525-515
		Inlet to Topping Unit 2	Condensate to MAP-15000 Naphtha Heater	PBB-11050/11055 Feed to MAP-15000	Condensate+Naptha to tower CBA-13075	MAP-15000 Remote Shutdown	Fuel Gas to Naphtha Heater MAP-15000	EAL-14530A Naphtha Tower Condenser Fan A	EAL-14530A Naphtha Tower Condenser Fan B	EAL-14530B Naphtha Tower Condenser Fan C	EAL-14530B Naphtha Tower Condenser Fan D	EAL-14530C Naphtha Tower Condenser Fan E	EAL-14530C Naphtha Tower Condenser Fan F	EBC-14085 Diesel Stripper Reboiler Hot Oil Supply	PBB-11080/11085 Stripper Feed Pumps Suction	PBB-11080 Stripper Feed Pump	PBB-11085 Stripper Feed Pump	PBB-11040 Naphtha Tower Reflux Pump	PBB-11045 Naphtha Tower Reflux Pump	PBB-11040/11045 Naphtha Tower Reflux Pumps Suction	PBB-11050 Naphtha Tower Bottoms Pump	PBB-11055 Naphtha Tower Bottoms Pump	PBB-11050/11055 Naphtha Tower Bottoms Pumps Suction	PBB-11070 Diesel Draw Pump	PBB-11075 Diesel Draw Pump	PBB-11070/11075 Diesel Draw Pumps Suction	EAL-14550/14570/14580 Fan A	EAL-14550/14570/14580 Fan B	Naphtha Product to TKBJ-3020/13020 Naphtha Storage Tank	Product Rerun to TKBJ-13000 Condensate Surge Tank	Diesel Product to TKBJ-3030/13030 Diesel Storage Tank	Diesel Product to TKBJ-13000 Condensate Surge Tank	Diesel Product Return to CBA-13075 Naphtha Tower	Naphtha Tower Bottoms to TKBJ-3060/Slop Tank
	TOPPING UNIT SHUTDOWN LEVEL 2					NOTE 6									NOTE 8					NOTE 8			NOTE 8			NOTE 8								
		SDV-11032 on SDV-11032	SDV-15000 on SDV-15000	SDV-15003 on SDV-15003	SDV-15001 on SDV-15001	YC-15000A	SDV-15002 on SDV-15002	Motor M-EAL-14530A A	Motor M-EAL-14530A B	Motor M-EAL-14530B C	Motor M-EAL-14530B D	Motor M-EAL-14530C E	Motor M-EAL-14530C F	SDV-14085 on FV-14085	SDV-11080 on SDV-11080	Motor M-PBB-11080	Motor M-PBB-11085	Motor M-PBB-11040	Motor M-PBB-11045	SDV-11045 on SDV-11045	Motor M-PBB-11050	Motor M-PBB-11055	SDV-11050 on SDV-11050	Motor M-PBB-11070	Motor M-PBB-11075	SDV-11070 on SDV-11070	Motor M- EAL-14570 A	Motor M- EAL-14570 B	SDV-14550A on FV-14550A	SDV-14550B on FV-14550B	SDV-14570A on FV-14570A	SDV-14570B on FV-14570B	SDV-14570C on FV-14570C	SDV-13075B on LV-13075B
1		D					D	S	S	S	S	S	S	D	D	S	S	S	S	D	S	S	D	S	S	D	S	S	D	D	D	D	D	D
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NOTES

NOTE 1 DELETED
NOTE 2 If the ZSO-11050 is not activated (SDV-11050 valve not completely open or in OFF position) the pump PBB-11050/11055 can not be started or if it is running it must be stoppe
NOTE 3 If the ZSO-11080 is not activated (SDV-11080 valve not completely open or in OFF position) the pump PBB-11080/11085 can not be started or if it is running it must be stopped
NOTE 4 If the ZSO-11070 is not activated (SDV-11070 valve not completely open or in OFF position) the pump PBB-11070/11075 can not be started or if it is running it must be stopped
NOTE 5 If the ZSO-11045 is not activated (SDV-11045 valve not completely open or in OFF position) the pump PBB-11040/11045 can not be started or if it is running it must be stopped.
NOTE 6 For MAP-15000 Remote Shutdown, see worksheet "MAP-15000_New"
NOTE 7 DELETED
NOTE 8 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST SHUTDOWN THE PUMP OR PUMPS, 2ND CLOSE THE SHUTDOWN VALVE.

CAUSE AND EFFECT MATRIX (NEW)

PERU - CAMISEA SECOND EXPANSION PROJECT
PISCO PLANT
CAUSE AND EFFECT MATRIX
TOPPING UNIT 3 (NEW)
For set points and alarm values, see PCSE-500-LI-K-101.

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
1		**TOPPPING UNIT 3 SHUTDOWN LEVEL 2**															
2	ESD - 26813	Topping Unit Shutdown Manual SOFT Push Bottom in CCR				X						X					
3	PAHH - 24040	EBG-24040 Diesel Feed Exchanger	525-759		psig			180									
4	PALL - 24040	EBG-24040 Diesel Feed Exchanger	525-759		psig					100						X	
5	FALL - 21038	Condensate to Topping Unit	525-758		gpm					244						X	
6	FAH - 21038	Condensate to Topping Unit	525-758		gpm				733								
7	VSHH - 24530 A	EAL-24530A Naphtha Tower Condenser Fan A	525-761					X						X			
8	VSHH - 24530 B	EAL-24530A Naphtha Tower Condenser Fan B	525-761					X						X			
9	VSHH - 24530 C	EAL-24530B Naphtha Tower Condenser Fan C	525-761					X						X			
10	VSHH - 24530 D	EAL-24530B Naphtha Tower Condenser Fan D	525-761					X						X			
11	LAHH - 23075 A	CBA-23075 Naphtha Tower	525-760		in			95						X			
12	LALL - 23075 A	CBA-23075 Naphtha Tower	525-760	6	in					41						X	
13	LAH - 23140	VBA-23140 Naphtha Tower Reflux Accumulator	525-761		in				63								
14	LAHH - 23140	VBA-23140 Naphtha Tower Reflux Accumulator	525-761		in			71									
15	LAL - 23140	VBA-23140 Naphtha Tower Reflux Accumulator	525-761		in					18							
16	LALL - 23140	VBA-23140 Naphtha Tower Reflux Accumulator	525-761	6	in					8						X	
17	PSHH - 21040	PBB-21045 Naphtha Tower Reflux Pump (seal)	525-761	5,11	psig	X		7,25						~~X~~			
18	LSHH - 21040	PBB-21040 Naphtha Tower Reflux Pump (seal)	525-761	~~6,~~ ~~10,11~~	in	X		27,5						~~X~~			
19	LSLL - 21040	PBB-21040 Naphtha Tower Reflux Pump (seal)	525-761	7, ~~11~~	in					19,5						X	
20	PSLL - 21040 A	PBB-21040 Suction Pressure	525-761		psig					9						X	
21	PSHH - 21045	PBB-21045 Naphtha Tower Reflux Pump (seal)	525-761	5,11	psig	X		7,25						~~X~~			
22	LSHH - 21045	PBB-21045 Naphtha Tower Reflux Pump (seal)	525-761	~~6,~~ ~~10,11~~	in	X		27,5						~~X~~			
23	LSLL - 21045	PBB-21045 Naphtha Tower Reflux Pump (seal)	525-761	7,11	in					19,5						X	
24	PSLL - 21045 A	PBB-21045 Suction Pressure	525-761		psig					9						X	
25	ZSO - 21045	PBB-21040 / 45 Suction Valve	525-761	5,6									X				
26	PSHH - 21070	PBB-21070 Diesel Draw Pump (seal)	525-762	1,11	psig	X		7,25						X			
27	LSHH - 21070	PBB-21070 Diesel/MDBS Draw Pump (seal)	525-762	~~6,~~ ~~10,11~~	in	X		27,5						~~X~~			
28	LSLL - 21070	PBB-21070 Diesel/MDBS Draw Pump (seal)	525-762	8,11	in					19,5						X	
29	PSLL - 21070 A	PBB-21070 Suction Pressure	525-762		psig					13						X	
30	PSHH - 21075	PBB-21075 Diesel Draw Pump (seal)	525-762	5,11	psig	X		7,25						~~X~~			
31	LSHH - 21075	PBB-21075 Diesel/MDBS Draw Pump (seal)	525-762	~~6,~~ ~~10,11~~	in									~~X~~			
32	LSLL - 21075	PBB-21075 Diesel/MDBS Draw Pump (seal)	525-762	8,11	in					19,5						X	
33	LSLL - 21070	PBB-21070 Diesel Draw Pump (seal)	525-762	11	in	X				19,5							
35	PSHH - 21075	PBB-21075 Diesel Draw Pump (seal)	525-762	1	psig	X		26						~~X~~			
36	LSLL - 21075	PBB-21075 Diesel Draw Pump (seal)	525-762	8,11	in					19,5						X	
37	PSLL - 21075 A	PBB-21075 Suction Pressure	525-762		psig					13						X	
38	ZSO - 21070	PBB-21070/21075 Suction valve	525-762	4, ~~6~~			X						~~X~~				
39	VSHH - 24550 A	EAL-24550 Cooler Fan A	525-763					X						X			
40	VSHH - 24550 B	EAL-24550 Cooler Fan B	525-763					X						X			
41	VSHH - 24570 A	EAL-24570 Cooler Fan A	525-763					X						X			
42	VSHH - 24570 B	EAL-24570 Cooler Fan B	525-763					X						X			
43	VSHH - 24570 C	EAL-24570 Cooler Fan C	525-763					X						X			
44	TAHH - 24550 E	EAL-24550 Naphtha Product Cooler	525-763		°F			135						X			
45	TAHH - 24570 E	EAL-24570 Diesel/MDBS Product Cooler	525-763		°F			135						X			
46	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																
47	HS - 21032	Inlet to Topping Unit 3	525-758														
48																	
49																	
50	~~HS - 24085~~	~~EBC-24085 Tower Reboiler Hot Oil Supply~~	~~525-760~~														
51	HS - 24050	EBC-24050 Hot Oil Preheater Supply	525-759														
52	HS - 21045	PBB-21040/21045 Naphtha Tower Reflux Pumps Suction	525-761														
53	HS - 21070	PBB-21070/21075 Diesel/MDBS Draw Pumps Suction	525-762														
54	HS - 24550 A	Naphtha Product to TKBJ-3020/TKBJ-13020 Naphtha Storage Tanks	525-763														
55	HS - 24550 B	Product Rerun to TKBJ-23000 Condensate Surge Tank	525-763														
56	HS - 24570 A	Diesel/MDBS Product to TKBJ-3030/13030/23030 Diesel/MDBS Storage Tank	525-763														
57	HS - 24570 B	Diesel/MDBS Product to TKBJ-23000 Condensate Surge Tank	525-763														
58	HS - 24085A	HOT OIL INLET TO EBC-24085A ~~LC /IM 01/08/2011~~	525-760														
59	HS - 24085B	HOT OIL INLET TO EBC-24085B ~~LC /IM 01/08/2011~~	525-760														

	TOPPING UNIT SHUTDOWN LEVEL 2	1	2	3	4	5	6	~~7~~	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
			525-758	525-760	525-760	525-760	525-760	~~525-760~~	525-759	525-761	525-761	525-761	525-762	525-762	525-762	525-763	525-763	525-763	525-763	525-763	525-763	525-763	525-763	525-763	525-760	525-760
			Inlet to Topping Unit 3	EAL-24530A Naphtha Tower Condenser Fan A	EAL-24530A Naphtha Tower Condenser Fan B	EAL-24530B Naphtha Tower Condenser Fan C	EAL-24530B Naphtha Tower Condenser Fan D	~~EBC-24085 Reboiler Hot Oil Supply~~	EBC-24050 Preheater Hot Oil Supply	PBB-21040 Naphtha Tower Reflux Pump	PBB-21045 Naphtha Tower Reflux Pump	PBB-21040/21045 Naphtha Tower Reflux Pumps Suction	PBB-21070 Diesel Draw Pump	PBB-21075 Diesel Draw Pump	PBB-21070/21075 Diesel Draw Pumps Suction	EAL-24550 Fan A	EAL-24550 Fan B	EAL-24570 Fan A	EAL-24570 Fan B	EAL-24570 Fan C	Naphtha Product to TKBJ-3020/13020 Naphtha Storage Tank	Product Rerun to TKBJ-23000 Condensate Surge Tank	Diesel Product to TKBJ-3030/13030 Diesel Storage Tank	Diesel Product to TKBJ-23000 Condensate Surge Tank	Hot Oil Stream to Diesel Stripper Reboiler (Tube side Inlet)	Hot Oil Stream to Diesel Stripper Reboiler (Tube side Inlet)
												NOTE 6			NOTE 6											
			SDY-21032 on SDV-21032	Motor M-EAL-24530A A	Motor M-EAL-24530A B	Motor M-EAL-24530B C	Motor M-EAL-24530B D	~~SDY-24085 on FV-24085~~	SDY-24050 on TV-24050	Motor M-PBB-21040	Motor M-PBB-21045	SDY-21045 on SDV-21045	Motor M-PBB-21070	Motor M-PBB-21075	SDY-21070 on SDV-21070	Motor M- EAL-24550 A	Motor M- EAL-24550 B	Motor M- EAL-24570 A	Motor M- EAL-24570 B	Motor M- EAL-24570 C	SDY-24550A on FV-24550A	SDY-24550B on FV-24550B	SDY-24570A on FV-24570A	SDY-24570B on FV-24570B	SDY-24085A on FV-24085A	SDY-24085B on FV-24085B
1			D	S	S	S	S	~~D~~	D	S	S	D	S	S	D	S	S	S	S	S	D	D	D	D	D	D
2		X																								
3																										
4									D																	
5									D																	
6																										
7				S																						
8					S																					
9						S																				
10							S																			
11																									~~D~~	~~D~~
12													S	S	D											
13																										
14																										
15																										
16										S	S	D														
17										~~S~~	~~S~~	~~D~~														
18										~~S~~	~~S~~	~~D~~														
19										S	~~S~~	D														
20										S																
21										~~S~~	~~S~~	~~D~~														
22										~~S~~	~~S~~	~~D~~														
23										~~S~~	S	D														
24											S															
25										S	S															
26													~~S~~	~~S~~	~~D~~											
27													~~S~~	~~S~~	~~D~~											
28													S	~~S~~	D											
29													S													
30													~~S~~	~~S~~	~~D~~											
31													~~S~~	~~S~~	~~D~~											
32													~~S~~	S	D											
33													~~S~~	~~S~~	~~D~~											
35													~~S~~	~~S~~	~~D~~											
36													S	S	D											
37														S												
38													S	S												
39																S										
40																	S									
41																		S								
42																			S							
43																				S						
44																					D	D				
45																							D	D		
46																										
47			C/O																							
48																										
49																										
50								~~C/O~~																		
51									C/O																	
52												C/O														
53															C/O											
54																					C/O					
55																						C/O				
56																							C/O			
57																								C/O		
58																									C/O	
59																										C/O

NOTES

~~NOTE 1 Holds 1 to 14 to be defined by EPC22 contractor~~
~~NOTE 2 If the ZSO-21050 is not activated (SDV-21050 valve not completely open or in OFF position) the pump PBB-21050/21055 can not be started or if it is running it must be stopped.~~
~~NOTE 3 If the ZSO-21080 is not activated (SDV-21080 valve not completely open or in OFF position) the pump PBB-21080/21085 can not be started or if it is running it must be stopped.~~
NOTE 4 If the ZSO-21070 is not activated (SDV-21070 valve not completely open or in OFF position) the pump PBB-21070/21075 can not be started or if it is running it must be stopped.
NOTE 5 If the ZSO-21045 is not activated (SDV-21045 valve not completely open or in OFF position) the pump PBB-21040/21045 can not be started or if it is running it must be stopped.
NOTE 6 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST SHUTDOWN THE PUMP OR PUMPS, 2ND CLOSE THE SHUTDOWN VALVE (after 30 seconds)
NOTE 7 AFTER 10 MIN OF LSLL-21040 ACTIVATION PUMP PBB-21040 SHALL BE STOPPED AND XV-21045 CLOSED. MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED TO DEACTIVATE ALL INTERLOCKS ASSOCIATED TO THE PUMP THAT HAS BEEN STOPPED.
AFTER 10 MIN OF LSLL-21045 ACTIVATION PUMP PBB-21045 SHALL BE STOPPED AND XV-21045 CLOSED. MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED TO DEACTIVATE ALL INTERLOCKS ASSOCIATED TO THE PUMP THAT HAS BEEN STOPPED.
NOTE 8 AFTER 10 MIN OF LSLL-21040 ACTIVATION PUMP PBB-21070 SHALL BE STOPPED AND XV-21070 CLOSED. MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED TO DEACTIVATE ALL INTERLOCKS ASSOCIATED TO THE PUMP THAT HAS BEEN STOPPED.
AFTER 10 MIN OF LSLL-21075 ACTIVATION PUMP PBB-21075 SHALL BE STOPPED AND XV-21070 CLOSED. MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED TO DEACTIVATE ALL INTERLOCKS ASSOCIATED TO THE PUMP THAT HAS BEEN STOPPED.
~~NOTE 9 IF THE LSHH-21040/45 IS actived, pump must be stopped (PBB-21040/45) and the suction valve must be closed (SDY-21045) deenergize.~~

CAUSE AND EFFECT MATRIX (EXISTING)

PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (based on PCAM-520-PL-Y-8206 Revision 5) (EPC2-PISCO PLANT)
HOT OIL UNIT 1_Existing

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low	1	2	3	4	5	6	7	8	9
																			610-PL-Y-8039	610-PL-Y-8039	610-PL-Y-8039	610-PL-Y-8039	610-PL-Y-8040	610-PL-Y-8040	610-PL-Y-8042	610-PL-Y-8042
																			VBA-3250 Hot Oil Expansion Vessel SDV-3250	PBB-1185 Hot Oil Pump	PBB-1185 Hot Oil Pump	PBB-1185 Hot Oil Pump	MAP-5010 Hot Oil Heater SDV-5010	MAP-5010 Hot Oil Heater	EAL-4600 Hot Oil Excess Cooler Fan A	EAL-4600 Hot Oil Excess Cooler Fan A
																			Note 1							
																		HOT OIL UNIT SHUTDOWN LEVEL 2	SDY-3250 on SDV-3250	Motor PBB-1185	Motor PBB-1190	Motor PBB-1195	SDY-5010 on SDV-5010	XS-29B Fuel Gas/ Diesel Fuel Supply	Motor EAL-4600	Motor EAL-4600
HOT OIL UNIT 1																										
1	**HOT OIL UNIT 1 SHUTDOWN LEVEL 2**		2																D	S	S	S	D	S	S	S
2	ESD - 6816	Hot Oil Shutdown Manual SOFT Push Button in CCR										X						X								
3																										
4	LSLL - 3250	VBA-3250 Hot Oil Expansion Vessel	610-8039		in						12						X			S	S	S				
5	PSHH - 1185	PBB-1185 Hot Oil Pump (seal)	610-8039	1	psig			12						X					D	S	S	S				
6	PSHH - 1190	PBB-1190 Hot Oil Pump (seal)	610-8039	1	psig			12						X					D	S	S	S				
7	PSHH - 1195	PBB-1195 Hot Oil Pump (seal)	610-8039	1	psig			12						X					D	S	S	S				
8																										
9	TAHH - 5010E	MAP-5010 Hot Oil Heater	610-8040		°F			585						X										S		
10																										
11	FAHH - 5010E	MAP-5010 Hot Oil Heater	610-8042		gpm			3054						X									D	S		
12	FALL - 5010E	MAP-5010 Hot Oil Heater	610-8042		gpm						1577						X							S		
13	VSHH - 4600A	EAL-4600 Exccess Hot Oil Cooler Fan A	610-8042					X						X											S	
14	VSHH - 4600B	EAL-4600 Exccess Hot Oil Cooler Fan A	610-8042					X						X												S
15																										

NOTES

Note 1 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST SHUTDOWN THE PUMP OR PUMPS, 2ND CLOSE THE SHUTDOWN VALVE.

Note 2 THIS SHEET IS NOT IN FILE PCSE-500-MC-K-506_A(1)

CAUSE AND EFFECT MATRIX (EXISTING)

BLOCK 56 - CAMISEA EXPANSION PROJECT
PISCO PLANT
CAUSE AND EFFECT MATRIX
HOT OIL UNIT 2 (EXISTING)
REFERENCE: PPAG-0520-MC-Y-560 Revision 2 (AESA-TECNA)
For set points and alarm values, see PPAG-0520-LI-K-505.

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low	HOT OIL UNIT SHUTDOWN LEVEL 2	PBB-11185/90/95 inlet valve	PBB-11185 Hot Oil Pump	PBB-11190 Hot Oil Pump	PBB-11195 Hot Oil Pump	Hot Oil From PBB-11185/90/95 (Inlet to MAP-15010)	Hot Oil to Distribution (Outlet from MAP-15010)	MAP-15010 Remote Shutdown	Fuel Gas to Hot Oil Heater MAP-15010	EAL-14600 Hot Oil Excess Cooler Fan A	EAL-14600 Hot Oil Excess Cooler Fan B	PBB-11150 Hot Oil Sump Pump
																		1	2	3	4	5	6	7	9	8	10	11	12
																			0610-516	0610-516	0610-516	0610-516	0610-517S1	0610-517S1	0610-518	0615-521	0610-519	0610-519	0610-519
																			Note4	Note4	Note4	Note4			NOTE 3				
																			SDY-13250 on SDV-13250	Motor M-PBB-11185	Motor M-PBB-11190	Motor M-PBB-11195	SDY-15010 on SDV-15010	SDY-15011 on SDV-15011	YC-15010A	SDY-15012 on SDV-15012	Motor M- EAL-14600 A	Motor M- EAL-14600 B	Motor M-PBB-11150
1		**HOT OIL UNIT 2 SHUTDOWN LEVEL 2**		6															D	S	S	S			X	D	S	S	S
2	ESD - 16816	Hot Oil Shutdown Manual SOFT Push Button in CCR				X						X						X											
3	HS - 15010A	MAP-15010 Shutdown Manual SOFT Push Bottom in CCR										X													X	X			
4	LAHH - 13250A	VBA-13250 Hot Oil Expansion Vessel	0610-516		in			108																					
5	LALL - 13250A	VBA-13250 Hot Oil Expansion Vessel	0610-516		in						20						X			S	S	S			X	D			
6	PAHH - 11185	PBB-11185 Hot Oil Pump (seal)	0610-516	4	psig			26						X					D	S	S	S							
7	LALL - 11185 B	PBB-11185 Hot Oil Pump (seal)	0610-516		in						16																		
9	PSLL - 11185 A	PBB-11185 Suction Pressure	0610-516		psig						1						X			S									
10	PAHH - 11190	PBB-11190 Hot Oil Pump (seal)	0610-516	4	psig			26						X					D	S	S	S							
11	LALL - 11190 B	PBB-11190 Hot Oil Pump (seal)	0610-516		in						16																		
13	PSLL - 11190 A	PBB-11190 Suction Pressure	0610-516		psig						1						X				S								
14	PAHH - 11195	PBB-11195 Hot Oil Pump (seal)	0610-516	4	psig			26						X					D	S	S	S							
15	LALL - 11195 B	PBB-11195 Hot Oil Pump (seal)	0610-516		in						16																		
17	PSLL - 11195 A	PBB-11195 Suction Pressure	0610-516		psig						1						X					S							
18	ZSO - 13250	PBB-11185/90/85 inlet valve	0610-516	1			X						X							S	S	S							
19	ZSO - 15010	MAP-15010 Hot Oil Heater SDV-15010	0610-517S1				X						X												X	D			
20	ZSO - 15011	MAP-15010 Hot Oil Heater SDV-15011	0610-517S1				X						X												X	D			
21	TAHH - 15010 E	MAP-15010 Hot Oil Heater	0610-517S1		°F			585						X											X	D			
22	FAHH - 15010 A	MAP-15010 Hot Oil Heater feed to "pass A"	0610-517S1		gpm			500																					
23	FAHH - 15010 B	MAP-15010 Hot Oil Heater feed to "pass B"	0610-517S1		gpm			500																					
24	FAHH - 15010 C	MAP-15010 Hot Oil Heater feed to "pass C"	0610-517S1		gpm			500																					
25	FAHH - 15010 D	MAP-15010 Hot Oil Heater feed to "pass D"	0610-517S1		gpm			500																					
26	FALL - 15010 A	MAP-15010 Hot Oil Heater feed to "pass A"	0610-517S1		gpm						170						X								X	D			
27	FALL - 15010 B	MAP-15010 Hot Oil Heater feed to "pass B"	0610-517S1		gpm						170						X								X	D			
28	FALL - 15010 C	MAP-15010 Hot Oil Heater feed to "pass C"	0610-517S1		gpm						170						X								X	D			
29	FALL - 15010 D	MAP-15010 Hot Oil Heater feed to "pass D"	0610-517S1		gpm						170						X								X	D			
30	FAHH - 15010 E	MAP-15010 Hot Oil Heater	0610-519		gpm			2000						X											X	D			
31	FALL - 15010 E	MAP-15010 Hot Oil Heater	0610-519		gpm						675						X								X	D			
32	VSHH - 14600 A	EAL-14600 Exccess Hot Oil Cooler Fan A	0610-519					X						X													S		
33	VSHH - 14600 B	EAL-14600 Exccess Hot Oil Cooler Fan B	0610-519					X						X														S	
34	TAHH - 13252	VBA-13252 Hot Oil Sump	0610-519		°F			440						X															S
35	XA - 11185	PBB-11185 Hot Oil Pump (seal air cooler motor)	0610-516	2			X																						
36	XA - 11190	PBB-11190 Hot Oil Pump (seal air cooler motor)	0610-516	2			X																						
37	XA - 11195	PBB-11195 Hot Oil Pump (seal air cooler motor)	0610-516	2			X																						
38	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																												
39	HS - 13250	PBB-11185/90/85 inlet valve	0610-516																C/O										
40	HS - 15010	Hot Oil From PBB-11185/90/95 (Inlet to MAP-15010)	0610-517S1																				C/O						
41	HS - 15011	Hot Oil to Distribution (Outlet from MAP-15010)	0610-517S1																					C/O					
42	HS - 15012	Fuel Gas to Hot Oil Heater MAP-15010	0610-517S1																							C/O			

NOTES

NOTE 1 If the ZAO-13250 is not activated (SDV-12350 valve OFF position) the pump PBB-11185/11190/11195 can not be started or if it is running it must be stopped.
NOTE 2 If the pump is running and the air cooler motor of the pump is stopped, the alarm must be activated.
NOTE 3 For MAP-15010 Remote Shutdown, see worksheet "MAP-15010_New"
NOTE 4 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST SHUTDOWN THE PUMP OR PUMPS, 2ND CLOSE THE SHUTDOWN VALVE.
NOTE 5 Deleted.

CAUSE AND EFFECT MATRIX (NEW)

PERU - CAMISEA SECOND EXPANSION PROJECT
PISCO PLANT
CAUSE AND EFFECT MATRIX
HOT OIL UNIT 3 (NEW)
For set points and alarm values, see PCSE-500-LI-K-101.

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
1		**HOT OIL UNIT 3 SHUTDOWN LEVEL 2**															
2	ESD - 26826	Hot Oil Shutdown Manual SOFT Push Button in CCR				X						X					
3	HS - 25010A	MAP-25010 Shutdown Manual SOFT Push Bottom in CCR	610-774									X					
4	HS - 35010A	MAP-35010 Shutdown Manual SOFT Push Bottom in CCR	610-794									X					
5	LAHH - 23250A	VBA-23250 Hot Oil Expansion Vessel	610-772		in	x		120						X			
6	LALL - 23250A	VBA-23250 Hot Oil Expansion Vessel	610-772		in						20						X
7	PAHH - 21185	PBB-21185 Hot Oil Pump (seal)	610-772-2	4	psig	x		7,25						X			
8	LALL - 21185 B	PBB-21185 Hot Oil Pump (seal)	610-772-2	6	in						19,5						X
9	LAHH - 21185	PBB-21185 Hot Oil Pump (seal)	610-772-2		in			27,5									
10	PSLL - 21185 A	PBB-21185 Suction Pressure	610-772-2		psig						1						X
11	PAHH - 21190	PBB-21190 Hot Oil Pump (seal)	610-772-2	4	psig	x		7,25						X			
12	LALL - 21190 B	PBB-21190 Hot Oil Pump (seal)	610-772-2	6	in						19,5						X
13	LAHH - 21190	PBB-21190 Hot Oil Pump (seal)	610-772-2	4	in			27,5						X			
14	PSLL - 21190 A	PBB-21190 Suction Pressure	610-772-2		psig						1						X
15	PAHH - 21195	PBB-21195 Hot Oil Pump (seal)	610-772-2	4	psig	x		7,25						X			
16	LALL - 21195 B	PBB-21195 Hot Oil Pump (seal)	610-772-2	6	in						19,5						X
17	LAHH - 21195	PBB-21190 Hot Oil Pump (seal)	610-772-2		in			27,5									
18	PSLL - 21195 A	PBB-21195 Suction Pressure	610-772-2		psig						1						X
19	ZSO - 23250	PBB-21185/90/85 inlet valve	610-772-2	1			X						X				
20	ZSO - 35010	MAP-35010 Hot Oil Heater SDV-35010	610-793				X						X				
21	ZSO - 35011	MAP-35010 Hot Oil Heater SDV-35011	610-793				X						X				
22	TAHH - 35010 E	MAP-35010 Hot Oil Heater	610-793		°F			655						X			
23	FAHH - 35010 A	MAP-35010 Hot Oil Heater feed to "pass A"	610-793		gpm			380			X						
24	FAHH - 35010 B	MAP-35010 Hot Oil Heater feed to "pass B"	610-793		gpm			380			X						
25	FAHH - 35010 C	MAP-35010 Hot Oil Heater feed to "pass C"	610-793		gpm			380					X				
26	FAHH - 35010 D	MAP-35010 Hot Oil Heater feed to "pass D"	610-793		gpm			380					X				
28	FALL - 35010 A	MAP-35010 Hot Oil Heater feed to "pass A"	610-793	5	gpm						193						X
29	FALL - 35010 B	MAP-35010 Hot Oil Heater feed to "pass B"	610-793		gpm						193						X
30	FALL - 35010 C	MAP-35010 Hot Oil Heater feed to "pass C"	610-793		gpm						193						X
31	FALL - 35010 D	MAP-35010 Hot Oil Heater feed to "pass D"	610-793		gpm						193						X
31	ZSO - 25010	MAP-25010 Hot Oil Heater SDV-25010	610-773				X						X				
33	ZSO - 25011	MAP-25010 Hot Oil Heater SDV-25011	610-773				X						X				
34	TAHH - 25010 E	MAP-25010 Hot Oil Heater	610-773		°F			655						X			
35	FAHH - 25010 A	MAP-25010 Hot Oil Heater feed to "pass A"	610-773	5	gpm			380									
36	FAHH - 25010 B	MAP-25010 Hot Oil Heater feed to "pass B"	610-773		gpm			380									
37	FAHH - 25010 C	MAP-25010 Hot Oil Heater feed to "pass C"	610-773		gpm			380									
38	FAHH - 25010 D	MAP-25010 Hot Oil Heater feed to "pass D"	610-773		gpm			380									
39	FALL - 25010 A	MAP-25010 Hot Oil Heater feed to "pass A"	610-773		gpm						193						X
40	FALL - 25010 B	MAP-25010 Hot Oil Heater feed to "pass B"	610-773		gpm						193						X
41	FALL - 25010 C	MAP-25010 Hot Oil Heater feed to "pass C"	610-773		gpm						193						X
42	FALL - 25010 D	MAP-25010 Hot Oil Heater feed to "pass D"	610-773		gpm						193						X
	FAHH - 25010 E	MAP-25010 Hot Oil Heater feed + MAP-35010 Hot Oil Heaters	610-775		gpm			1520					X	X			
43	FALL - 25010 E	MAP-25010 + MAP-35010 Hot Oil Heaters	610-775		gpm						773						X
45	VSHH - 24600 A	EAL-24600 Exccess Hot Oil Cooler Fan A	610-775					X						X			
46	VSHH - 24600 B	EAL-24600 Exccess Hot Oil Cooler Fan B	610-775					X						X			
47	TAHH - 23252	VBA-23252 Hot Oil Sump	610-775		°F			580						X			
48	XA - 21185	PBB-21185 Hot Oil Pump (seal air cooler motor)	610-772-2	2			X										
49	XA - 21190	PBB-21190 Hot Oil Pump (seal air cooler motor)	610-772-2	2			X										
50	XA - 21195	PBB-21195 Hot Oil Pump (seal air cooler motor)	610-772-2	2			X										
51	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																
52	HS - 23250	PBB-21185/90/85 inlet valve	610-772-2														
53	HS - 25010	Hot Oil From PBB-21185/90/95 (Inlet to MAP-25010)	610-773														
54	HS - 25011	Hot Oil to Distribution (Outlet from MAP-25010)	610-773														
55	HS - 35010	Hot Oil From PBB-21185/90/95 (Inlet to MAP-35010)	610-793														
56	HS - 35011	Hot Oil to Distribution (Outlet from MAP-35010)	610-793														
57	HS - 25002	Fuel Gas to Hot Oil Heater MAP-35010	615-776														
55	HS - 25012	Fuel Gas to Hot Oil Heater MAP-25010	615-776														

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		610-772-2	610-772-2	610-772-2	610-772-2	610-793	610-793	610-773	610-773	610-794	610-774	615-776	615-776	610-775	610-775	610-775
	HOT OIL UNIT SHUTDOWN LEVEL 2	PBB-21185/90/95 inlet valve	PBB-21185 Hot Oil Pump	PBB-21190 Hot Oil Pump	PBB-21195 Hot Oil Pump	Hot Oil From PBB-21185/90/95 (Inlet to MAP-35010)	Hot Oil to Distribution (Outlet from MAP-35010)	Hot Oil From PBB-21185/90/95 (Inlet to MAP-25010)	Hot Oil to Distribution (Outlet from MAP-25010)	MAP-35010 Remote Shutdown	MAP-25010 Remote Shutdown	Fuel Gas to Hot Oil Heater MAP-35010	Fuel Gas to Hot Oil Heater MAP-25010	EAL-24600 Hot Oil Excess Cooler Fan A	EAL-24600 Hot Oil Excess Cooler Fan B	PBB-21150 Hot Oil Sump Pump
		Note4	Note4	Note4	Note4					NOTE 3	NOTE 3					
		SDY-23250 on SDV-23250	Motor M-PBB-21185	Motor M-PBB-21190	Motor M-PBB-21195	SDY-35010 on SDV-35010	SDY-35011 on SDV-35011	SDY-25010 on SDV-25010	SDY-25021 on SDV-25011	YC-35010A	YC-25010A	SDY-25002 on SDV-25002	SDY-25012 on SDV-25012	Motor M- EAL-24600 A	Motor M- EAL-24600 B	Motor M-PBB-21150
1		D	S	S	S					X	X	D	D	S	S	S
2	X															
3											X		D			
4										X		D				
5																
6			S	S	S					X	X	D	D			
7		D	S	S	S											
8		D	S	S	S											
9		D	S	S	S											
10			S													
11		D	S	S	S											
12		D	S	S	S											
13		D	S	S	S											
14				S												
15		D	S	S	S											
16					S											
17																
18					S											
19			S	S	S					X	X	D	D			
20										X		D				
21										X		D				
22										X		D				
23																
24																
25																
26																
28										X		D				
29										X		D				
30										X		D				
31										X		D				
31											X		D			
33											X		D			
34											X		D			
35																
36																
37																
38																
39											X		D			
40											X		D			
41											X		D			
42											X		D			
										X	X	D	D			
43										X	X	D	D			
45														S		
46															S	
47																S
48																
49																
50																
51																
52		C/O														
53						C/O										
54							C/O									
55								C/O								
56									C/O							
57												C/O				
55													C/O			

NOTES

NOTE 1 If the ZAO-23250 is not activated (SDV-22350 valve OFF position) the pump PBB-21185/21190/21195 can not be started or if it is running it must be stopped.
NOTE 2 If the pump is running and the air cooler motor of the pump is stopped, the alarm must be activated.
NOTE 3 For MAP-25010 / MAP-35010 Remote Shutdown, see worksheet "MAP-25010_New" / "MAP-35010_New" respectively
~~NOTE 4 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST SHUTDOWN THE PUMP OR PUMPS, 2ND CLOSE THE SHUTDOWN VALVE.~~

REFERENCE: PPAG-0525-P2-K-527 Revision 1 (FLARGENT. AESA-TECNA)

BLOCK 56 - CAMISEA EXPANSION PROJECT
PISCO PLANT
CAUSE AND EFFECT MATRIX: INTERLOCKS PERFORMED BY THE BMS OF THE MAP-15000
MAP-15000 NAPHTHA HEATER (NEW, BUT THESE INTERLOCKS ARE NOT PERFORMED BY THE SSS)

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low	REMOTE SHUTDOWN	LOCAL SHUTDOWN	STACK DAMPER	SHUT OFF MAIN FUEL GAS	MAIN GAS VENT	SHUT OFF MAIN FUEL GAS- BURNER A	SHUT OFF MAIN FUEL GAS- BURNER B	SHUT OFF MAIN FUEL GAS- BURNER C	SHUT OFF MAIN FUEL GAS- BURNER D	SHUT OFF MAIN FUEL GAS- BURNER E	SHUT OFF FUEL GAS- PILOT A	SHUT OFF FUEL GAS- PILOT B	SHUT OFF FUEL GAS- PILOT C	SHUT OFF FUEL GAS- PILOT D	SHUT OFF FUEL GAS- PILOT E	SHUT OFF FUEL GAS TO PILOTS	PILOTS FUEL GAS VENT
																		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
																				0525-508S2	0525-509	0525-509	0525-509	0525-509	0525-509	0525-509	0525-509	0525-509	0525-509	0525-509	0525-509	0525-509	0525-509	0525-509
																				XY-15004	SDV-15000A	SDV-15000C	SDV-15001A	SDV-15001B	SDV-15001C	SDV-15001D	SDV-15001E	SDV-15002A	SDV-15002B	SDV-15002C	SDV-15002D	SDV-15002E	SDV-15000B	SDV-15000D
1	YC - 15000A	REMOTE SHUTDOWN (SIGNAL FROM THE SSS)	0525-509	5	-	X						X						X		O	C	O	C	C	C	C	C	C	C	C	C	C	C	O
2	HS - 15001 A	LOCAL SHUTDOWN			-	X						X							X	O	C	O	C	C	C	C	C	C	C	C	C	C	C	O
3	TAH - 15005 B	FLUE GAS STACK TEMPERATURE	0525-508		ºF				590						X				X															
4	TAHH - 15004 A	TUBE SKIN TEMPERATURE- RADIATION	0525-508		ºF			630						X					X															
5	TAHH - 15004 B	TUBE SKIN TEMPERATURE- RADIATION	0525-508		ºF			630						X					X															
6	TAHH - 15004 C	TUBE SKIN TEMPERATURE- RADIATION	0525-508		ºF			630						X					X															
7	TAHH - 15004 D	TUBE SKIN TEMPERATURE- RADIATION	0525-508		ºF			630						X					X															
8	TAH - 15004 A	TUBE SKIN TEMPERATURE- RADIATION	0525-508		ºF				610																									
9	TAH - 15004 B	TUBE SKIN TEMPERATURE- RADIATION	0525-508		ºF				610																									
10	TAH - 15004 C	TUBE SKIN TEMPERATURE- RADIATION	0525-508		ºF				610																									
11	TAH - 15004 D	TUBE SKIN TEMPERATURE- RADIATION	0525-508		ºF				610																									
12	TAHH - 15002 A	TUBE SKIN TEMPERATURE- CONVECTION	0525-508		ºF			555																										
13	TAHH - 15002 B	TUBE SKIN TEMPERATURE- CONVECTION	0525-508		ºF			555																										
14	TAHH - 15002 C	TUBE SKIN TEMPERATURE- CONVECTION	0525-508		ºF			555																										
15	TAHH - 15002 D	TUBE SKIN TEMPERATURE- CONVECTION	0525-508		ºF			555																										
16	TAH - 15002 A	TUBE SKIN TEMPERATURE- CONVECTION	0525-508		ºF				530																									
17	TAH - 15002 B	TUBE SKIN TEMPERATURE- CONVECTION	0525-508		ºF				530																									
18	TAH - 15002 C	TUBE SKIN TEMPERATURE- CONVECTION	0525-508		ºF				530																									
19	TAH - 15002 D	TUBE SKIN TEMPERATURE- CONVECTION	0525-508		ºF				530																									
20	ZSC - 15009	OPEN POSITION STACK DAMPER	0525-508			X						X								O	C	O	C	C	C	C	C							
21	PSLL - 15000C	PILOT GAS PRESSURE	0525-509		psig						5						X		X															
22	PSHH - 15005A	MAIN GAS PRESSURE	0525-509		psig			40						X							C	O	C	C	C	C	C							
23	PSLL - 15001C	MAIN GAS PRESSURE	0525-509		psig						10						X				C	O	C	C	C	C	C							
24	PSL - 15003	PURGE AIR PRESSURE DURING PURGE	0525-508		in H_2O					0,5						X			X															
25	BSL - 15000A	FLAME DETECTION PILOT A	0525-508		-		X						X										C					C						
26	BSL - 15000B	FLAME DETECTION PILOT B	0525-508		-		X						X											C					C					
27	BSL - 15000C	FLAME DETECTION PILOT C	0525-508		-		X						X												C					C				
28	BSL - 15000D	FLAME DETECTION PILOT D	0525-508		-		X						X													C					C			
29	BSL - 15000E	FLAME DETECTION PILOT E	0525-508		-		X						X														C					C		
30	BSL - 15001A	FLAME DETECTION BURNER A	0525-508	1, 2			X						X										C											
31	BSL 15001B	FLAME DETECTION BURNER B	0525-508	1, 2			X						X											C										
32	BSL - 15001C	FLAME DETECTION BURNER C	0525-508	1, 2			X						X												C									
33	BSL - 15001D	FLAME DETECTION BURNER D	0525-508	1, 2			X						X													C								
34	BSL - 15001E	FLAME DETECTION BURNER E	0525-508	1, 2			X						X														C							
35	ZSC - 15000D	CLOSE POSITION FUEL GAS VENT VALVE (PILOTS)	0525-509	4			X						X						X															
36	ZSO - 15000D	OPEN POSITION FUEL GAS VENT VALVE (PILOTS)	0525-509	4		X						X							X															
37	ZSC - 15000C	CLOSE POSITION FUEL GAS VENT VALVE (BURNERS)	0525-509	4			X						X						X															
38	ZSO - 15000C	OPEN POSITION FUEL GAS VENT VALVE (BURNERS)	0525-509	4		X						X							X															

NOTES

NOTE 1 In case no flame detected in burners pilot, fuel gas supply to that pilot shall be shut off.
NOTE 2 In case no flame detected in any consecutive burners pilots, local shutdown shall occur.
NOTE 3 When valve position differs from limit switch indication, action shall be performed depending on:
- a- Fuel gas to pilots (general): Local shutdown shall occur.
- b- Fuel gas to pilots (individual):
- c- Fuel gas to burners (general): Local shutdown shall occur.
- d- Fuel gas to burners (individual):

NOTE 4 If fuel gas vent (pilot/burner) is open during heaters operation, local shutdown shall occur.
NOTE 5 For remote shutdown contingencies, see worksheet "Topping_New"
NOTE 6 If flame is detected and the corresponding valve is closed, local shutdown shall occur.

CAUSE AND EFFECT MATRIX (NEW) - TO BE REVIEWED AND COMPLETED BY HEATER VENDOR

PERU - CAMISEA SECOND EXPANSION PROJECT
PISCO PLANT
CAUSE AND EFFECT MATRIX: INTERLOCKS PERFORMED BY THE BMS OF THE MAP-25010
HOT OIL HEATER (THESE INTERLOCKS ARE NOT PERFORMED BY THE SSS)

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low	REMOTE SHUTDOWN	LOCAL SHUTDOWN	BMS SYSTEM MAP-25010	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
																					610-773-2	0610-774	0610-774	0610-774	0610-774	0610-774	0610-774	0610-774	0610-774	0610-774	0610-774	0610-774	0610-774	0610-774	0610-774	0610-774
																					STACK DAMPER	SHUT OFF MAIN FUEL GAS TO BURNERS	MAIN GAS VENT	SHUT OFF BUNER FUEL GAS-BURNER A	SHUT OFF BURNER FUEL GAS-BURNER B	SHUT OFF BURNER FUEL GAS-BURNER C	SHUT OFF BURNER FUEL GAS-BURNER D	SHUT OFF BURNER FUEL GAS-BURNER E	SHUT OFF BURNER FUEL GAS-BURNER F	SHUT OFF PILOT FUEL GAS-PILOT A	SHUT OFF PILOT FUEL GAS-PILOT B	SHUT OFF PILOT FUEL GAS-PILOT C	SHUT OFF PILOT FUEL GAS-PILOT D	SHUT OFF PILOT FUEL GAS-PILOT E	SHUT OFF PILOT FUEL GAS-PILOT F	SHUT OFF MAIN FUEL GAS TO PILOTS	PILOTS FUEL GAS VEN
																					XY-25016	SDV-25010A	SDV-25010C	SDV-25011A	SDV-25011B	SDV-25011C	SDV-25011D	SDV-25011E	SDV-25011F	SDV-25012A	SDV-25012B	SDV-25012C	SDV-25012D	SDV-25012E	SDV-25012F	SDV-25010B	SDV-25010D
1	YC - 25010A	REMOTE SHUTDOWN (SIGNAL FROM THE SSS)	610-774	5	-	X						X						X			O	C	O	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	HS - 25010A	LOCAL SHUTDOWN	610-774		-	X						X							X		O	C	O	C	C	C	C	C	C	C	C	C	C	C	C	C	O
	BMS SYSTEM MAP-25010																																				
3	TAH - 25014 B	FLUE GAS STACK TEMPERATURE	610-773-2		°F				685						X				X																		
4	TAHH - 25015A	TUBE SKIN TEMPERATURE- RADIATION	610-773-2	~~7~~	°F			801						X					X																		
5	TAHH - 25015B	TUBE SKIN TEMPERATURE- RADIATION	610-773-2		°F			801						X					X																		
6	TAH - 25015B	TUBE SKIN TEMPERATURE- RADIATION	610-773-2		°F				721																												
7	TAHH - 25015C	TUBE SKIN TEMPERATURE- RADIATION	610-773-2		°F			801						X					X																		
8	TAHH - 25015 D	TUBE SKIN TEMPERATURE- RADIATION	610-773-2		°F			801						X					X																		
9	TAH - 25015 A	TUBE SKIN TEMPERATURE- RADIATION	610-773-2		°F				721																												
10	TAH - 25015 C	TUBE SKIN TEMPERATURE- RADIATION	610-773-2		°F				721																												
11	TAH - 25015 D	TUBE SKIN TEMPERATURE- RADIATION	610-773-2		°F				721																												
12	TAHH - 25012A	TUBE SKIN TEMPERATURE- CONVECTION	610-773-2	~~7~~	°F			683																													
13	TAHH - 25012B	TUBE SKIN TEMPERATURE- CONVECTION	610-773-2		°F			683																													
14	TAHH - 25012C	TUBE SKIN TEMPERATURE- CONVECTION	610-773-2		°F			683																													
15	TAHH - 25012D	TUBE SKIN TEMPERATURE- CONVECTION	610-773-2		°F			683																													
16	TAH - 25012 C	TUBE SKIN TEMPERATURE- CONVECTION	610-773-2		°F				610																												
17	TAH - 25012 D	TUBE SKIN TEMPERATURE- CONVECTION	610-773-2		°F				610																												
18	TAH - 25012A	TUBE SKIN TEMPERATURE- CONVECTION	610-773-2	~~7~~	°F				610																												
19	TAH - 25012B	TUBE SKIN TEMPERATURE- CONVECTION	610-773-2		°F				610																												
20	ZAC - 25016	OPEN POSITION STACK DAMPER	610-773-2	**10**	%	X						X									O	C	O	C	C	C	C	C	C								
21	ZAO - 25016	OPEN POSITION STACK DAMPER	610-773-2	7,10	%	X						X									O	C	O	C	C	C	C	C	C	~~C~~							
22	PSLL - 25013C	PILOT GAS PRESSURE	610-774		psig						5					X			X																		
23	PAHH - 25012B	MAIN GAS PRESSURE	610-774		psig			40						X								C	O	C	C	C	C	C	C								
24	PALL - 25012B	MAIN GAS PRESSURE	610-774		psig						10					X						C	O	C	C	C	C	C	C								
25	PSLL - 25012A	MAIN GAS PRESSURE	610-774		psig						15					X						C	O	C	C	C	C	C	C								
26	PSL - 25012	PURGE AIR PRESSURE DURING PURGE	610-773-2		in H_2O					0,5					X				X																		
27	BSL - 25012A	FLAME DETECTION PILOT A	610-773-2	~~8~~	-		X						X											C						C							
28	BSL - 25012B	FLAME DETECTION PILOT B	610-773-2		-		X						X												C							C					
29	BSL - 25012C	FLAME DETECTION PILOT C	610-773-2		-		X						X													C							C				
30	BSL - 25012D	FLAME DETECTION PILOT D	610-773-2		-		X						X														C							C			
31	BSL - 25012E	FLAME DETECTION PILOT E	610-773-2		-		X						X															C							C		~~C~~
32	BSL - 25012F	FLAME DETECTION PILOT F	610-773-2		-		X						X																	C	~~C~~					C		~~C~~
33	BSL - 25011A	FLAME DETECTION BURNER A	610-773-2	1, 2, 8			X						X											C													
34	BSL 25011B	FLAME DETECTION BURNER B	610-773-2	1, 2			X						X												C												
35	BSL - 25011C	FLAME DETECTION BURNER C	610-773-2	1, 2			X						X													C											
36	BSL - 25011D	FLAME DETECTION BURNER D	610-773-2	1, 2			X						X														C										
37	BSL - 25011E	FLAME DETECTION BURNER E	610-773-2	1, 2			X						X															C									
38	BSL - 25011F	FLAME DETECTION BURNER F	610-773-2	1, 2			X						X																C	~~C~~							
39	ZSC - 25010D	CLOSE POSITION FUEL GAS VENT VALVE (PILOTS)	610-774	4			X						X						X																		
40	ZSO - 25010D	OPEN POSITION FUEL GAS VENT VALVE (PILOTS)	610-774	4		X						X							X																		
41	ZSC - 25010C	CLOSE POSITION FUEL GAS VENT VALVE (BURNERS)	610-774	4			X						X						X																		
42	ZSC - 25010C	CLOSE POSITION FUEL GAS VENT VALVE (BURNERS)	610-774	4			X						X						X																		
43	ZSO - 25010C	OPEN POSITION FUEL GAS VENT VALVE (BURNERS)	610-774	4		X						X							X																		

NOTES

NOTE 1 In case no flame detected in burners pilot, fuel gas supply to that pilot shall be shut off.
NOTE 2 In case no flame detected in any X (number of burners to be defined by heater vendor) consecutive burners pilots, local shutdown shall occur.
NOTE 3 When valve position differs from limit switch indication, action shall be performed depending on:
a- Fuel gas to pilots (general): Local shutdown shall occur.
b- Fuel gas to pilots (individual)-
c- Fuel gas to burners (general): Local shutdown shall occur.
d- Fuel gas to burners (individual)-
NOTE 4 If fuel gas vent (pilot/burner) is open during heaters operation, local shutdown shall occur.
NOTE 5 For remote shtudown contingencies, see worksheet "Hot Oil Unit 3_New".
NOTE 6 If flame is detected and the corresponding valve is closed, local shutdown shall occur.
NOTE 7 ZAO-25016 (Close Position Stack Damper) should have the interlock action only during heater purging.
NOTE 8
NOTE 9 DELETE
NOTE 10 This value to be defined by vendor

CAUSE AND EFFECT MATRIX (NEW)

PERU - CAMISEA SECOND EXPANSION PROJECT
PISCO PLANT
CAUSE AND EFFECT MATRIX: INTERLOCKS PERFORMED BY THE BMS OF THE MAP-35010
HOT OIL HEATER (THESE INTERLOCKS ARE NOT PERFORMED BY THE SSS)

						ALARMS						INTERLOCKS																									
																		1	2		3	4	5	6	7	8	9	10		7	15	16	17	18		8	9
																					610-793_2	610-794	610-794	610-794	610-794	610-794	610-794	610-794	610-794	610-794	610-794	610-794	610-794	610-794	610-794	610-794	610-794
	TAG	Loop Service	P&ID	Notes	Unit	ON	OFF	High High	High	Low	Low Low	ON	OFF	High High	High	Low	Low Low	REMOTE SHUTDOWN	LOCAL SHUTDOWN	BMS SYSTEM MAP-35010	STACK DAMPER	SHUT OFF MAIN FUEL GAS TO BURNERS	MAIN GAS VENT	SHUT OFF BUNER FUEL GAS- BURNER A	SHUT OFF BURNER FUEL GAS- BURNER B	SHUT OFF BURNER FUEL GAS- BURNER C	SHUT OFF BURNER FUEL GAS- BURNER D	SHUT OFF BURNER FUEL GAS- BURNER E	SHUT OFF BURNER FUEL GAS- BURNER F	SHUT OFF PILOTFUEL GAS- PILOT A	SHUT OFF PILOT FUEL GAS- PILOT B	SHUT OFF PILOT FUEL GAS- PILOT C	SHUT OFF PILOT FUEL GAS- PILOT D	SHUT OFF PILOT FUEL GAS- PILOT E	SHUT OFF PILOT FUEL GAS- PILOT F	SHUT OFF MAIN FUEL GAS TO PILOTS	PILOTS FUEL GAS VENT
																					XY-35016	SDV-35010A	SDV-35010C	SDV-35011A	SDV-35011B		SDV-35011D	SDV-35011E	SDV-35011F	SDV-35012A	SDV-35012B	SDV-35012C	SDV-35012D	SDV-35012E	SDV-35012F	SDV-35010B	SDV-35010D
1	YC - 35010A	REMOTE SHUTDOWN (SIGNAL FROM THE SSS)	610-794	5	0	X						X						X			O	C	O	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	HS - 35010A	LOCAL SHUTDOWN	610-794		-	X						X							X		O	C	O	C	C	C	C	C	C	C	C	C	C	**C**	**C**	**C**	**O**
	BMS SYSTEM MAP-35010																																				
3	TAH - 35014B	FLUE GAS STACK TEMPERATURE	610-793-2		ºF				685	0					X				X																		
4	TAHH - 35015A	TUBE SKIN TEMPERATURE- RADIATION	610-793-2		ºF			801						X					X																		
5	TAHH - 35015B	TUBE SKIN TEMPERATURE- RADIATION	610-793-2		ºF		0	801						X					X										0						0		
6	TAHH - 35015C	TUBE SKIN TEMPERATURE- RADIATION	610-793-2		ºF			801		0				X					X																		
7	TAHH - 35015D	TUBE SKIN TEMPERATURE- RADIATION	610-793-2		ºF		0	801						X					X																		
8	TAH - 35015A	TUBE SKIN TEMPERATURE- RADIATION	610-793-2		ºF				721	0																											
9	TAH - 35015B	TUBE SKIN TEMPERATURE- RADIATION	610-793-2		ºF				721																												
10	TAH - 35015C	TUBE SKIN TEMPERATURE- RADIATION	610-793-2		ºF				721	0																											
11	TAH - 35015D	TUBE SKIN TEMPERATURE- RADIATION	610-793-2		ºF				721																												
12	TAHH - 35012A	TUBE SKIN TEMPERATURE- CONVECTION	610-793-2		ºF			683																													
13	TAHH - 35012B	TUBE SKIN TEMPERATURE- CONVECTION	610-793-2		ºF			683																													
14	TAHH - 35012C	TUBE SKIN TEMPERATURE- CONVECTION	610-793-2		ºF			683																													
15	TAHH - 35012D	TUBE SKIN TEMPERATURE- CONVECTION	610-793-2		ºF			683																													
16	TAH - 35012A	TUBE SKIN TEMPERATURE- CONVECTION	610-793-2		ºF				610																												
17	TAH - 35012B	TUBE SKIN TEMPERATURE- CONVECTION	610-793-2		ºF				610																												
18	TAH - 35012C	TUBE SKIN TEMPERATURE- CONVECTION	610-793-2		ºF				610																												
19	TAH - 35012D	TUBE SKIN TEMPERATURE- CONVECTION	610-793-2		ºF				610																												
20	ZAC - 35016	OPEN POSITION STACK DAMPER	610-793-2	~~8,1~~	%	X						X									O	C	O	C	C	C	C	C	C								
21	ZAO - 35016	CLOSE POSITION STACK DAMPER	610-793-2	~~7,8~~	%	X						X									O	C	O	C	C	C	C	C	C								
22	PSLL - 35013C	PILOT GAS PRESSURE	610-794		psig						5						X		X																		
23	PAHH - 35012B	MAIN GAS PRESSURE	610-794		psig			40						X								C	O	C	C	C	C	C	C								
24	PALL - 35012B	MAIN GAS PRESSURE	610-794		psig						10						X					C	O	C	C	C	C	C	C								
25	PSLL - 35012A	MAIN GAS PRESSURE	610-794		psig						15						X					C	O	C	C	C	C	C	C								
26	PSL - 35012	AIR PRESSURE DURING PURGE	610-793-2		in H2O					0,5						X			X																		
28	BSL - 35012A	FLAME DETECTION PILOT A	610-793-2		-		X						X											C						C							
29	BSL - 35012B	FLAME DETECTION PILOT B	610-793-2		-		X						X												C							C					
30	BSL - 35012C	FLAME DETECTION PILOT C	610-793-2		-		X						X													C							C				
31	BSL - 35012D	FLAME DETECTION PILOT D	610-793-2		-		X						X														C							C			
32	BSL - 35012E	FLAME DETECTION PILOT E	610-793-2		-		X						X															C							C		
33	BSL - 35012F	FLAME DETECTION PILOT F	610-793-2		-		X						X																C	~~C~~					C		~~C~~
34	BSL - 35011A	FLAME DETECTION BURNER A	610-793-2	1, 2			X						X											C													
35	BSL 35011B	FLAME DETECTION BURNER B	610-793-2	1, 2			X						X												C												
36	BSL - 35011C	FLAME DETECTION BURNER C	610-793-2	1, 2			X						X													C											
37	BSL - 35011D	FLAME DETECTION BURNER D	610-793-2	1, 2			X						X														C										
38	BSL - 35011E	FLAME DETECTION BURNER E	610-793-2	1, 2			X						X															C									
39	BSL - 35011F	FLAME DETECTION BURNER F	610-793-2	1, 2			X						X																C	~~C~~							
40	ZSC - 35010D	CLOSE POSITION FUEL GAS VENT VALVE (PILOTS)	610-794	4			X						X						X																		
41	ZSO - 35010D	OPEN POSITION FUEL GAS VENT VALVE (PILOTS)	610-794	4		X						X							X																		
42	ZSC - 35010C	CLOSE POSITION FUEL GAS VENT VALVE (BURNERS)	610-794	4			X						X						X																		
43	ZSO - 35010C	OPEN POSITION FUEL GAS VENT VALVE (BURNERS)	610-794	4		X						X							X																		

NOTES

NOTE 1 In case no flame detected in burners pilot, fuel gas supply to that pilot shall be shut off.
NOTE 2 In case no flame detected in any X (number of burners to be defined by heater vendor) consecutive burners pilots, local shutdown shall occur.
NOTE 3 When valve position differs from limit switch indication, action shall be performed depending on:
a- Fuel gas to pilots (general): Local shutdown shall occur.
b- Fuel gas to pilots (individual)-
c- Fuel gas to burners (general): Local shutdown shall occur.
d- Fuel gas to burners (individual)-
NOTE 4 If fuel gas vent (pilot/burner) is open during heaters operation, local shutdown shall occur.
NOTE 5 For remote shtudown contingencies, see worksheet "Hot Oil Unit 3_New".
NOTE 6 If flame is detected and the corresponding valve is closed, local shutdown shall occur.
NOTE 7 ZAO-35016 (Close Position Stack Damper) should have the interlock action only during heater purging.

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
REFRIGERATION: REFRIGERANT SIDE (KBA-2015/2025 & KBA-2020/2030)
SEE PROCESS FLOW DIAGRAM PCAM-523-PL-Y-8806, PPAG-523-PL-Y-8806 & PCSE-523-PL-Y-970
SEE NOTES IN WORKSHEET "Howe-Baker_Existing_NOTES"
Reference:
PPAG-500-MC-K-606 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT)
PCAM-500-ET-Y-606 Revision 4 (based on PCAM-520-PL-Y-8206 Revision 5) (EPC2-PISCO PLANT)

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	TAG	Loop Service	P&D	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
1																	
2		REFRIGERATION 1: EBG-4010 AND EBG-4005/4020 AND KBA-2015/2025 AND KBA-202/2030		7													
3		REFRIGERATION AREA 1 SHUTDOWN LEVEL 2. REFRIGERANT SIDE.															
4		KBA-2015/2025: REFRIGERANT VAPORS ARE TAKEN FROM EBG-4010 AND EBG-4005/4020															
5	LSLL - 3240	VBA-3240 REFRIGERANT SUCTION SCRUBBER	523-8023		in					12						X	
6	LSHH - 3240	VBA-3240 REFRIGERANT SUCTION SCRUBBER	523-8023		in			34.5						X			
7	PSHH - 1565	PBB-1565 REFRIGERANT LIQUID ACCUMULATOR PUMP SEAL POT	523-8023		psig			12						X			
8	LSHH - 3245	VBA-3245 REFRIGERANT INTERSTAGE SCRUBBER	523-8024		in			60.5						X			
9	UALL - 2015	KBA-2015/2025 REFRIGERANT COMPRESSOR (UNIT SD)	523-8025				X				X						
10	UAL - 2015	KBA-2015/2020 REFRIGERANT COMPRESSOR (UNIT ALARM)	523-8025				X										
11		KBA-2020/2030 IS SPARE OF KBA-2015/2025 OR KBA-12015/12025 OR KBA-22015/22025 KBA-2020/2030 AS SPARE OF KBA-2015/2025: REFRIGERANT VAPORS ARE TAKEN FROM EBG-4010 AND EBG-4005/4020 KBA-2020/2030 AS SPARE OF KBA-12015/12025: REFRIGERANT VAPORS ARE TAKEN FROM EBG-14010 AND EBG-14005/14020 KBA-2020/2030 AS SPARE OF KBA-22015/22025: REFRIGERANT VAPORS ARE TAKEN FROM EBG-24010 AND EBG-24005/24020															
12	LSLL - 3241	VBA-3241 REFRIGERANT SUCTION SCRUBBER	523-8026		in					12						X	
13	LSHH - 3241	VBA-3241 REFRIGERANT SUCTION SCRUBBER	523-8026		in			34.5						X			
14	PSHH - 1570	PBB-1570 REFRIGERANT LIQUID ACCUMULATOR PUMP	523-8026		psig			12						X			
16	LSHH - 3246	VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER	523-8027		in			60.5						X			
18	UALL - 2020	KBA-2020/2030 REFRIGERANT COMPRESSOR (UNIT SD)	523-8028				X				X						
19	UAL - 2020	KBA-2020/2030 REFRIGERANT COMPRESSOR (UNIT ALARM)	523-8028				X										
20		CHILLERS EBG-4010 AND EBG-4005/4020															
21	LT - 4010	EBG-4010 C3 CHILLER	523-8031		%			70	67	15	10						
22	LT - 4020	EBG-4005/20 C3 CHILLER / C4 CHILLER	523-8031		%			60	58	20	10						
23		AIR COOLERS FOR VBA-3235 REFRIGERANT ACCUMULATOR															
24	VSHH - 4590A	EAL-4590 REFRIGERANT CONDENSER FAN A	523-8030					X						X			
25	VSHH - 4590B	EAL-4590 REFRIGERANT CONDENSER FAN B	523-8030					X						X			
26	VSHH - 4590C	EAL-4590 REFRIGERANT CONDENSER FAN C	523-8030					X						X			
27	VSHH - 4590D	EAL-4590 REFRIGERANT CONDENSER FAN D	523-8030					X						X			
28	VSHH - 4590E	EAL-4590 REFRIGERANT CONDENSER FAN E	523-8030					X						X			
29	VSHH - 4590F	EAL-4590 REFRIGERANT CONDENSER FAN F	523-8030					X						X			
30		New train chillers EBG-14005/20 and EBG-14010															
31	LSHH - 14010	EBG-14010 LOW LEVEL PROPANE PRODUCT CHILLER	659D1993 SHT. 1		%			67									
32	LSHH - 14020	EBG-14005/14020 HIGH LEVEL C3 CHILLER / C4 CHILLER	659D1993 SHT. 1		%			71									
33		HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS															
34	HS - 12021	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER STRAIGHT FROM VBA-13235	523-8026														
35	HS - 13241A	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-14010	523-8026														
36	HS - 13241B	BYPASS TO INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-14010	523-8026														
37	HS - 13246A	INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-14005/14020	523-8027														
38	HS - 13246B	BYPASS TO INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-14005/14020	523-8027														
39	HS - 12030	OUTLET OF F-2032 REFRIGERANT LUBE OIL COALESCER TOWARD EAL-14590 AND VBA-	523-8029B														
40	HS - 11570	LIQUID REFRIGERANT (DISCHARGE OF PBB-1570) TOWARD EBG-4005/4020	523-8026														
41	HS - 22570	LIQUID REFRIGERANT (DISCHARGE OF PBB-1570) TOWARD EBG-14005/14020	523-8026														
42	HS - 22021	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER STRAIGHT FROM VBA-23235	C 523-8026														
43	HS - 23241A	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-24010	523-8026														
44	HS - 23241B	BYPASS TO INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-24010 (BY-PASS)	C 523-8026														
45	HS - 23246A	INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-24005/24020	523-8027														
46	HS - 23246B	BYPASS TO INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-24005/24020 (BY PASS)	523-8027														
47	HS - 22030	OUTLET OF F-2032 REFRIGERANT LUBE OIL COALESCER TOWARD EAL-24590	C 523-8029B														
48	HS - 21570	LIQUID REFRIGERANT (DISCHARGE OF PBB-1570) TOWARD EBG-24010	523-8026														
49																	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	523-PL-Y-8023	523-PL-Y-8023	523-PL-Y-8023	523-PL-Y-8023	523-PL-Y-8024	523-PL-Y-8024	523-PL-Y-8025	523-PL-Y-8029	523-PL-Y-8026	523-PL-Y-8026	523-PL-Y-8026	523-PL-Y-8026	523-PL-Y-8027	523-PL-Y-8027	523-PL-Y-8028	523-PL-Y-8029
	VBA-3240 REFRIGERANT SUCTION SCRUBBER SDV-2016	VBA-3240 REFRIGERANT SUCTION SCRUBBER SDV-3240A	VBA-3240 REFRIGERANT SUCTION SCRUBBER SDV-3240B	PBB-1565 REFRIGERANT LIQUID ACCUMULATOR PUMP	VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER SDV-3245A	VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER SDV-3245B	KBA-2015/2025 REFRIGERATION COMPRESSOR	F-2027 REFRIGERANT LUBE OIL COALESCER SDV-2025	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER STRAGHT FROM VBA-3235	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-4010	BYPASS TO INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-4010	PBB-1570 REFRIGERANT LIQUID ACCUMULATOR PUMP	INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-4005/4020	BYPASS TO INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-4005/4020	KBA-2020/2030 REFRIGERATION COMPRESSOR	OUTLET OF F-2032 REFRIGERANT LUBE OIL COALESCER TOWARD EAL-4590 AND VBA-3235
							NOTE 4					NOTE 3			NOTE 4	
	SDV-2016	SDV-3240A	SDV-3240B	Motor PBB-1565	SDV-3245A	SDV-3245B	KBA-20/15/2025 USS-2015	SDV-2025	SDV-3221 on SDV-3221	SDV-3241A on SDV-3241A	SDV-3241B on SDV-3241B	Motor PBB-1570	SDV-3246A on SDV-3246A	SDV-3246B on SDV-3246B	KBA-2020/2030 USS-2020	SDV-2030 on SDV-2030
2																
3	D	D	D	S	D	D	S	D	D	D	D	S	D	D	S	D
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6	D	D	D		D	D	S	D								
7				S												
8	D	D	D		D	D	S	D								
9	D	D	D		D	D		D								
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11																
12												S				
13									D	D	D		D	D	S	D
14												S				
16									D	D	D		D	D	S	D
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	523-PL-Y-8030	523-PL-Y-8030	523-PL-Y-8030	523-PL-Y-8030	523-PL-Y-8030	523-PL-Y-8030	523-PL-Y-8030	523-8026	523-8026	523-8026	523-8027	523-8027	523-8029B	523-8026	523-8026
	EAL-4590 REFRIGERANT CONDENSER FAN A	EAL-4590 REFRIGERANT CONDENSER FAN B	EAL-4590 REFRIGERANT CONDENSER FAN C	EAL-4590 REFRIGERANT CONDENSER FAN D	EAL-4590 REFRIGERANT CONDENSER FAN E	EAL-4590 REFRIGERANT CONDENSER FAN F	OUTLET OF VBA-3235 REFRIGERANT ACCUMULATOR	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER STRAGHT FROM VBA-13235	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-14010	BYPASS TO INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-14010	INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-14005/14020	BYPASS TO INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-14005/14020	OUTLET OF F-2032 REFRIGERANT LUBE OIL COALESCER TOWARD EAL-14590 AND VBA-3235	LIQUID REFRIGERANT (DISCHARGE OF PBB-1570) TOWARD EBG-4005/4020 THROUGH EBG-4005	LIQUID REFRIGERANT (DISCHARGE OF PBB-1570) TOWARD EBG-14005/14020
	Motor A EAL-4590	Motor B EAL-4590	Motor C EAL-4590	Motor D EAL-4590	Motor E EAL-4590	Motor F EAL-4590	SDV-3235 on SDV-3235	SDV-12021 on SDV-12021	SDV-13241A on SDV-13241A	SDV-13241B on SDV-13241B	SDV-13246A on SDV-13246A	SDV-13246B on SDV-13246B	SDV-12030 on SDV-12030	SDV-11570 on SDV-11570	SDV-22570 on SDV-22570
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	523-PL-Y-8026	523-PL-Y-8026	523-PL-Y-8026	523-PL-Y-8027	523-PL-Y-8027	523-PL-Y-8029	523-PL-Y-8026
	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER STRAGHT FROM VBA-23225	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-24010	BYPASS TO INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-24010 (BY-PASS)	INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-24005/24020	BYPASS TO INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-24005/24020 (BY-PASS)	OUTLET OF F-2032 REFRIGERANT LUBE OIL COALESCER TOWARD BAL-24590	LIQUID REFRIGERANT (DISCHARGE OF PBB-1570) TOWARD EBG-24010
	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4
	SDV-22021 on SDV-22021	SDV-23241A on SDV-23241A	SDV-23241B on SDV-23241B	SDV-23246A on SDV-23246A	SDV-23246B on SDV-23246B	SDV-22030 on SDV-22030	SDV-21570 on SDV-21570
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NOTES SEE NOTES IN WORKSHEET "Howe-Baker_Existing_NOTES"
Note 1 DELETED
Note 2 DELETED
Note 3 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST STOP THE PBB-1570 PUMP, 2ND CLOSE THE SHUTDOWN VALVES.
Note 4 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST STOP THE COMPRESSOR, 2ND CLOSE THE SHUTDOWN VALVES.
Note 5 KBA-2020/2030 IS SPARE OF KBA-2015/20025 OR KBA-12015/12025 OR KBA-22015/22015
Note 6 KBA-2020/2030 AS SPARE OF KBA-22015/22025 REFRIGERANT VAPOURS ARE TAKEN FROM EBG-24010 AND EBG-24005/25020.

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)
AND PPAG-500-MC-K-606 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT)
BLOCK 56 - CAMISEA EXPANSION PROJECT

REFRIGERATION: EBG-14005/14020
AND EBG-14010 AND KBA-12015/12025

CAUSE AND EFFECT MATRIX (EXISTING)

ITEM NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
SERVICE	Refrigeration Area (KBA-12015/25). REFRIGERANT SIDE. Shutdown Level 2	INLET TO VBA-13240 REFRIGERANT SUCTION SCRUBBER FROM EBG-14010	BYPASS TO INLET TO VBA-13340 REFRIGERANT SUCTION SCRUBBER FROM EBG-14010	INLET TO VBA-13240 REFRIGERANT SUCTION SCRUBBER STRAGHT FROM VBA-13235	PBB-11565 REFRIGERANT LIQUID ACCUMULATOR PUMP	INLET TO VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-14005/14020	BYPASS TO INLET TO VBA-13345 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-14005/14020	KBA-12015/12025 REFRIGERANT COMPRESSOR	OUTLET OF F-12027 REFRIGERANT LUBE OIL COALESCER	EAL-14590 REFRIGERANT CONDENSER FAN A	EAL-14590 REFRIGERANT CONDENSER FAN B	EAL-14590 REFRIGERANT CONDENSER FAN C	EAL-14590 REFRIGERANT CONDENSER FAN D	EAL-14590 REFRIGERANT CONDENSER FAN E	EAL-14590 REFRIGERANT CONDENSER FAN F	OUTLET OF VBA-13235 REFRIGERANT ACCUMULATOR	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER STRAIGHT FROM VBA-13235	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-14010	BYPASS TO INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-14010	INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-14005/14020	BYPASS TO INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-14005/14020	OUTLET OF F-3232 REFRIGERANT LUBE OIL COALESCER TOWARD EAL-14590 AND VBA-13235	LIQUID REFRIGERANT (DISCHARGE OF PBB-1570) TOWARD EBG-14005/14020	KBA-2020/2030 REFRIGERANT COMPRESSOR
RESULTING ACTION		CLOSE VALVE	CLOSE VALVE	CLOSE VALVE	STOP PUMP, UNLESS	CLOSE VALVE	CLOSE VALVE		CLOSE VALVE	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	CLOSE VALVE	CLOSE VALVE	CLOSE VALVE	CLOSE VALVE	CLOSE VALVE	CLOSE VALVE	CLOSE VALVE	CLOSE VALVE	
EQUIP. NUMBER		SDV-13240A	SDV-13240B	SDV-12016	PBB-11565	SDV-13245A	SDV-13245B	KBA-12015/12025	SDV-12027	MOTOR OF EAL-14590	MOTOR OF EAL-14590	MOTOR OF EAL-14590	MOTOR OF EAL-14590	MOTOR OF EAL-14590	MOTOR OF EAL-14590	SDV-13235	SDV-12021	SDV-13241A	SDV-13241B	SDV-13246A	SDV-13246B	SDV-12030	SDV-22570	KBA-2020/2030
P&ID SHEET		659D1993 3	659D1993 3	659D1993 3	659D1993 3	659D1993 4	659D1993 4	659D1990 1	659D1993 6	659D1993 7	659D1993 7	659D1993 7	659D1993 7	659D1993 7	659D1993 7	659D1993 7	523-8026	523-8026	523-8026	523-8027	523-8027	523-8029B	523-8026	523-8028
ITEM																								
1		C	C	C	S	C	C	S	C	S	S	S	S	S	S	C	C	C	C	C	C	C	C	
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26																								
27		C	C	C		C	C	S	C															
28					START PUMP																			
29					STOP PUMP																			
30					S																			
31								NOTE 2																
32		C	C	C		C	C	S	C															
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59		C	C	C		C	C	S	C															
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72		C	C	C		C	C	S	C															
73		C	C	C		C	C	S	C															
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75								START PERMISSIVE																
76		C	C	C		C	C	S	C															
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78		C	C	C		C	C	S	C															
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86																								
87		C	C	C		C	C	S	C															
88																								
89		C	C	C		C	C	S	C															

ITEM	SERVICE	MALFUNCTION	NOTES	FIELD DEVICE	ANNUNCIATOR TAG	UNIT	VALUE	INPUT TO YORK'S PLC	INPUT TO PCS	INPUT TO SSS	P&ID SHEET
1	**REFRIGERATION 2: EBG-14005/14020 AND EBG-14010 AND KBA-12015/12025 SHUTDOWN LEVEL 2. REFRIGERANT SIDE.**	EMERGENCY S.D.	~~NOTE 10~~ 9							X	
2	Manual SOFT Push Button in Control Room (Control System)				ESD 12015					X	
3	**REFRIGERATION: EBG-14005/14020 AND EBG-14010 AND KBA-12015/12025**										
4	**REFRIGERANT SIDE**										
5	KBA-12015/12025 REFRIGERANT COMPRESSOR - SUCTION	LO PRESS AL		PIT 12015	PAL 12015	psia	13	PLC-12	X		659D1993 SHT. 5
6	KBA-12015/12025 REFRIGERANT COMPRESSOR - SUCTION	LO LO PRESS S.D.	NOTE 5	PIT 12015B	PALL 12015	psia	7	PLC-12			659D1993 SHT. 5
7	KBA-12015/12025 REFRIGERANT COMPRESSOR - SUCTION	HI DIFF PRESS AL		PDIT 12015A	PDAH 12015A	psid	300		X		659D1993 SHT. 5
8	KBA-12015/12025 REFRIGERANT COMPRESSOR - INTERSTAGE	HI DIFF PRESS AL		PDIT 12015B	PDAH 12015B	psid	250		X		659D1993 SHT. 5
9	VBA-13240 REFRIGERANT SUCTION SCRUBBER	HI TEMP AL		TE 12016B (spare)	TAH 12016	°F	0	PLC-12	X		659D1993 SHT. 3
10	KBA-12015/12025 REFRIGERANT COMPRESSOR - DISCHARGE	HI HI TEMP S.D.	NOTE 5	TSHH 12024	TAHH 12024	°F	250	PLC-12			659D1993 SHT. 5
11	KBA-12015/12025 REFRIGERANT COMPRESSOR - DISCHARGE	HI PRESS AL		PIT 12025	PAH 12025	psig	280	PLC-12	X		659D1993 SHT. 5
12	KBA-12015/12025 REFRIGERANT COMPRESSOR - DISCHARGE	LO PRESS AL		PIT 12025	PAL 12025	psig	180	PLC-12	X		659D1993 SHT. 5
13	KBA-12015/12025 REFRIGERANT COMPRESSOR - INTERSTAGE	LO LO PRESS S.D.	NOTE 5	PIT 12025B	PALL 12025B	psig	170	PLC-12			659D1993 SHT. 5
14	KBA-12015/12025 REFRIGERANT COMPRESSOR - DISCHARGE	HI HI TEMP AL		TE 12025A 12025B (spare)	TAHH 12025	°F	250	PLC-12	X		659D1993 SHT. 5
15	KBA-12015/12025 REFRIGERANT COMPRESSOR - DISCHARGE	HI TEMP AL		TE 12025A 12025B (spare)	TAH 12025	°F	240	PLC-12	X		659D1993 SHT. 5
16	KBA-12015/12025 REFRIGERANT COMPRESSOR - DISCHARGE	HI HI PRESS S.D.	NOTE 5	PIT 12026	PAHH 12026	psig	290	PLC-12			659D1993 SHT. 5
17	VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER	HI TEMP AL		TE 12026A 12026B (spare)	TAH 12026	°F	50	PLC-12	X		659D1993 SHT. 4
18	F-12027 REFRIGERANT LUBE OIL FILTER	HI LEVEL AL		LSH 12027A	LAH 12027A	%	40		X		659D1993 SHT. 6
19	F-12027 REFRIGERANT LUBE OIL FILTER	HI DIFF PRESS AL		PDIT 12027A	PDAH 12027A	psid	20		X		659D1993 SHT. 6
20	COMPRESSOR SURGE CONTROL	HI DIFF PRESS AL		PDSH 12027B	PDAH 12027B	psid	5		X		659D1993 SHT. 6
21	F-12027 REFRIGERANT LUBE OIL FILTER	HI LEVEL AL		LSH 12027B	LAH 12027B	%	50		X		659D1993 SHT. 6
22	VBA-13235 REFRIGERANT ACCUMULATOR	HI LEVEL AL		LIT 13235	LAH 13235	%	88		X		659D1993 SHT. 7
23	VBA-13235 REFRIGERANT ACCUMULATOR	LO LEVEL AL	9	LIT 13235	LAL 13235	%	5		X		659D1993 SHT. 7
24	VBA-13235 REFRIGERANT ACCUMULATOR	LO LO LEVEL S.D.	NOTE 5, 7	LSLL 13235	LALL 13235		2			X	659D1993 SHT. 7
25	VBA-13235 REFRIGERANT ACCUMULATOR	HI PRESS AL		PIT 13235	PAH 13235B	psig	250		X		659D1993 SHT. 7
26	VBA-13235 REFRIGERANT ACCUMULATOR	LO PRESS AL		PIT 13235	PAL 13235B	psig	150		X		659D1993 SHT. 7
27	VBA-13240 REFRIGERANT SUCTION SCRUBBER	HI HI LEVEL S.D.	NOTE 5	LSHH 13240	LAHH 13240	%	35			X	659D1993 SHT. 3
28	VBA-13240 REFRIGERANT SUCTION SCRUBBER	HI LEVEL AL	NOTE 1	LIT 13240	LAH 13240	%	25		X		659D1993 SHT. 3
29	VBA-13240 REFRIGERANT SUCTION SCRUBBER	LO LEVEL AL	NOTE 1	LIT 13240	LAL 13240	%	0		X		659D1993 SHT. 3
30	VBA-13240 REFRIGERANT SUCTION SCRUBBER	LO LO LEVEL S.D.		LSLL 13240	LALL 13240	%	0			X	659D1993 SHT. 3
31	INLET TO VBA-13240 REFRIGERANT SUCTION SCRUBBER	HI DIFF PRESS AL	NOTE 2	PDIT 13240	PDAH 13240	psid	10		X		659D1993 SHT. 3
32	VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER	HI HI LEVEL S.D.	NOTE 5	LSHH 13245	LAHH 13245	%	35			X	659D1993 SHT. 4
33	VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER	HI LEVEL AL		LIT 13245	LAH 13245	%	25		X		659D1993 SHT. 4
34	VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER	LO LEVEL AL		LIT 13245	LAL 13245	%	0		X		659D1993 SHT. 4
35	VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER	LO LO LEVEL AL		LIT 13245	LALL 13245	%	0		X		659D1993 SHT. 4
36	VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER	HI PRESS AL		PIT 13245	PAH 13245	psig	70	PLC-12	X		659D1993 SHT. 4
37	VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER	LO PRESS AL		PIT 13245	PAL 13245	psig	55	PLC-12	X		659D1993 SHT. 4
38	INLET TO VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER	HI DIFF PRESS AL	NOTE 2	PDIT 13245	PDAH 13245	psid	10		X		659D1993 SHT. 4
39	EBG-14010 LOW LEVEL PROPANE PRODUCT CHILLER	HI HI LEVEL S.D.		LSHH 14010	LAHH 14010	%	67			X	659D1993 SHT. 1
40	EBG-14010 LOW LEVEL PROPANE PRODUCT CHILLER	HI LEVEL AL		LIT 14010	LAH 14010	%	55		X		659D1993 SHT. 1
41	EBG-14010 LOW LEVEL PROPANE PRODUCT CHILLER	LO LEVEL AL		LIT 14010	LAL 14010	%	18		X		659D1993 SHT. 1
42	EBG-14005/14020 HIGH LEVEL C3 CHILLER / C4 CHILLER	HI HI LEVEL S.D.		LSHH 14020	LAHH 14020	%	71			X	659D1993 SHT. 1
43	EBG-14005/14020 HIGH LEVEL C3 CHILLER / C4 CHILLER	HI LEVEL AL		LIT 14020	LAH 14020	%	57		X		659D1993 SHT. 1
44	EBG-14005/14020 HIGH LEVEL C3 CHILLER / C4 CHILLER	LO LEVEL AL		LIT 14020	LAL 14020	%	14		X		659D1993 SHT. 1
45	EAL-14590 REFRIGERANT CONDENSER	HI TEMP AL		TE 14590	TAH 14590	°F	125		X		659D1993 SHT. 7
46	EAL-14590A REFRIGERANT CONDENSER FAN A	HI HI VIB S.D.		VSHH 14590A	VAHH 14590A	G's	3		X	X	659D1993 SHT. 7
47	EAL-14590A REFRIGERANT CONDENSER FAN B	HI HI VIB S.D.		VSHH 14590B	VAHH 14590B	G's	3		X	X	659D1993 SHT. 7
48	EAL-14590B REFRIGERANT CONDENSER FAN C	HI HI VIB S.D.		VSHH 14590C	VAHH 14590C	G's	3		X	X	659D1993 SHT. 7
49	EAL-14590B REFRIGERANT CONDENSER FAN D	HI HI VIB S.D.		VSHH 14590D	VAHH 14590D	G's	3		X	X	659D1993 SHT. 7
50	EAL-14590C REFRIGERANT CONDENSER FAN E	HI HI VIB S.D.		VSHH 14590E	VAHH 14590E	G's	3		X	X	659D1993 SHT. 7
51	EAL-14590C REFRIGERANT CONDENSER FAN F	HI HI VIB S.D.		VSHH 14590F	VAHH 14590F	G's	3		X	X	659D1993 SHT. 7
52	**KBA-12015/12025 REFRIGERANT COMPRESSOR**										
53	KBA-12015/12025 REFRIGERANT COMPRESSOR (SIGNAL FROM SSS)	PERMISSIVE RUN			UPLL 12015			PLC-12			659D1993 SHT. 5
54	KBA-12015/12025 REFRIGERANT COMPRESSOR (SIGNAL FROM SSS)	EMERGENCY S.D.	NOTE 5		USS 12015			PLC-12			659D1993 SHT. 5
55	KBA-12015/12025 REFRIGERANT COMPRESSOR	COMMON ALARM			UAL 12015					X	659D1993 SHT. 5
56	KBA-12015/12025 REFRIGERANT COMPRESSOR	UNIT SHUTDOWN	NOTE 5		UALL 12015					X	659D1993 SHT. 5
57	COMPRESSOR AXIAL PROBE	HI HI AXIAL VIB S.D.	NOTE 5	ZE 1401	ZAHH 1401	G's	5,17	BN/PLC-12			659D1990 SHT. 1
58	COMPRESSOR AXIAL PROBE	HI AXIAL VIB AL		ZE 1401	ZAH 1401	G's	10,22	BN/PLC-12			659D1990 SHT. 1
59	COMPRESSOR SHAFT END BEARING - "X" VIBRATION PROBE	HI HI RADIAL VIB S.D.	NOTE 5	XE 1401X	XAHH 1401X	G's	1,80	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
60	COMPRESSOR SHAFT END BEARING - "X" VIBRATION PROBE	HI RADIAL VIB AL		XE 1401X	XAH 1401X	G's	1,50	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
61	COMPRESSOR SHAFT END BEARING - "Y" VIBRATION PROBE	HI HI RADIAL VIB S.D.	NOTE 5	XE 1401Y	XAHH 1401Y	G's	1,80	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
62	COMPRESSOR SHAFT END BEARING - "Y" VIBRATION PROBE	HI RADIAL VIB AL		XE 1401Y	XAH 1401Y	G's	1,50	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
63	COMPRESSOR LUBE OIL CIRCUIT	LO DIFF PRESS AL		PDIT 1401	PDAL 1401	psid	30,00	PLC-12			659D1990 SHT. 1
64	COMPRESSOR CARTER	LO LEVEL AL		LSL 1401	LAL 1401	%	20,00	PLC-12			659D1990 SHT. 1
65	COMPRESSOR SUMP END BEARING - "X" VIBRATION PROBE	HI HI RADIAL VIB S.D.	NOTE 5	XE 1402X	XAHH 1402X	G's	1,80	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
66	COMPRESSOR SUMP END BEARING - "X" VIBRATION PROBE	HI RADIAL VIB AL		XE 1402X	XAH 1402X	G's	1,50	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
67	COMPRESSOR SUMP END BEARING - "Y" VIBRATION PROBE	HI HI RADIAL VIB S.D.	NOTE 5	XE 1402Y	XAHH 1402Y	G's	1,80	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
68	COMPRESSOR SUMP END BEARING - "Y" VIBRATION PROBE	HI RADIAL VIB AL		XE 1402Y	XAH 1402Y	G's	1,50	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
69	COMPRESSOR LUBE OIL FILTER	HI DIFF PRESS AL		PDIT 1402	PDAH 1402	psid	20	PLC-12			659D1990 SHT. 1
70	COMPRESSOR LUBE OIL CIRCUIT	LO DIFF PRESS AL		PDIT 1403	PDAL 1403	psid	30	PLC-12			659D1990 SHT. 1
71	COMPRESSOR LUBE OIL CIRCUIT	LO LO DIFF PRESS S.D.	NOTE 5	PDIT 1403	PDALL 1403A	psid	20	PLC-12			659D1990 SHT. 1
72	COMPRESSOR LUBE OIL CIRCUIT	LO LO DIFF PRESS S.D.	NOTE 5	PDIT 1403	PDALL 1403B	psid	20	PLC-12			659D1990 SHT. 1
73	COMPRESSOR LUBE OIL CIRCUIT	HI HI TEMP S.D.	NOTE 5	TE 1404A 1404B (spare)	TAHH 1404	°F	185	PLC-12			659D1990 SHT. 1
74	COMPRESSOR LUBE OIL CIRCUIT	HI TEMP AL		TE 1404A 1404B (spare)	TAH 1404	°F	180	PLC-12			659D1990 SHT. 1
75	COMPRESSOR CARTER	LO TEMP AL		TE 1406A 1406B (spare)	TAL 1406	°F	100	PLC-12			659D1990 SHT. 1
76	COMPRESSOR JOURNAL BEARING	HI HI TEMP S.D.	NOTE 5	TE 1407A 1407B (spare)	TAHH 1407	°F	210	PLC-12			659D1990 SHT. 1
77	COMPRESSOR JOURNAL BEARING	HI TEMP AL		TE 1407A 1407B (spare)	TAH 1407	°F	200	PLC-12			659D1990 SHT. 1
78	COMPRESSOR JOURNAL BEARING	HI HI TEMP S.D.	NOTE 5	TE 1408A 1408B (spare)	TAHH 1408	°F	210	PLC-12			659D1990 SHT. 1
79	COMPRESSOR JOURNAL BEARING	HI TEMP AL		TE 1408A 1408B (spare)	TAH 1408	°F	200	PLC-12			659D1990 SHT. 1
80	**GEAR LUBE OIL CIRCUIT AND MOTOR**										
81	GEAR LS SHAFT EXTENSION END - "X" RADIAL VIBRATION PROBE	HI HI RADIAL VIB S.D.	NOTE 5	XE 1501X	XAHH 1501X	G's	4,00	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
82	GEAR LS SHAFT EXTENSION END - "X" RADIAL VIBRATION PROBE	HI RADIAL VIB AL		XE 1501X	XAH 1501X	G's	2,50	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
83	GEAR LS SHAFT EXTENSION END - "Y" RADIAL VIBRATION PROBE	HI HI RADIAL VIB S.D.	NOTE 5	XE 1501Y	XAHH 1501Y	G's	4,00	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
84	GEAR LS SHAFT EXTENSION END - "Y" RADIAL VIBRATION PROBE	HI RADIAL VIB AL		XE 1501Y	XAH 1501Y	G's	2,50	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
85	GEAR LS SHAFT JOURNAL BEARING	HI HI TEMP S.D.	NOTE 5	TE 1501A 1501B (spare)	TAHH 1501	°F	240	PLC-12			659D1991 SHT. 1
86	GEAR LS SHAFT JOURNAL BEARING	HI TEMP AL		TE 1501A 1501B (spare)	TAH 1501	°F	225	PLC-12			659D1991 SHT. 1
87	GEAR LS SHAFT BLIND END - "X" RADIAL VIBRATION PROBE	HI HI RADIAL VIB S.D.	NOTE 5	XE 1502X	XAHH 1502X	G's	4,00	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
88	GEAR LS SHAFT BLIND END - "X" RADIAL VIBRATION PROBE	HI RADIAL VIB AL		XE 1502X	XAH 1502X	G's	2,50	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
89	GEAR LS SHAFT BLIND END - "Y" RADIAL VIBRATION PROBE	HI HI RADIAL VIB S.D.	NOTE 5	XE 1502Y	XAHH 1502Y	G's	4,00	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)
AND PPAG-500-MC-K-606 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT)
BLOCK 56 - CAMISEA EXPANSION PROJECT

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REFRIGERATION: EBG-14005/14020
AND EBG-14010 AND KBA-12015/12025

CAUSE AND EFFECT MATRIX (EXISTING)

ITEM	SERVICE	MALFUNCTION	NOTES	FIELD DEVICE	ANNUNCIATOR TAG	UNIT	VALUE	INPUT TO YORK'S PLC	INPUT TO_PCS	INPUT TO SSS	P&ID SHEET
											ITEM NUMBER
											SERVICE
											RESULTING ACTION
											EQUIP. NUMBER
92	GEAR LS SHAFT JOURNAL BEARING	HI TEMP AL		TE 1502A 1502B (spare)	TAH 1502	°F	225	PLC-12			659D1991 SHT. 1
93	GEAR HS SHAFT EXTENSION END - "X" RADIAL VIBRATION PROBE	HI HI RADIAL VIB S.D.	NOTE 5	XE 1503X	XAHH 1503X	G's	2,50	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
94	GEAR HS SHAFT EXTENSION END - "X" RADIAL VIBRATION PROBE	HI RADIAL VIB AL		XE 1503X	XAH 1503X	G's	1,75	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
95	GEAR HS SHAFT EXTENSION END - "Y" RADIAL VIBRATION PROBE	HI HI RADIAL VIB S.D.	NOTE 5	XE 1503Y	XAHH 1503Y	G's	2,50	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
96	GEAR HS SHAFT EXTENSION END - "Y" RADIAL VIBRATION PROBE	HI RADIAL VIB AL		XE 1503Y	XAH 1503Y	G's	1,75	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
97	GEAR HS SHAFT JOURNAL BEARING	HI HI TEMP S.D.	NOTE 5	TE 1503A 1503B (spare)	TAHH 1503	°F	240	PLC-12			659D1991 SHT. 1
98	GEAR HS SHAFT JOURNAL BEARING	HI TEMP AL		TE 1503A 1503B (spare)	TAH 1503	°F	225	PLC-12			659D1991 SHT. 1
99	GEAR LUBE OIL CIRCUIT	LO PRESS AL		PIT 1503	PAL 1503	psig		PLC-12			659D1991 SHT. 1
100	GEAR HS SHAFT BLIND END - "X" RADIAL VIBRATION PROBE	HI HI RADIAL VIB S.D.	NOTE 5	XE 1504X	XAHH 1504X	G's	2,50	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
101	GEAR HS SHAFT BLIND END - "X" RADIAL VIBRATION PROBE	HI RADIAL VIB AL		XE 1504X	XAH 1504X	G's	1,75	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
102	GEAR HS SHAFT BLIND END - "Y" RADIAL VIBRATION PROBE	HI HI RADIAL VIB S.D.	NOTE 5	XE 1504Y	XAHH 1504Y	G's	2,50	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
103	GEAR HS SHAFT BLIND END - "Y" RADIAL VIBRATION PROBE	HI RADIAL VIB AL		XE 1504Y	XAH 1504Y	G's	1,75	BN/PLC-12			659D1991 SHT. 1 669D0077 SHT.4
104	GEAR HS SHAFT JOURNAL BEARING	HI HI TEMP S.D.	NOTE 5	TE 1504A 1504B (spare)	TAHH 1504	°F	240	PLC-12			659D1991 SHT. 1
105	GEAR HS SHAFT JOURNAL BEARING	HI TEMP AL		TE 1504A 1504B (spare)	TAH 1504	°F	225	PLC-12			659D1991 SHT. 1
106	GEAR LUBE OIL CIRCUIT	LO LO PRESS S.D.	NOTE 5	PIT 1504	PALL 1504	psig	10	PLC-12			659D1991 SHT. 1
107	GEAR LUBE OIL CIRCUIT	LO PRESS AL		PIT 1504	PAL 1504	psig	15	PLC-12			659D1991 SHT. 1
108	GEAR LS SHAFT	HI HI AXIAL VIB S.D.	NOTE 5	ZE 1507	ZAHH 1507	G's	6	BN/PLC-12			659D1991 SHT. 1
109	GEAR LS SHAFT	HI AXIAL VIB AL		ZE 1507	ZAH 1507	G's	4	BN/PLC-12			659D1991 SHT. 1
110	MOTOR JOURNAL BEARING	HI HI TEMP S.D.	NOTE 5	TE 1507A 1507B (spare)	TAHH 1507	°F	203	PLC-12			659D1991 SHT. 1
111	MOTOR JOURNAL BEARING	HI TEMP AL		TE 1507A 1507B (spare)	TAH 1507	°F	194	PLC-12			659D1991 SHT. 1
112	GEAR HS SHAFT	HI HI AXIAL VIB S.D.	NOTE 5	ZE 1508	ZAHH 1508	G's	6	BN/PLC-12			659D1991 SHT. 1
113	GEAR HS SHAFT	HI AXIAL VIB AL		ZE 1508	ZAH 1508	G's	4	BN/PLC-12			659D1991 SHT. 1
114	MOTOR JOURNAL BEARING	HI HI TEMP S.D.	NOTE 5	TE 1508A 1508B (spare)	TAHH 1508	°F	203	PLC-12			659D1991 SHT. 1
115	MOTOR JOURNAL BEARING	HI TEMP AL		TE 1508A 1508B (spare)	TAH 1508	°F	194	PLC-12			659D1991 SHT. 1
116	MOTOR SPACE	HI HI TEMP S.D.	NOTE 5	TE 1510	TAHH 1510	°F	329	MCC OF M-1501/ KBA-12015/12025			659D1991 SHT. 1
117	MOTOR SPACE	HI TEMP AL		TE 1510	TAH 1510	°F	311	MCC OF M-1501/ KBA-12015/12025			659D1991 SHT. 1
118	GEAR LUBE OIL CIRCUIT	LO LO PRESS S.D.	NOTE 5	PSLL 1510	PALL 1510	psig	10	PLC-12			659D1991 SHT. 1 669D077 SHT.3
119	MOTOR SPACE	HI HI TEMP S.D.	NOTE 5	TE 1512	TAHH 1512	°F	329	MCC OF M-1501/ KBA-12015/12025			659D1991 SHT. 1
120	MOTOR SPACE	HI TEMP AL		TE 1512	TAH 1512	°F	311	MCC OF M-1501/ KBA-12015/12025			659D1991 SHT. 1
121	MOTOR SPACE	HI HI TEMP S.D.	NOTE 5	TE 1514	TAHH 1514	°F	329	MCC OF M-1501/ KBA-12015/12025			659D1991 SHT. 1
122	MOTOR SPACE	HI TEMP AL		TE 1514	TAH 1514	°F	311	MCC OF M-1501/ KBA-12015/12025			659D1991 SHT. 1
123	GEAR LUBE OIL CIRCUIT	HI HI TEMP S.D.	NOTE 5	TE 1516A 1516B (spare)	TAHH 1516	°F	145	PLC-12			659D1991 SHT. 1
124	GEAR LUBE OIL CIRCUIT	HI TEMP AL		TE 1516A 1516B (spare)	TAH 1516	°F	142	PLC-12			659D1991 SHT. 1
125	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**										
126	INLET TO VBA-13240 REFRIGERANT SUCTION SCRUBBER			HS 13240A							659D1993 SHT. 3
127	BYPASS TO INLET TO VBA-13240 REFRIGERANT SUCTION SCRUBBER			HS 13240B							659D1993 SHT. 3
128	INLET TO VBA-1324 REFRIGERANT SUCTION SCRUBBER STRAIGHT FROM VBA-13235			HS 12016							659D1993 SHT. 3
129	INLET TO VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER			HS 13245A							659D1993 SHT. 4
130	BYPASS TO INLET TO VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER			HS 13245B							659D1993 SHT. 4
131	OUTLET OF F-12027 REFRIGERANT LUBE OIL COALESCER			HS 12027							659D1993 SHT. 6
132	OUTLET OF VBA-13235 REFRIGERANT ACCUMULATOR			HS 13235							659D1993 SHT. 7

ITEM	SERVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
ITEM NUMBER			2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
SERVICE		Refrigeration Area (KBA-12015/25). REFRIGERANT SIDE. Shutdown Level 2	INLET TO VBA-13240 REFRIGERANT SUCTION SCRUBBER FROM EBG-14010	BYPASS TO INLET TO VBA-13340 REFRIGERANT SUCTION SCRUBBER FROM EBG-14010	INLET TO VBA-13340 REFRIGERANT SUCTION SCRUBBER STRAGHT FROM VBA-13235	PBB-11565 REFRIGERANT LIQUID ACCUMULATOR PUMP	INLET TO VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-14005/14020	BYPASS TO INLET TO VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-14005/14020	KBA-12015/12025 REFRIGERANT COMPRESSOR	OUTLET OF F-12027 REFRIGERANT LUBE OIL COALESCER	EAL-14590 REFRIGERANT CONDENSER FAN A	EAL-14590 REFRIGERANT CONDENSER FAN B	EAL-14590 REFRIGERANT CONDENSER FAN C	EAL-14590 REFRIGERANT CONDENSER FAN D	EAL-14590 REFRIGERANT CONDENSER FAN E	EAL-14590 REFRIGERANT CONDENSER FAN F	OUTLET OF VBA-13235 REFRIGERANT ACCUMULATOR	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER STRAIGHT FROM VBA-13235	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-14010	BYPASS TO INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-14010	INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-14005/14020	BYPASS TO INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-14005/14020	OUTLET OF F-20132 REFRIGERANT LUBE OIL COALESCER TOWARD EAL-14590 AND VBA-13235	LIQUID REFRIGERANT (DISCHARGE OF PBB-1570) TOWARD EBG-14005/14020	KBA-20202/2030 REFRIGERANT COMPRESSOR
RESULTING ACTION			CLOSE VALVE	CLOSE VALVE	CLOSE VALVE	STOP PUMP, UNLESS	CLOSE VALVE	CLOSE VALVE		CLOSE VALVE	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	CLOSE VALVE	CLOSE VALVE	CLOSE VALVE	CLOSE VALVE	CLOSE VALVE	CLOSE VALVE	CLOSE VALVE	CLOSE VALVE	
EQUIP. NUMBER			SDV-13240A	SDV-13240B	SDV-12016	PBB-11565	SDV-13245A	SDV-13245B	KBA-12015/12025	SDV-12027	MOTOR OF EAL-14590	MOTOR OF EAL-14590	MOTOR OF EAL-14590	MOTOR OF EAL-14590	MOTOR OF EAL-14590	MOTOR OF EAL-14590	SDV-13235	SDV-12021	SDV-13241A	SDV-13241B	SDV-13246A	SDV-13246B	SDV-12030	SDV-22570	KBA-2020/2030
P&ID SHEET			659D1993 3	659D1993 3	659D1993 3	659D1993 3	659D1993 4	659D1993 4	659D1990 1	659D1993 6	659D1993 7	659D1993 7	659D1993 7	659D1993 7	659D1993 7	659D1993 7	659D1993 7	523-8026	523-8026	523-8026	523-8027	523-8027	523-8029B	523-8026	523-8028
92	GEAR LS SHAFT JOURNAL BEARING																								
93	GEAR HS SHAFT EXTENSION END - "X" RADIAL VIBRATION PROBE		C	C	C		C	C	S	C															
94	GEAR HS SHAFT EXTENSION END - "X" RADIAL VIBRATION PROBE																								
95	GEAR HS SHAFT EXTENSION END - "Y" RADIAL VIBRATION PROBE		C	C	C		C	C	S	C															
96	GEAR HS SHAFT EXTENSION END - "Y" RADIAL VIBRATION PROBE																								
97	GEAR HS SHAFT JOURNAL BEARING		C	C	C		C	C	S	C															
98	GEAR HS SHAFT JOURNAL BEARING																								
99	GEAR LUBE OIL CIRCUIT																								
100	GEAR HS SHAFT BLIND END - "X" RADIAL VIBRATION PROBE		C	C	C		C	C	S	C															
101	GEAR HS SHAFT BLIND END - "X" RADIAL VIBRATION PROBE																								
102	GEAR HS SHAFT BLIND END - "Y" RADIAL VIBRATION PROBE		C	C	C		C	C	S	C															
103	GEAR HS SHAFT BLIND END - "Y" RADIAL VIBRATION PROBE																								
104	GEAR HS SHAFT JOURNAL BEARING		C	C	C		C	C	S	C															
105	GEAR HS SHAFT JOURNAL BEARING																								
106	GEAR LUBE OIL CIRCUIT		C	C	C		C	C	S	C															
107	GEAR LUBE OIL CIRCUIT																								
108	GEAR LS SHAFT		C	C	C		C	C	S	C															
109	GEAR LS SHAFT																								
110	MOTOR JOURNAL BEARING		C	C	C		C	C	S	C															
111	MOTOR JOURNAL BEARING																								
112	GEAR HS SHAFT		C	C	C		C	C	S	C															
113	GEAR HS SHAFT																								
114	MOTOR JOURNAL BEARING		C	C	C		C	C	S	C															
115	MOTOR JOURNAL BEARING																								
116	MOTOR SPACE		C	C	C		C	C	S	C															
117	MOTOR SPACE																								
118	GEAR LUBE OIL CIRCUIT		C	C	C		C	C	S	C															
119	MOTOR SPACE		C	C	C		C	C	S	C															
120	MOTOR SPACE																								
121	MOTOR SPACE		C	C	C		C	C	S	C															
122	MOTOR SPACE																								
123	GEAR LUBE OIL CIRCUIT		C	C	C		C	C	S	C															
124	GEAR LUBE OIL CIRCUIT																								
125	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																								
126	INLET TO VBA-13240 REFRIGERANT SUCTION SCRUBBER		C/O																						
127	BYPASS TO INLET TO VBA-13240 REFRIGERANT SUCTION SCRUBBER			C/O																					
128	INLET TO VBA-1324 REFRIGERANT SUCTION SCRUBBER STRAIGHT FROM VBA-13235				C/O																				
129	INLET TO VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER						C/O																		
130	BYPASS TO INLET TO VBA-13245 REFRIGERANT INTERSTAGE SCRUBBER							C/O																	
131	OUTLET OF F-12027 REFRIGERANT LUBE OIL COALESCER									C/O															
132	OUTLET OF VBA-13235 REFRIGERANT ACCUMULATOR																C/O								

NOTES:

1. LAH-13240 TO START PUMP PBB-11565, LAL-13240 TO STOP PUMP PBB-11565
2. PERMISSIVE FOR KBA-12015/12025 TO START
   AT KBA-12015/12025 START THE FOLLOWING STEPS SHOULD OCCUR TO GET THE PERMISSIVE TO START THE UNIT:
   SDV-13240B SHOULD BE OPENED TO CLEAR PDAH-13240.
   ONCE PDAH-13240 IS CLEARED, SDV-13240A CAN BE OPENED.
   SDV-13245B SHOULD BE OPENED TO CLEAR PDAH-13245.
   ONCE PDAH-13245 IS CLEARED, SDV-13245A CAN BE OPENED.
   ONCE BOTH THE PDAH ARE CLEARED SDV-12027 CAN BE OPENED AND KBA-12015/12025 CAN BE GIVEN THE PERMISSIVE TO START.
3. Deleted.
4. Deleted.
5. The logic should be in the following order: 1St shutdown the compressor KBA-12015/12025, 2nd close the shutdown valve.
6. ~~Provide 1 min time delay to allow the operator to bypass the interlock in case of absence of propane leakage~~
7. KBA-2020/2030 shall be stopped only if SDV-13241A and SDV-13246A are opened. 0
8. KBA-2020/2030 IS SPARE OF KBA-2015/20025 OR KBA-12015/12025 OR KBA-22015/22015
9. KBA-2020/2030 AS SPARE OF KBA-22015/22025 REFRIGERANT VAPOURS ARE TAKEN FROM EBG-24010 AND EBG-24005/25020.

CAUSE AND EFFECT MATRIX (NEW)

PERU CAMISEA SECOND EXPANSION PROJECT

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
1																	
2																	
3																	
4																	
5	LSLL - 23240	VBA-23240 REFRIGERANT SUCTION SCRUBBER	523-742	Note 4	in			68			12						X
6	LSHH - 23240	VBA-23240 REFRIGERANT SUCTION SCRUBBER	523-742	Note 1	in									X			
7	PSL - 21565	PBB-21565 REFRIGERANT SUCTION SCRUBBER PUMP SEAL POT	523-742	Note 10	psig					Hold				X			
9	LSHH - 23245	VBA-23245 REFRIGERANT INTERSTAGE SCRUBBER	523-743	Note 1	in			52						X			
10	UALL - 22015	KBA-22015/22025 REFRIGERANT COMPRESSOR (UNIT SD)	523-744	Note 3		X						X					
11	UAL - 22015	KBA-22015/22020 REFRIGERANT COMPRESSOR (UNIT ALARM)	523-744			X											
12																	
13	VSHH - 24590A	EAL-24590 REFRIGERANT CONDENSER FAN A	523-746					X						X			
14	VSHH - 24590B	EAL-24590 REFRIGERANT CONDENSER FAN B	523-746					X						X			
15	VSHH - 24590C	EAL-24590 REFRIGERANT CONDENSER FAN C	523-746					X						X			
16	VSHH - 24590D	EAL-24590 REFRIGERANT CONDENSER FAN D	523-746					X						X			
17	VSHH - 24590E	EAL-24590 REFRIGERANT CONDENSER FAN E	523-746					X						X			
18	VSHH - 24590F	EAL-24590 REFRIGERANT CONDENSER FAN F	523-746					X						X			
19	LSLL - 23235	VBA-23235 REFRIGERANT ACCUMULATOR	523-746	Note 5,6	in						12						
20	LSHH - 24010	EBG-24010 LOW LEVEL PROPANE PRODUCT CHILLER	523-741		%			55									
21	LSHH - 24020	EBG-24005/24020 HIGH LEVEL C3 CHILLER / C4 CHILLER	523-741		%			57									
22																	
23																	
24	HS - 22016	INLET TO VBA-21324 REFRIGERANT SUCTION SCRUBBER STRAIGHT FROM VBA-23235	523-742														
25	HS - 23240A	INLET TO VBA-23240 REFRIGERANT SUCTION SCRUBBER	523-742														
26	HS - 23240B	BYPASS TO INLET TO VBA-23240 REFRIGERANT SUCTION SCRUBBER	523-742														
27	HS - 23245A	INLET TO VBA-23245 REFRIGERANT INTERSTAGE SCRUBBER	523-743														
28	HS - 23245B	BYPASS TO INLET TO VBA-23245 REFRIGERANT INTERSTAGE SCRUBBER	523-743														
29	HS - 22027	OUTLET OF F-22027 REFRIGERANT LUBE OIL COALESCER	523-745														
30	HS - 23235	OUTLET OF VBA-23235 REFRIGERANT ACCUMULATOR	523-746														

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
		523-PL-Y-742	523-PL-Y-742	523-PL-Y-742	523-PL-Y-742	523-PL-Y-743	523-PL-Y-743	523-PL-Y-744	523-PL-Y-745	523-PL-Y-746	523-PL-Y-746	523-PL-Y-746	523-PL-Y-746	523-PL-Y-746	523-PL-Y-746	523-PL-Y-746	523-PL-Y-8026	523-PL-Y-8026	523-PL-Y-8026	523-PL-Y-8027	523-PL-Y-8027	523-PL-Y-8029B	523-PL-Y-8026	523-PL-Y-8028
	Refrigeration Area (KBA-22015/25), REFRIGERANT SIDE. Shutdown Level 2	VBA-23240 INLET TO VBA-23240 REFRIGERANT SUCTION SCRUBBER FROM VBA-23235	INLET TO VBA-23240 REFRIGERANT SUCTION SCRUBBER FROM EBG-24010 ~~REFRIGERANT SUCTION SCRUBBER~~	INLET TO VBA-23240 REFRIGERANT SUCTION SCRUBBER FROM EBG-24010 ~~REFRIGERANT SUCTION SCRUBBER~~	PBB-21565 REFRIGERANT SUCTION SCRUBBER PUMP	INLET TO VBA-23245 REFRIGERANT SUCTION SCRUBBER FROM EBG-24005	INLET TO VBA-23245 REFRIGERANT SUCTION SCRUBBER FROM EBG-24005	KBA-22015/22025 REFRIGERATION COMPRESSOR	F-22027 REFRIGERANT LUBE OIL COALESCER	EAL-24590A REFRIGERANT CONDENSER FAN A	EAL-24590A REFRIGERANT CONDENSER FAN B	EAL-24590B REFRIGERANT CONDENSER FAN C	EAL-24590B REFRIGERANT CONDENSER FAN D	EAL-24590C REFRIGERANT CONDENSER FAN E	EAL-24590C REFRIGERANT CONDENSER FAN F	OUTLET OF VBA-23235 REFRIGERANT ACCUMULATOR	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER STRAIGHT FROM VBA-23235	INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-24010	BYPASS TO INLET TO VBA-3241 REFRIGERANT SUCTION SCRUBBER FROM EBG-24010 (BY-PASS)	INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-24005/24020	BYPASS TO INLET TO VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER FROM EBG-24005/24020 (BY-PASS)	OUTLET OF F-2032 REFRIGERANT LUBE OIL COALESCER TOWARD EAL-24590	LIQUID REFRIGERANT (DISCHARGE OF PBB-1570) TOWARD EBG-24010	KBA-2020/2030 REFRIGERATION COMPRESSOR
		SDV-22016 on SDV-22016	SDV-23240A on SDV-23240A	SDV-23240B on SDV-23240B	NOTE 1 Motor PBB-21565	SDV-23245A on SDV-23245A	SDV-23245B on SDV-23245B	NOTE 2 KBA-22015/22025 USS-22015	SDV-22027 on SDV-22027	Motor A EAL-24590A	Motro B EAL-24590A	Motro C EAL-24590B	Motor D EAL-24590B	Motor E EAL-24590C	Motor F EAL-24590C	SDV-23235 on SDV-23235	SDV-22021 on SDV-22021	SDV-23241A on SDV-23241A	SDV-23241B on SDV-23241B	SDV-23246A on SDV-23246A	SDV-23246B on SDV-23246B	SDV-22030 on SDV-22030	SDV-21570 on SDV-21570	KBA-2020/2030
1																								
2	X																							
3		D	D	D	S	D	D	S	D	S	S	S	S	S	S	D	D	D	D	D	D	D	D	
4																								
5					S																			
6		D	D	D		D	D	S	D															
7					S																			
9		D	D	D		D	D	S	D															
10		D	D	D		D	D		D															
11																								
12																								
13										S														
14											S													
15												S												
16													S											
17														S										
18															S									
19		D	D	D		D	D	S	D							D	D	D	D	D	D	D	D	S
20																								
21																								
22																								
23																								
24		C/O																						
25			C/O																					
26				C/O																				
27						C/O																		
28							C/O																	
29									C/O															
30																C/O								

REFRIGERATION UNIT 3: EBG-24005/24020 AND EBG-24010 AND KBA-22015/22025

REFRIGERATION AREA 3 SHUTDOWN LEVEL 2. REFRIGERANT SIDE.

KBA-2015/22025: REFRIGERANT VAPORS ARE TAKEN FROM EBG-24010 AND EBG-24005/24020

REFRIGERANT SIDE

NOTES

Note 1 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST STOP THE COMPRESSOR, 2ND CLOSE THE SHUTDOWN VALVES.
Note 2 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST STOP THE PBB-21565 PUMP, 2ND CLOSE THE SHUTDOWN VALVES.
Note 3 For compressor KBA-22015/22025 shutdonw logic implemeted in compprsor PLC refers to "REFRIGARATION_KBA-22015_25 New"
Note 4 LALL-23240 cleared is a permissive to start PBB-21565
~~Note 5 Provide 1 min time delay to allow the operator to bypass the interlock in case of absence of propane leakage.~~
Note 6 KBA-2020/2030 shall be stopped only if SDV-23241A and SDV-23246A are opened.
Note 7 KBA-2020/2030 IS SPARE OF KBA-2015/20025 OR KBA-12015/12025 OR KBA-22015/22015
Note 8 KBA-2020/2030 AS SPARE OF KBA-22015/22025 REFRIGERANT VAPOURS ARE TAKEN FROM EBG-24010 AND EBG-24005/25020.
Note 9 ~~PSL must be in alarm condition to activate Shutdown of the pump acoording to API Plan 53B.~~
Note 10 CONFIGURE A MAINTENANCE OVERRIDE SWITCH TO DEACTIVATE ALL INTERLOCKS ASSOCIATED TO THE PUMP PBB-21565

CAUSE AND EFFECT MATRIX (NEW)

PERU CAMISEA SECOND EXPANSION PROJECT
PISCO PLANT
SEE NOTES IN WORKSHEET "Howe-Baker_Existing_NOTES"

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low	1 523-PL-Y-742 VBA-23240 REFRIGERANT SUCTION SCRUBBER SDY-22016 on SDV-22016	2 523-PL-Y-742 VBA-23240 REFRIGERANT SUCTION SCRUBBER SDY-23240A on SDV-23240A	3 523-PL-Y-742 VBA-23240 REFRIGERANT SUCTION SCRUBBER SDY-23240B on SDV-23240B	4 523-PL-Y-743 VBA-23245 REFRIGERANT INTERSTAGE SCRUBBER SDY-23245A on SDV-23245A	5 523-PL-Y-743 VBA-23245 REFRIGERANT INTERSTAGE SCRUBBER SDY-23245B on SDV-23245B	6 523-PL-Y-744 KBA-22015/22025 REFRIGERATION COMPRESSOR NOTE 2 KBA-22015/22025 USS-22015	7 523-PL-Y-745 F-22027 REFRIGERANT LUBE OIL COALESCER SDY-22027 on SDV-22027
	REFRIGERATION KBA-22015/22025			6																				
1	COMPRESSORS PLC-22																							
3	PALL - 22015B	KBA-22015/22025 REFRIGERANT COMPRESSOR - SUCTION	523-744	3	psia						7						X	C	C	C	C	C	S	C
5	TAHH - 22024	KBA-22015/22025 REFRIGERANT COMPRESSOR - DISCHARGE	523-744		°F			250	0					X				C	C	C	C	C	S	C
8	PALL - 22025B	KBA-22015/22025 REFRIGERANT COMPRESSOR - INTERSTAGE	523-744		psig						170						X	C	C	C	0	C	S	C
9	TAHH - 22025	KBA-22015/22025 REFRIGERANT COMPRESSOR - DISCHARGE	523-744		°F		0	250						X									S	
11	PAHH - 22026	KBA-22015/22025 REFRIGERANT COMPRESSOR - DISCHARGE	523-744		psig			290						X				C	C	C	C	C	S	C
18	~~ZAO - 22016~~ 0	~~VBA-23240 REFRIGERANT SUCTION SCRUBBER~~	~~523-742~~	~~Note 5~~									X										~~S~~	
20	UPLL - 22015	KBA-22015/22025 REFRIGERANT COMPRESSOR (SIGNAL FROM SSS)	523-744	1																				
21	USS - 22015	KBA-22015/22025 REFRIGERANT COMPRESSOR (SIGNAL FROM SSS)	523-744									X						C	C	C	C	C	S	C
22	UAL - 22015	KBA-22015/22025 REFRIGERANT COMPRESSOR	523-744																					
23	UALL - 22015	KBA-22015/22025 REFRIGERANT COMPRESSOR	523-744														X	C	C	C	C	C		C
	COMPRESSORS PLC-22																							
19	KBA-22015/22025 REFRIGERANT COMPRESSOR																							
24	ZAHH - 22401	COMPRESSOR AXIAL PROBE	659D2204	6	G's									X				C	C	C	C	C	S	C
25	ZAH - 22401	COMPRESSOR AXIAL PROBE	659D2204	6	G's																			
26	XAHH - 22401X	COMPRESSOR SHAFT END BEARING - "X" VIBRATION PROBE	659D2204	6	G's									X				C	C	C	C	C	S	C
27	XAH - 22401X	COMPRESSOR SHAFT END BEARING - "X" VIBRATION PROBE	659D2204	6	G's																			
28	XAHH - 22401Y	COMPRESSOR SHAFT END BEARING - "Y" VIBRATION PROBE	659D2204	6	G's									X				C	C	C	C	C	S	C
29	XAH - 22401Y	COMPRESSOR SHAFT END BEARING - "Y" VIBRATION PROBE	659D2204	6	G's																			
30	PDAL - 22401	COMPRESSOR LUBE OIL CIRCUIT	659D2204	6	psid																			
31	LAL - 22401	COMPRESSOR CARTER	659D2204	6	%										X								START PERMISSIVE	0
32	XAHH - 22402X	COMPRESSOR SUMP END BEARING - "X" VIBRATION PROBE	659D2204	6	G's									X				C	C	C	C	C	S	C
33	XAH - 22402X	COMPRESSOR SUMP END BEARING - "X" VIBRATION PROBE	659D2204	6	G's																			
34	XAHH - 22402Y	COMPRESSOR SUMP END BEARING - "Y" VIBRATION PROBE	659D2204	6	G's									X				C	C	C	C	C	S	C
35	XAH - 22402Y	COMPRESSOR SUMP END BEARING - "Y" VIBRATION PROBE	659D2204	6	G's																			
36	PDAH - 22402	COMPRESSOR LUBE OIL FILTER	659D2204	6	psid																			
37	PDAL - 22403	COMPRESSOR LUBE OIL CIRCUIT	659D2204	6	psid																			
38	PDALL - 22403A	COMPRESSOR LUBE OIL CIRCUIT	659D2204	6	psid											X		C	C	C	C	C	S	C
39	PDALL - 22403B	COMPRESSOR LUBE OIL CIRCUIT	659D2204	6	psid											X		C	C	C	C	C	S	C
40	TAHH - 22404	COMPRESSOR LUBE OIL CIRCUIT	659D2204	6	°F									X				C	C	C	C	C	S	C
41	TAH - 22404	COMPRESSOR LUBE OIL CIRCUIT	659D2204	6	°F																			
42	TAL - 22406 0	COMPRESSOR CARTER	659D2204	6	°F										X								START PERMISSIVE	
43	TAHH - 22407	COMPRESSOR JOURNAL BEARING	659D2204	6	°F									X				C	C	C	C	C	S	C
44	TAH - 22407	COMPRESSOR JOURNAL BEARING	659D2204	6	°F																			
45	TAHH - 22408	COMPRESSOR JOURNAL BEARING	659D2204	6	°F									X				C	C	C	C	C	S	C
46	TAH - 22408	COMPRESSOR JOURNAL BEARING	659D2204	6	°F																			
47	-	GEAR LUBE OIL CIRCUIT AND MOTOR		6																				
48	XAHH - 21501X	GEAR LS SHAFT EXTENSION END - "X" RADIAL VIBRATION PROBE	569D2205	6	G's									X				C	C	C	C	C	S	C
49	XAH - 21501X	GEAR LS SHAFT EXTENSION END - "X" RADIAL VIBRATION PROBE	569D2205	6	G's																			
50	XAHH - 21501Y	GEAR LS SHAFT EXTENSION END - "Y" RADIAL VIBRATION PROBE	569D2205	6	G's									X				C	C	C	C	C	S	C
51	XAH - 21501Y	GEAR LS SHAFT EXTENSION END - "Y" RADIAL VIBRATION PROBE	569D2205	6	G's																			
52	TAHH - 21501	GEAR LS SHAFT JOURNAL BEARING	569D2205	6	°F									X				C	C	C	C	C	S	C
53	TAH - 21501	GEAR LS SHAFT JOURNAL BEARING	569D2205	6	°F																			
54	XAHH - 21502X	GEAR LS SHAFT BLIND END - "X" RADIAL VIBRATION PROBE	569D2205	6	G's									X				C	C	C	C	C	S	C
55	XAH - 21502X	GEAR LS SHAFT BLIND END - "X" RADIAL VIBRATION PROBE	569D2205	6	G's																			
56	XAHH - 21502Y	GEAR LS SHAFT BLIND END - "Y" RADIAL VIBRATION PROBE	569D2205	6	G's									X				C	C	C	C	C	S	C
57	XAH - 21502Y	GEAR LS SHAFT BLIND END - "Y" RADIAL VIBRATION PROBE	569D2205	6	G's																			
58	TAHH - 21502	GEAR LS SHAFT JOURNAL BEARING	569D2205	6	°F									X				C	C	C	C	C	S	C
59	TAH - 21502	GEAR LS SHAFT JOURNAL BEARING	569D2205	6	°F																			
60	XAHH - 21503X	GEAR HS SHAFT EXTENSION END - "X" RADIAL VIBRATION PROBE	569D2205	6	G's									X				C	C	C	C	C	S	C
61	XAH - 21503X	GEAR HS SHAFT EXTENSION END - "X" RADIAL VIBRATION PROBE	569D2205	6	G's																			
62	XAHH - 21503Y	GEAR HS SHAFT EXTENSION END - "Y" RADIAL VIBRATION PROBE	569D2205	6	G's									X				C	C	C	C	C	S	C
63	XAH - 21503Y	GEAR HS SHAFT EXTENSION END - "Y" RADIAL VIBRATION PROBE	569D2205	6	G's																			
64	TAHH - 21503	GEAR HS SHAFT JOURNAL BEARING	569D2205	6	°F									X				C	C	C	C	C	S	C
65	TAH - 21503	GEAR HS SHAFT JOURNAL BEARING	569D2205	6	°F																			
66	PAL - 21503	GEAR LUBE OIL CIRCUIT	569D2205	6	psig																			
67	XAHH - 21504X	GEAR HS SHAFT BLIND END - "X" RADIAL VIBRATION PROBE	569D2205	6	G's									X				C	C	C	C	C	S	C
68	XAH - 21504X	GEAR HS SHAFT BLIND END - "X" RADIAL VIBRATION PROBE	569D2205	6	G's																			
69	XAHH - 21504Y	GEAR HS SHAFT BLIND END - "Y" RADIAL VIBRATION PROBE	569D2205	6	G's									X				C	C	C	C	C	S	C

Completar información faltante de YORK

CAUSE AND EFFECT MATRIX (NEW)

PERU CAMISEA SECOND EXPANSION PROJECT
PISCO PLANT
SEE NOTES IN WORKSHEET "Howe-Baker_Existing_NOTES"

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low	1	2	3	4	5	6	7
																		523-PL-Y-742	523-PL-Y-742	523-PL-Y-742	523-PL-Y-743	523-PL-Y-743	523-PL-Y-744	523-PL-Y-745
																		VBA-23240 REFRIGERANT SUCTION SCRUBBER	VBA-23240 REFRIGERANT SUCTION SCRUBBER	VBA-23240 REFRIGERANT SUCTION SCRUBBER	VBA-23245 REFRIGERANT INTERSTAGE SCRUBBER	VBA-23245 REFRIGERANT INTERSTAGE SCRUBBER	KBA-22015/22025 REFRIGERATION COMPRESSOR	F-22027 REFRIGERANT LUBE OIL COALESCER
																							NOTE 2	
																		SDV-22016 on SDV-22016	SDV-23240A on SDV-23240A	SDV-23240B on SDV-23240B	SDV-23245A on SDV-23245A	SDV-23245B on SDV-23245B	KBA-22015/22025 USS-22015	SDV-22027 on SDV-22027
73	PALL - 21504	GEAR LUBE OIL CIRCUIT	569D2205	6	psig												X	C	C	C	C	C	S	C
74	PAL - 21504	GEAR LUBE OIL CIRCUIT	569D2205	6	psig																			
75	ZAHH - 21507	GEAR LS SHAFT	569D2205	6	G's									X				C	C	C	C	C	S	C
76	ZAH - 21507	GEAR LS SHAFT	569D2205	6	G's																			
77	TAHH - 21507	MOTOR JOURNAL BEARING	569D2205	6	°F									X				C	C	C	C	C	S	C
78	TAH - 21507	MOTOR JOURNAL BEARING	569D2205	6	°F																			
79	ZAHH - 21508	GEAR HS SHAFT	569D2205	6	G's									X				C	C	C	C	C	S	C
80	ZAH - 21508	GEAR HS SHAFT	569D2205	6	G's																			
81	TAHH - 21508	MOTOR JOURNAL BEARING	569D2205	6	°F									X				C	C	C	C	C	S	C
82	TAH - 21508	MOTOR JOURNAL BEARING	569D2205	6	°F																			
83	TAHH - 21510	MOTOR SPACE	569D2205	6	°F									X				C	C	C	C	C	S	C
84	TAH - 21510	MOTOR SPACE	569D2205	6	°F																			
85	PALL - 21510	GEAR LUBE OIL CIRCUIT	569D2205	6	psig												X	C	C	C	C	C	S	C
86	TAHH - 21512	MOTOR SPACE	569D2205	6	°F									X				C	C	C	C	C	S	C
87	TAH - 21512	MOTOR SPACE	569D2205	6	°F																			
88	TAHH - 21514	MOTOR SPACE	569D2205	6	°F									X				C	C	C	C	C	S	C
89	TAH - 21514	MOTOR SPACE	569D2205	6	°F																			
90	TAHH - 21516	GEAR LUBE OIL CIRCUIT	569D2205	6	°F									X				C	C	C	C	C	S	C
91	TAH - 21516	GEAR LUBE OIL CIRCUIT	569D2205	6	°F																			

NOTES:

1 PERMISSIVE FOR KBA-22015/22025 TO START
AT KBA-22015/22025 START THE FOLLOWING STEPS SHOULD OCCUR TO GET THE PERMISSIVE TO START THE UNIT:
SDV-23240B SHOULD BE OPENED TO CLEAR PDAH-23240.
ONCE PDAH-23240 IS CLEARED, SDV-23240A CAN BE OPENED.
SDV-23245B SHOULD BE OPENED TO CLEAR PDAH-23245.
ONCE PDAH-23245 IS CLEARED, SDV-23245A CAN BE OPENED.
ONCE BOTH THE PDAH ARE CLEARED SDV-22027 CAN BE OPENED AND KBA-22015/22025 CAN BE GIVEN THE PERMISSIVE TO START.
2 In PCS
3, The logic should be in the following order: 1St shutdown the compressor KBA-22015/22025, 2nd close the shutdown valve.
4,CAUSE AND EFFECT DIAGRAM OF KBA-22015/25 BY YORK (Document Nº PCSE-523-P3-M-523)
5. If the compressor KBA-22015/25 is operating, and ZAO-22016 are desactivated (this meaning that the SDV-22016 is not totally open) then stop the compressor.
6. This value to be defined by vendor

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

PROYECTO EPC2-PISCO PLANT
BLOCK 56 - CAMISEA EXPANSION PROJECT
NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PISCO PLANT
PRECHILLING AND REFRIGERATION: PRODUCT SIDE
Reference:
PP

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
1																	
2			520-205														
3			520-605														
4			520-731														
5			523-613														
6			520-8014														
7			659D1993 SHT. 2														
8			523-740														
9			520-205														
10			520-205														
11			520-605														
12			523-731														
13			523-613														
14			520-8014														
15			659D1993 SHT. 2														
16			523-740														
17			520-205														
18			520-605														
19			520-205														
20			520-731														
21			523-740														
			PRECHILLING AND REFRIGERATION PRODUCT SIDE Shutdown Level 2														
2			Propane Product (Unit 1) to Precooling System														
3			Propane Product (Unit 2) to Precooling System														
4			Propane Product (Unit 3) to Precooling System														
5			Propane from VRUS to Prechilling and Refrigeration														
6			PROPANE FROM EBG-4010 TO TKBJ-3005/13005/23005 REFRIGERATED STORAGE TANKS														
7			PROPANE FROM EBG-14010 TO TKBJ-3005/13005/23005 REFRIGERATED STORAGE TANKS														
8			PROPANE FROM EBG-24010 TO TKBJ-3005/13005/23005 REFRIGERATED STORAGE TANKS														
9			PRECHILLED PROPANE TO BULLETS														
10			Butane Product (Unit 1) to Precooling System														
11			Butane Product (Unit 2) to Precooling System														
12			Butane Product (Unit 3) to Precooling System														
13			Butane from VRUS to Prechilling and Refrigeration														
14			BUTANE FROM EBG-4020 TO TKBJ-3010/13010/23010 REFRIGERATED STORAGE TANKS														
15			BUTANE FROM EBG-14020 TO TKBJ-3010/13010/23010 REFRIGERATED STORAGE TANKS														
16			BUTANE FROM EBG-24020 TO TKBJ-3010/13010/23010 REFRIGERATED STORAGE TANKS														
17			PRECHILLED BUTANE TO BULLETS														
18			Rerun (OFF-SPEC) (Unit 2) of Propane Product to Feed Surge Vessel														
19			Rerun (OFF-SPEC) (Unit 1) of Propane Product to Feed Surge Vessel														
20			Rerun (OFF-SPEC) (Unit 3) of Propane Product to Feed Surge Vessel														
21			Butane to Naphtha Product line														
			PRECHILLING AND REFRIGERATION PRODUCT SIDE Shutdown Level 2														
2			XY-13283 on XV-13283														
3			XY-13280 on XV-13280														
4			XY-23280 on XV-23280														
5			XY-13288 on XV-13288														
6			SDY-1998C on PV-1998C														
7			SY-1998A on PV-1998A														
8			SY-2998A on PV-2998A														
9			XY-13290 on XV-13290														
10			XY-13282 on XV-13282														
11			XY-13281 on XV-13281														
12			XY-23281 on XV-23281														
13			XY-13289 on XV-13289														
14			SDY-3135B on FV-3135B														
15			SY-1998B on PV-1998B														
16			SY-2998B on PV-2998B														
17			XY-13291 on XV-13291														
18			XY-13279 on XV-13279														
19			XY-3279 on XV-3279														
20			XY-23279 on XV-23279														
21			SY-23136 on FV-23136														
		PRECHILLING AND REFRIGERATION PRODUCT SIDE															
1		**PRECHILLING AND REFRIGERATION PRODUCT SIDE**															
2	ESD	12025	PRECHILLING AND REFRIGERATION PRODUCT SIDE SHUTDOWN Manual SOFT Push Button in Control Room (Control System									X					
3		**PROPANE SIDE. INTERLOCKS**															
4	TAHH	4010	EBG-4010 LOW LEVEL PROPANE PRODUCT CHILLER OUTLET TO STORAGE	520-8014	1, 5, 8 °F			-10						X			
5	TAHH	14010C	EBG-14010 LOW LEVEL PROPANE PRODUCT CHILLER OUTLET TO STORAGE	659D1993 SHT. 2	3 , 5, 8 °F			-10						X			
6	TAHH	24010C	EBG-14010 LOW LEVEL PROPANE PRODUCT CHILLER OUTLET TO STORAGE	523-740	6, 5, 8 °F			-10						X			
7																	
8																	
9																	
10		**BUTANE SIDE. INTERLOCKS**															
11	TAHH	4020	EBG-4020 BUTANE PRODUCT CHILLER OUTLET TO STORAGE	520-8014	2 °F			60						X			
12	TAHH	14020	EBG-14020 BUTANE PRODUCT CHILLER OUTLET TO STORAGE	659D1993 SHT. 2	4 °F			60						X			
13	TAHH	24020	EBG-24020 BUTANE PRODUCT CHILLER OUTLET TO STORAGE	523-740	7 °F			60						X			
14		**PROPANE SIDE. ALARMS ON PCS**															
15	PAL	1998A	INLET STREAM TO EBG-1998A/2998A PROPANE CHILLERS	659D1999 SHT. 4	psig			250									
20	PALL	1998A	INLET STREAM TO EBG-1998A/2998A PROPANE CHILLERS	659D1999 SHT. 4	psig			245									
21	PDAH	1998A	EBG-1998A PROPANE CHILLER	659D1999 SHT. 4	psi			10									
23	TAH	1998H	OUTLET STREAM OF EBG-1998A PROPANE CHILLER	659D1999 SHT. 4	°F			68									
24	TAH	2998H	OUTLET STREAM OF EBG-2998A PROPANE CHILLER	523-753	°F			68									
25	TAH	4010	EBG-4010 LOW LEVEL PROPANE PRODUCT CHILLER OUTLET	520-8014	°F			-15									
26	PDAH	14005	EBG-14005 HIGH LEVEL PROPANE PRODUCT CHILLER	659D1993 SHT. 2	psid			10									
27	PDAH	14010	EBG-14010 LOW LEVEL PROPANE PRODUCT CHILLER	659D1993 SHT. 2	psid			10									
28	TAH	14010D	EBG-14010 LOW LEVEL PROPANE PRODUCT CHILLER OUTLET	659D1993 SHT. 2	°F			-15									
32	PDAH	2998A	EBG-2998A PROPANE CHILLER	523-753	psi			10									
33	TAH	2998H	OUTLET STREAM OF EBG-2998A PROPANE CHILLER	523-753	°F			68									
34	PDAH	24005	EBG-24005 HIGH LEVEL PROPANE PRODUCT CHILLER	523-740	psid			10									
35	PDAH	24010	EBG-24010 LOW LEVEL PROPANE PRODUCT CHILLER	523-740	psid			10									
36	TAH	24010D	EBG-24010 LOW LEVEL PROPANE PRODUCT CHILLER OUTLET	523-740	°F			-15									
37		**BUTANE SIDE. ALARMS ON PCS**															
38	PAL	1998B	INLET STREAM TO EBG-1998B BUTANE CHILLER	659D1999 SHT. 4	psig			75									
39	PALL	1998B	INLET STREAM TO EBG-1998B BUTANE CHILLER	659D1999 SHT. 4	psig			70									
40	TAH	1998I	OUTLET STREAM OF EBG-1998B BUTANE CHILLER	659D1999 SHT. 4	°F			68									
41	TAH	4020B	EBG-4020 BUTANE PRODUCT CHILLER OUTLET	520-8014	°F			55									
42	TAH	14020B	EBG-14020 BUTANE PRODUCT CHILLER OUTLET	659D1993 SHT. 2	°F			55									
43	TAH	24020B	EBG-24020 BUTANE PRODUCT CHILLER OUTLET	523-740	°F			60									
44	TAH	2998I	OUTLET STREAM OF EBG-2998B BUTANE CHILLER	523-753	°F			68									
46																	
47		**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**															
48	HS	13283	Propane Product (Unit 1) to Precooling System	520-205													
49	HS	13280	Propane Product (Unit 2) to Precooling System	520-605													
50	HS	23280	Propane Product (Unit 3) to Precooling System	520-731													
51	HS	13288	Propane from VRUS	523-613													
52	HS	1998C	PROPANE FROM EBG-4010 TO TKBJ-3005/13005/23005 REFRIGERATED STORAGE TANKS	520-8014													
53	HS	1998A	PROPANE FROM EBG-14010 TO TKBJ-3005/13005/23005 REFRIGERATED STORAGE TANKS	659D1993 SHT. 2													
54	HS	2998A	PROPANE FROM EBG-24010 TO TKBJ-3005/13005/23005 REFRIGERATED STORAGE TANKS	523-740													
55	HS	13290	PRECHILLED PROPANE TO BULLETS	520-205													
56	HS	13282	Butane Product (Unit 1) to Precooling System	520-205													
57	HS	13281	Butane Product (Unit 2) to Precooling System	520-605													
58	HS	23281	Butane Product (Unit 3) to Precooling System	520-731													
59	HS	13289	Butane from VRUS	523-613													
60	HS	3135B	BUTANE FROM EBG-4020 TO TKBJ-3010/13010/23010 REFRIGERATED STORAGE TANKS	520-8014													
61	HS	1998B	BUTANE FROM EBG-14020 TO TKBJ-3010/13010/23010 REFRIGERATED STORAGE TANKS	659D1993 SHT. 2													
62	HS	2998B	BUTANE FROM EBG-24020 TO TKBJ-3010/13010/23010 REFRIGERATED STORAGE TANKS	523-740													
63	HS	13291	PRECHILLED BUTANE TO BULLETS	520-205													
65	HS	23136	BUTANE FROM EBG-24020 TO NAPHTA PRODUCT LINE	520-205													
67	HS	23279	Rerun (OFF-SPEC) (Unit 3) of Propane Product to Feed Surge Vesse	520-731													
68																	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
4						C															
5							C														
6								C													
11														C							
12															C						
13																C					
24																					
34																					
35																					
48		C/O																			
49			C/O																		
50				C/O																	
51					C/O																
52						C/O															
53							C/O														
54								C/O													
55									C/O												
56										C/O											
57											C/O										
58												C/O									
59													C/O								
60														C/O							
61															C/O						
62																C/O					
63																	C/O				
65																				C/O	
67																				C/O	

NOTES

NOTE 1 UPON ACTIVATION OF TAHH-4010, PROPANE SHALL NOT BE SENT ANYMORE TO REFRIGERATED TANKS. PROPANE SHALL BE SENT TO BULLETS.
CLOSE PV-1998C 15 MINUTES AFTER TAHH-4010 ACTIVATION

NOTE 2 UPON ACTIVATION OF TAHH-4020, BUTANE SHALL NOT BE SENT ANYMORE TO REFRIGERATED TANKS. BUTANE SHALL BE SENT TO BULLETS.
CLOSE FV-3135B
THE OPERATOR SHALL DECIDE IF HE SENDS PRECHILLED BUTANE TO PRESSURIZED TANKS OR TO RERUN.

NOTE 3 UPON ACTIVATION OF TAHH-14010C, PROPANE SHALL NOT BE SENT ANYMORE TO REFRIGERATED TANKS. PROPANE SHALL BE SENT TO BULLETS.
CLOSE PV-1998A 15 MINUTES AFTER TAHH-14010C ACTIVATION

NOTE 4 UPON ACTIVATION OF TAHH-14020, BUTANE SHALL NOT BE SENT ANYMORE TO REFRIGERATED TANKS. BUTANE SHALL BE SENT TO BULLETS.
CLOSE PV-1998B
THE OPERATOR SHALL DECIDE IF HE SENDS PRECHILLED BUTANE TO PRESSURIZED TANKS OR TO RERUN.

NOTE 5

NOTE 6 UPON ACTIVATION OF TAHH-24010C, PROPANE SHALL NOT BE SENT ANYMORE TO REFRIGERATED TANKS. PROPANE SHALL BE SENT TO BULLETS.
CLOSE PV-2998A 15 MINUTES AFTER TAHH-24010C ACTIVATION.

NOTE 7 UPON ACTIVATION OF TAHH-24020, BUTANE SHALL NOT BE SENT ANYMORE TO REFRIGERATED TANKS. BUTANE SHALL BE SENT TO BULLETS.
CLOSE PV-2998B

NOTE 8: IF TAHH-4010 AND TAHH-14010C ARE ACTIVATED AT THE SAME TIME CLOSE PV-1998C AND PV-1998A.
IF TAHH-24010 AND TAHH-14010C ARE ACTIVATED AT THE SAME TIME CLOSE PV-2998A AND PV-1998A
IF TAHH-4010 AND TAHH-24010C ARE ACTIVATED AT THE SAME TIME CLOSE PV-1998C AND PV-2998/

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
BLOCK 56 - CAMISEA EXPANSION PROJECT
PISCO PLANT
PRECHILLER: EBG-1998A/1998B AND KBA-19000/19001 (EXISTING)
YORK PROCESS SYSTEMS JOB #294799
Reference:
PPAG-500-MC-K-606 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT)
PPAG-500-ET-Y-607 Revision 2 (YORK)
SEE PROCESS FLOW DIAGRAM PPAG-523-PL-Y-8807

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

ITEM	SERVICE	MALFUNCTION	NOTES	FIELD DEVICE		ANNUNCIATOR TAG		UNIT	VALUE	INPUT TO YORK'S	INPUT TO PCS	INPUT TO SSS	P&ID SHEET
1	**PRECHILLER: EBG-1998A/1998B AND KBA-19000/19001 SHUTDOWN LEVEL 2. REFRIGERANT SIDE.**	EMERGENCY S.D.										X	
2	Manual SOFT Push Button in Control Room (Control System)					ESD	19000					X	
3	**PRECHILLER: EBG-1998A/1998B AND KBA-19000/19001**												
4	**COMPRESSOR KBA-19000 SYSTEM**												
5	INLET SHUTDOWN VALVE TO VBA-19000 REFRIGERANT SUCTION SCRUBBER	HI HI DIFF PRESS AL	NOTE 1	PDIT	19000	PDAHH	19000	psid	10			X	659D1999 SHT. 1
6	VBA-19000 REFRIGERANT SUCTION SCRUBBER		NOTE 1,4	SDV	19000A	ZAO	19000A					X	659D1999 SHT. 1
7	VBA-19000 REFRIGERANT SUCTION SCRUBBER	HI HI LEVEL S.D.	NOTE 3	LSHH	19000	LAHH	19000	%	50			X	659D1999 SHT. 1
8	VBA-19000 REFRIGERANT SUCTION SCRUBBER	HI LEVEL AL		LIT	19000	LAH	19000	%	40		X		659D1999 SHT. 1
9	F-19000 REFRIGERANT LUBE OIL COALESCER	HI HI DIFF PRESS AL		PDIT	19005	PDAH	19005	psid	10		X		659D1999 SHT. 2
10	F-19000 REFRIGERANT LUBE OIL COALESCER (UPPER SIDE)	HI LEVEL AL		LSH	19005A	LAH	19005A	%	20		X		659D1999 SHT. 2
11	F-19000 REFRIGERANT LUBE OIL COALESCER (BOTTOM SIDE)	HI LEVEL AL		LSH	19005B	LAH	19005B	%	40		X		659D1999 SHT. 2
12	**COMPRESSOR KBA-19001 SYSTEM**												
13	KBA-19001 IS SPARE OF KBA-19000 OR KBA-29000 KBA-19001 AS SPARE OF KBA-19000: REFRIGERANT VAPORS ARE TAKEN FROM EBG-1998A/B KBA-19001 AS SPARE OF KBA-29000: REFRIGERANT VAPORS ARE TAKEN FROM EBG-2998A/B												
14	INLET SHUTDOWN VALVE TO VBA-19001 FROM EGB-1998A/B	HI HI DIFF PRESS AL	NOTE 2	PDIT	19001	PDAHH	19001	psid	10			X	659D1999 SHT. 1
15	VBA-19001 REFRIGERANT SUCTION SCRUBBER		NOTE 2,5	SDV	19001A	ZAO	19001A					X	659D1999 SHT. 1
16	INLET SHUTDOWN VALVE TO VBA-19001 FROM EGB-2998A/B	HI HI DIFF PRESS AL	NOTE 2,10	PDIT	29001	PDAHH	29001	psid	10			X	659D1999 SHT. 1
17	VBA-19001 REFRIGERANT SUCTION SCRUBBER		NOTE 2,5	SDV	29001A	ZAO	29001A					X	659D1999 SHT. 1
18	ZAO-19001A AND ZIO-29007		NOTE 6	SSC	19001A	XA	19001A					X	-
19	ZAO-29001A AND ZIO-29008		NOTE 7	SSC	19001B	XA	19001B					X	-
20	VBA-19001 REFRIGERANT SUCTION SCRUBBER	HI HI LEVEL S.D.	NOTE 3	LSHH	19001	LAHH	19001	%	50			X	659D1999 SHT. 1
21	VBA-19001 REFRIGERANT SUCTION SCRUBBER	HI LEVEL AL		LIT	19001	LAH	19001	%	40		X		659D1999 SHT. 1
22	F-19001 REFRIGERANT LUBE OIL COALESCER	HI DIFF PRESS AL		PDIT	19006	PDAH	19006	psid	10		X		659D1999 SHT. 2
23	F-19001 REFRIGERANT LUBE OIL COALESCER (UPPER SIDE)	HI LEVEL AL		LSH	19006A	LAH	19006A	%	20		X		659D1999 SHT. 2
24	F-19001 REFRIGERANT LUBE OIL COALESCER (BOTTOM SIDE)	HI LEVEL AL		LSH	19006B	LAH	19006B	%	40		X		659D1999 SHT. 2
25	**PRECHILLER EGB-1998 A/B SYSTEM**												
26	EAL-19000A REFRIGERANT CONDENSER FAN A	HI HI VIB S.D.		VSHH	19000A	VAHH	19000A	G's	3			X	659D1999 SHT. 3
27	EAL-19000A REFRIGERANT CONDENSER FAN B	HI HI VIB S.D.		VSHH	19000B	VAHH	19000B	G's	3			X	659D1999 SHT. 3
28	EAL-19000B REFRIGERANT CONDENSER FAN C	HI HI VIB S.D.		VSHH	19000C	VAHH	19000C	G's	3			X	659D1999 SHT. 3
29	EAL-19000B REFRIGERANT CONDENSER FAN D	HI HI VIB S.D.		VSHH	19000D	VAHH	19000D	G's	3			X	659D1999 SHT. 3
30	EAL-19000C REFRIGERANT CONDENSER FAN E	HI HI VIB S.D.		VSHH	19000E	VAHH	19000E	G's	3			X	659D1999 SHT. 3
31	EAL-19000C REFRIGERANT CONDENSER FAN F	HI HI VIB S.D.		VSHH	19000F	VAHH	19000F	G's	3			X	659D1999 SHT. 3
32	EAL-19000D REFRIGERANT CONDENSER FAN G	HI HI VIB S.D.		VSHH	19000G	VAHH	19000G	G's	3			X	659D1999 SHT. 3
33	EAL-19000D REFRIGERANT CONDENSER FAN H	HI HI VIB S.D.		VSHH	19000H	VAHH	19000H	G's	3			X	659D1999 SHT. 3
34	OUTLET OF EAL-19000 REFRIGERANT CONDENSER	HI TEMP AL		TE	19002	TAH	19002	°F	125		X		659D1999 SHT. 3
35	VBA-19025 REFRIGERANT ACCUMULATOR	HI PRESS AL		PIT	19025	PAH	19025B	psig	260		X		659D1999 SHT. 3
36	VBA-19025 REFRIGERANT ACCUMULATOR	LO PRESS AL		PIT	19025	PAL	19025B	psig	150		X		659D1999 SHT. 3
37	VBA-19025 REFRIGERANT ACCUMULATOR	HI LEVEL AL		LIT	19025	LAH	19025	%	71		X		659D1999 SHT. 3
38	VBA-19025 REFRIGERANT ACCUMULATOR	LO LEVEL AL		LIT	19025	LAL	19025	%	7		X		659D1999 SHT. 3
39	VBA-19025 REFRIGERANT ACCUMULATOR	LO LO LEVEL S.D.	NOTE 8, 9	LSLL	19025	LALL	19025	%	2			X	659D1999 SHT. 3
40	SHELL SIDE EBG-1998A/B PROPANE CHILLER/BUTANE CHILLER	HI HI LEVEL S.D.		LSHH	1998	LAHH	1998	%	38			X	659D1999 SHT. 4
41	SHELL SIDE EBG-1998A/B PROPANE CHILLER/BUTANE CHILLER	HI LEVEL AL		LIT	1998	LAH	1998	%	48		X		659D1999 SHT. 4
42	SHELL SIDE EBG-1998A/B PROPANE CHILLER/BUTANE CHILLER	LO LEVEL AL		LIT	1998	LAL	1998	%	27		X		659D1999 SHT. 4
43	**KBA-19000 PRECHILLER COMPRESSOR**												
44	KBA-19000 PRECHILLER COMPRESSOR (SIGNAL FROM SSS)	PERMISSIVE RUN				UPLL	19000			PLC-17A			659D1999 SHT. 2
45	KBA-19000 PRECHILLER COMPRESSOR (SIGNAL FROM SSS)	EMERGENCY S.D.	NOTE 3			USS	19000			PLC-17A			659D1999 SHT. 2
46	KBA-19000 PRECHILLER COMPRESSOR	COMMON ALARM				UAL	19000					X	659D1999 SHT. 2
47	KBA-19000 PRECHILLER COMPRESSOR	UNIT SHUTDOWN	NOTE 3			UALL	19000					X	659D1999 SHT. 2
48	SUCTION END COMPRESSOR SHAFT	HI HI RADIAL VIB S.D.	NOTE 3	XE	1601	XAHH	1601	G's	3,5	PLC-17A			659D1999 SHT. 2
49	SUCTION END COMPRESSOR SHAFT	HI RADIAL VIB AL		XE	1601	XAH	1601	G's	3,5	PLC-17A			659D1999 SHT. 2
50	COMPRESSOR LUBE OIL CIRCUIT	LO PRESS AL		PT	1601	PAL	1601	psig	30	PLC-17A			659D1999 SHT. 2
51	COMPRESSOR LUBE OIL CIRCUIT	LO LO PRESS S.D.	NOTE 3	PT	1601	PALL	1601	psig	25	PLC-17A			659D1999 SHT. 2
52	PV-1601 OIL SEPARATOR OF KBA-19000	LO LO LEVEL S.D.	NOTE 3	LSL	1601	LALL	1601	%	5	PLC-17A			659D1999 SHT. 2
53	MOTOR CURRENT	FORCE UNLOAD		IE	1601	IC	1601	AMP	166	PLC-17A			659D1999 SHT. 2
54	MOTOR CURRENT	STOP LOAD		IE	1602	IC	1602	AMP	158	PLC-17A			659D1999 SHT. 2
55	MOTOR CURRENT	HI HI CURR S.D.	NOTE 3	IE	1601	IAHH	1601	AMP	182	PLC-17A			659D1999 SHT. 2
56	MOTOR CURRENT	HI CURR AL		IE	1601	IAH	1601	AMP	174	PLC-17A			659D1999 SHT. 2
57	MOTOR CURRENT	LO LO CURR S.D.	NOTE 3	IE	1601	IALL	1601	AMP	45	PLC-17A			659D1999 SHT. 2
58	DISCHARGE END COMPRESSOR SHAFT	HI HI RADIAL VIB S.D.	NOTE 3	XE	1602	XAHH	1602	G's	4	PLC-17A			659D1999 SHT. 2
59	DISCHARGE END COMPRESSOR SHAFT	HI RADIAL VIB AL		XE	1602	XAH	1602	G's	4	PLC-17A			659D1999 SHT. 2
60	KBA-19000 PRECHILLER COMPRESSOR - DISCHARGE	HI HI TEMP S.D.	NOTE 3	TE	1602	TAHH	1602	°F	250	PLC-17A			659D1999 SHT. 2
61	KBA-19000 PRECHILLER COMPRESSOR - DISCHARGE	HI TEMP AL		TE	1602	TAH	1602	°F	230	PLC-17A			659D1999 SHT. 2
62	COMPRESSOR LUBE OIL CIRCUIT	HI HI DIFF PRESS S.D.	NOTE 3	PT	1602	PDAHH	1602	psid	20	PLC-17A			659D1999 SHT. 2
63	COMPRESSOR LUBE OIL CIRCUIT	HI DIFF PRESS AL		PT	1602	PDAH	1602	psid	15	PLC-17A			659D1999 SHT. 2
64	COMPRESSOR LUBE OIL CIRCUIT	HI HI TEMP S.D.	NOTE 3	TE	1603	TAHH	1603	°F	170	PLC-17A			659D1999 SHT. 2
65	COMPRESSOR LUBE OIL CIRCUIT	HI TEMP AL		TE	1603	TAH	1603	°F	160	PLC-17A			659D1999 SHT. 2
66	KBA-19000 PRECHILLER COMPRESSOR - DISCHARGE	HI HI PRESS S.D.	NOTE 3	PT	1603	PAHH	1603	psig	290	PLC-17A			659D1999 SHT. 2
67	KBA-19000 PRECHILLER COMPRESSOR - DISCHARGE	HI PRESS AL		PT	1603	PAH	1603	psig	280	PLC-17A			659D1999 SHT. 2
68	PV-1601 OIL SEPARATOR OF KBA-19000	LO TEMP AL		TE	1604	TAL	1604	°F	55	PLC-17A			659D1999 SHT. 2
69	PV-1601 OIL SEPARATOR OF KBA-19000	LO LO TEMP S.D.	NOTE 3	TE	1604	TALL	1604	°F	49	PLC-17A			659D1999 SHT. 2
70	KBA-19000 PRECHILLER COMPRESSOR - SUCTION	LO PRESS AL		PT	1604	PAL	1604	psig	70	PLC-17A			659D1999 SHT. 2
71	KBA-19000 PRECHILLER COMPRESSOR - SUCTION	LO LO PRESS S.D.		PT	1604	PALL	1604	psig	60	PLC-17A			659D1999 SHT. 2
72	MOTOR BEARING	HI HI TEMP S.D.	NOTE 3	TE	1605	TAHH	1605	°F	203	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
73	MOTOR BEARING	HI TEMP AL		TE	1605	TAH	1605	°F	194	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
74	COMPRESSOR LUBE OIL CIRCUIT	HI HI DIFF PRESS S.D.	NOTE 3	PT	1605	PDAHH	1605	psid	80	PLC-17A			659D1999 SHT. 2
75	COMPRESSOR LUBE OIL CIRCUIT	LO LO DIFF PRESS S.D.	NOTE 3	PT	1605	PDALL	1605	psid	15	PLC-17A			659D1999 SHT. 2
76	MOTOR BEARING	HI HI TEMP S.D.	NOTE 3	TE	1606	TAHH	1606	°F	203	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
77	MOTOR BEARING	HI TEMP AL		TE	1606	TAH	1606	°F	194	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
78	COMPRESSOR LUBE OIL CIRCUIT	LO PRESS AL		PT	1606	PAL	1606	psig	20	PLC-17A			659D1999 SHT. 2
79	COMPRESSOR LUBE OIL CIRCUIT	LO LO PRESS S.D.	NOTE 3	PT	1606	PALL	1606	psig	15	PLC-17A			659D1999 SHT. 2
80	MOTOR STATOR	HI HI TEMP S.D.	NOTE 3	TE	1607	TAHH	1607	°F	338	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
81	MOTOR STATOR	HI TEMP AL		TE	1607	TAH	1607	°F	320	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
82	KBA-19000 PRECHILLER COMPRESSOR - SUCTION	LO LO PRESS S.D.	NOTE 3	PT	1607	PALL	1607	psig	60	PLC-17A			659D1999 SHT. 2
83	MOTOR STATOR	HI HI TEMP S.D.	NOTE 3	TE	1608	TAHH	1608	°F	338	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
84	MOTOR STATOR	HI TEMP AL		TE	1608	TAH	1608	°F	320	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
85	MOTOR STATOR	HI HI TEMP S.D.	NOTE 3	TE	1609	TAHH	1609	°F	338	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
86	MOTOR STATOR	HI TEMP AL		TE	1609	TAH	1609	°F	320	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
87	MOTOR STATOR	HI HI TEMP S.D.	NOTE 3	TE	1610	TAHH	1610	°F	338	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
88	MOTOR STATOR	HI TEMP AL		TE	1610	TAH	1610	°F	320	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
89	KBA-19000 PRECHILLER COMPRESSOR - DISCHARGE	HI HI TEMP S.D.	NOTE 3	TSHH	1611	TAHH	1611	°F	250	PLC-17A			659D1999 SHT. 2
90	MOTOR STATOR	HI HI TEMP S.D.	NOTE 3	TE	1611	TAHH	1611	°F	338	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
91	MOTOR STATOR	HI TEMP AL		TE	1611	TAH	1611	°F	320	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
92	KBA-19000 PRECHILLER COMPRESSOR - DISCHARGE	HI HI PRESS S.D.	NOTE 3	PSHH	1611	PAHH	1611	psig	290	PLC-17A			659D1999 SHT. 2
93	COMPRESSOR LUBE OIL CIRCUIT	LO LO PRESS S.D.	NOTE 3	PSLL	1611	PALL	1611	psig	35	PLC-17A			659D1999 SHT. 2
94	COMPRESSOR LUBE OIL CIRCUIT	HI HI TEMP S.D.	NOTE 3	TSHH	1612	TAHH	1612	°F	200	PLC-17A			659D1999 SHT. 2
95	MOTOR STATOR	HI HI TEMP S.D.	NOTE 3	TE	1612	TAHH	1612	°F	338	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
96	MOTOR STATOR	HI TEMP AL		TE	1612	TAH	1612	°F	320	MCC OF M-1601/ KBA-19000			659D1999 SHT. 2
97	**KBA-19001 PRECHILLER COMPRESSOR**												
98	KBA-19001 PRECHILLER COMPRESSOR (SIGNAL FROM SSS)	PERMISSIVE RUN				UPLL	19001			PLC-17B			659D1999 SHT. 2
99	KBA-19001 PRECHILLER COMPRESSOR (SIGNAL FROM SSS)	EMERGENCY S.D.	NOTE 3			USS	19001			PLC-17B			659D1999 SHT. 2
100	KBA-19001 PRECHILLER COMPRESSOR	COMMON ALARM				UAL	19001					X	659D1999 SHT. 2
101	KBA-19001 PRECHILLER COMPRESSOR	UNIT SHUTDOWN	NOTE 3			UALL	19001					X	659D1999 SHT. 2
102	SUCTION END COMPRESSOR SHAFT	HI HI RADIAL VIB S.D.	NOTE 3	XE	1601	XAHH	1601	G's	3,5	PLC-17B			659D1999 SHT. 2
103	SUCTION END COMPRESSOR SHAFT	HI RADIAL VIB AL		XE	1601	XAH	1601	G's	3,5	PLC-17B			659D1999 SHT. 2
104	COMPRESSOR LUBE OIL CIRCUIT	LO PRESS AL		PT	1601	PAL	1601	psig	30	PLC-17B			659D1999 SHT. 2
105	COMPRESSOR LUBE OIL CIRCUIT	LO LO PRESS S.D.	NOTE 3	PT	1601	PALL	1601	psig	25	PLC-17B			659D1999 SHT. 2
106	PV-1601 OIL SEPARATOR OF KBA-19001	LO LO LEVEL S.D.	NOTE 3	LSL	1601	LALL	1601	%	5	PLC-17B			659D1999 SHT. 2
107	MOTOR CURRENT	FORCE UNLOAD		IE	1601	IC	1601	AMP	166	PLC-17B			659D1999 SHT. 2
108	MOTOR CURRENT	STOP LOAD		IE	1602	IC	1602	AMP	158	PLC-17B			659D1999 SHT. 2
109	MOTOR CURRENT	HI HI CURR S.D.	NOTE 3	IE	1601	IAHH	1601	AMP	182	PLC-17B			659D1999 SHT. 2
110	MOTOR CURRENT	HI CURR AL		IE	1601	IAH	1601	AMP	174	PLC-17B			659D1999 SHT. 2
111	MOTOR CURRENT	LO LO CURR S.D.	NOTE 3	IE	1601	IALL	1601	AMP	45	PLC-17B			659D1999 SHT. 2
112	DISCHARGE END COMPRESSOR SHAFT	HI HI RADIAL VIB S.D.	NOTE 3	XE	1602	XAHH	1602	G's	4	PLC-17B			659D1999 SHT. 2
113	DISCHARGE END COMPRESSOR SHAFT	HI RADIAL VIB AL		XE	1602	XAH	1602	G's	4	PLC-17B			659D1999 SHT. 2
114	KBA-19001 PRECHILLER COMPRESSOR - DISCHARGE	HI HI TEMP S.D.	NOTE 3	TE	1602	TAHH	1602	°F	250	PLC-17B			659D1999 SHT. 2
115	KBA-19001 PRECHILLER COMPRESSOR - DISCHARGE	HI TEMP AL		TE	1602	TAH	1602	°F	230	PLC-17B			659D1999 SHT. 2
116	COMPRESSOR LUBE OIL CIRCUIT	HI HI DIFF PRESS S.D.	NOTE 3	PT	1602	PDAHH	1602	psid	20	PLC-17B			659D1999 SHT. 2
117	COMPRESSOR LUBE OIL CIRCUIT	HI DIFF PRESS AL		PT	1602	PDAH	1602	psid	15	PLC-17B			659D1999 SHT. 2
118	COMPRESSOR LUBE OIL CIRCUIT	HI HI TEMP S.D.	NOTE 3	TE	1603	TAHH	1603	°F	170	PLC-17B			659D1999 SHT. 2
119	COMPRESSOR LUBE OIL CIRCUIT	HI TEMP AL		TE	1603	TAH	1603	°F	160	PLC-17B			659D1999 SHT. 2
120	KBA-19001 PRECHILLER COMPRESSOR - DISCHARGE	HI HI PRESS S.D.	NOTE 3	PT	1603	PAHH	1603	psig	290	PLC-17B			659D1999 SHT. 2
121	KBA-19001 PRECHILLER COMPRESSOR - DISCHARGE	HI PRESS AL		PT	1603	PAH	1603	psig	280	PLC-17B			659D1999 SHT. 2
122	PV-1601 OIL SEPARATOR OF KBA-19001	LO TEMP AL		TE	1604	TAL	1604	°F	55	PLC-17B			659D1999 SHT. 2
123	PV-1601 OIL SEPARATOR OF KBA-19001	LO LO TEMP S.D.	NOTE 3	TE	1604	TALL	1604	°F	49	PLC-17B			659D1999 SHT. 2
124	KBA-19001 PRECHILLER COMPRESSOR - SUCTION	LO PRESS AL		PT	1604	PAL	1604	psig	70	PLC-17B			659D1999 SHT. 2
125	KBA-19001 PRECHILLER COMPRESSOR - SUCTION	LO LO PRESS S.D.		PT	1604	PALL	1604	psig	60	PLC-17B			659D1999 SHT. 2
126	MOTOR BEARING	HI HI TEMP S.D.	NOTE 3	TE	1605	TAHH	1605	°F	203	MCC OF M-1601/ KBA-19001			659D1999 SHT. 2
127	MOTOR BEARING	HI TEMP AL		TE	1605	TAH	1605	°F	194	MCC OF M-1601/ KBA-19001			659D1999 SHT. 2
128	COMPRESSOR LUBE OIL CIRCUIT	HI HI DIFF PRESS S.D.	NOTE 3	PT	1605	PDAHH	1605	psid	80	PLC-17B			659D1999 SHT. 2
129	COMPRESSOR LUBE OIL CIRCUIT	LO LO DIFF PRESS S.D.	NOTE 3	PT	1605	PDALL	1605	psid	15	PLC-17B			659D1999 SHT. 2

ITEM NUMBER	1	2	3	4	5	6	7			8	9	10	11	12	13	14	15	16				
SERVICE	**Prechiller Area (KBA-19000/01). REFRIGERANT SIDE. Shutdown Level 2**	INLET TO VBA-19000 REFRIGERANT SUCTION SCRUBBER	BYPASS TO INLET TO VBA-19000 REFRIGERANT SUCTION SCRUBBER	INLET TO VBA-19001 REFRIGERANT SUCTION SCRUBBER FROM EGB-1998A/B	BYPASS TO INLET TO VBA-19001 REFRIGERANT SUCTION SCRUBBER FROM EBG-1998A/B	KBA-19000 PRECOOLING SYSTEM COMPRESSOR	KBA-19001 PRECOOLING SYSTEM COMPRESSOR	REFRIGERANT SUPPLY FROM VBA-19025 TO KBA-19001	OUTLET OF F-19001 COALESCER TOWARD EAL-19000A/B/C	EAL-19000A REFRIGERANT CONDENSER FAN A	EAL-19000A REFRIGERANT CONDENSER FAN B	EAL-19000B REFRIGERANT CONDENSER FAN C	EAL-19000B REFRIGERANT CONDENSER FAN D	EAL-19000C REFRIGERANT CONDENSER FAN E	EAL-19000C REFRIGERANT CONDENSER FAN F	EAL-19000D REFRIGERANT CONDENSER FAN G	EAL-19000D REFRIGERANT CONDENSER FAN H	VBA-19025 REFRIGERANT ACCUMULATOR SDV-19025	INLET TO VBA-19001 REFRIGERANT SUCTION SCRUBBER FROM EGB-2998A/B	BYPASS TO INLET TO VBA-19001 REFRIGERANT SUCTION SCRUBBER	REFRIGERANT SUPPLY FROM VBA-29025 TO KBA-19001	OUTLET OF F-19001 COALESCER TOWARD EAL-29000A/B/C
RESULTING ACTION		CLOSE VALVE (deenergize	CLOSE VALVE	CLOSE VALVE (deenergize SDY-	CLOSE VALVE			CLOSE VALVE (deenergize XY-	CLOSE VALVE	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	CLOSE VALVE	CLOSE VALVE (deenergize SDY-	CLOSE VALVE	CLOSE VALVE	CLOSE VALVE
EQUIP. NUMBER		SDV-19000A	SDV-19000B	SDV-19001A	SDV-19001B	KBA-19000	KBA-19001	XY-29008	XY-29005	MOTOR OF EAL-19000	MOTOR OF EAL-19000	MOTOR OF EAL-19000	MOTOR OF EAL-19000	MOTOR OF EAL-19000	MOTOR OF EAL-19000	MOTOR OF EAL-19000	MOTOR OF EAL-19000	SDV-19025	SDV-29001A	SDV-29001B	XY-29007	XY-29006
P&ID SHEET		659D1999 1	659D1999 1	659D1999 1	659D1999 1	659D1998 1	659D1998 1	659D1999 2	659D1999 2	659D1999 3	659D1999 3	659D1999 3	659D1999 3	659D1999 3	659D1999 3	659D1999 3	659D1999 3	659D1999 3	659D1999 1	659D1999 1	659D1999 2	659D1999 2
1		C	C	C	C	S	S	C	C	S	S	S	S	S	S	S	S	C	C	C	C	C
2	**X**																					
5		CLOSE. PDAHH cleared is a permissive to open SDV-19000A				PDAHH cleared is a permissive to start KBA-19000																
6						STOP (ZAO -19000A activated is permisive to start KBA-19000)																
7		C	C			S																
14				CLOSE. PDAHH cleared is a permissive to open SDV-19001A			PDAHH cleared is a permissive to start KBA-19001															
15							STOP (ZAO-19001A activated is permisive to start KBA-19001)															
16							PDAHH cleared is a permissive to start KBA-19001												CLOSE. PDAHH cleared is a permissive to open SDV-29001A			
17							STOP (ZAO-29001A activated is permisive to start KBA-19001)															
20				C	C		S	C	C										C	C	C	C
26										S												
27											S											
28												S										
29													S									
30														S								
31															S							
32																S						
33																	S					
39		C	C	C	C	S	S (NOTE 9)											C				
40		~~C~~	~~C~~	~~C~~	~~C~~	~~S~~	~~S~~											C				
45		C	C			S																
47		C	C																			
48		C	C			S																
51		C	C			S																
52		C	C			S																
55		C	C			S																
57		C	C			S																
58		C	C			S																
60		C	C			S																
62		C	C			S																
64		C	C			S																
66		C	C			S																
69		C	C			S																
72		C	C			S																
74		C	C			S																
75		C	C			S																
76		C	C			S																
79		C	C			S																
80		C	C			S																
82		C	C			S																
83		C	C			S																
85		C	C			S																
87		C	C			S																
89		C	C			S																
90		C	C			S																
92		C	C			S																
93		C	C			S																
94		C	C			S																
95		C	C			S																
99				C	C		S	C	C										C	C	C	C
101				C	C			C	C										C	C	C	C
102				C	C		S	C	C										C	C	C	C
105				C	C		S	C	C										C	C	C	C
106				C	C		S	C	C										C	C	C	C
109				C	C		S	C	C										C	C	C	C
111				C	C		S	C	C										C	C	C	C
112				C	C		S	C	C										C	C	C	C
114				C	C		S	C	C										C	C	C	C
116				C	C		S	C	C										C	C	C	C
118				C	C		S	C	C										C	C	C	C
120				C	C		S	C	C										C	C	C	C
123				C	C		S	C	C										C	C	C	C
126				C	C		S	C	C										C	C	C	C
128				C	C		S	C	C										C	C	C	C
129				C	C		S	C	C										C	C	C	C

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
BLOCK 56 - CAMISEA EXPANSION PROJECT
PISCO PLANT
PRECHILLER: EBG-1998A/1998B AND KBA-19000/19001 (EXISTING)
YORK PROCESS SYSTEMS JOB #294799
Reference:
PPAG-500-MC-K-606 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT)
PPAG-500-ET-Y-607 Revision 2 (YORK)
SEE PROCESS FLOW DIAGRAM PPAG-523-PL-Y-8807

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

ITEM	SERVICE	MALFUNCTION	NOTES	FIELD DEVICE		ANNUNCIATOR TAG		UNIT	VALUE	INPUT TO YORK'S	INPUT TO PCS	INPUT TO SSS	P&ID SHEET
													ITEM NUMBER
													SERVICE
													RESULTING ACTION
													EQUIP. NUMBER
137	MOTOR STATOR	HI HI TEMP S.D.	NOTE 3	TE	1608	TAHH	1608	°F	338	MCC OF M-1601/ KBA-19001			659D1999 SHT. 2
138	MOTOR STATOR	HI TEMP AL		TE	1608	TAH	1608	°F	320	MCC OF M-1601/ KBA-19001			659D1999 SHT. 2
139	MOTOR STATOR	HI HI TEMP S.D.	NOTE 3	TE	1609	TAHH	1609	°F	338	MCC OF M-1601/ KBA-19001			659D1999 SHT. 2
140	MOTOR STATOR	HI TEMP AL		TE	1609	TAH	1609	°F	320	MCC OF M-1601/ KBA-19001			659D1999 SHT. 2
141	MOTOR STATOR	HI HI TEMP S.D.	NOTE 3	TE	1610	TAHH	1610	°F	338	MCC OF M-1601/ KBA-19001			659D1999 SHT. 2
142	MOTOR STATOR	HI TEMP AL		TE	1610	TAH	1610	°F	320	MCC OF M-1601/ KBA-19001			659D1999 SHT. 2
143	KBA-19001 PRECHILLER COMPRESSOR - DISCHARGE	HI HI TEMP S.D.	NOTE 3	TSHH	1611	TAHH	1611	°F	250	PLC-17B			659D1999 SHT. 2
144	MOTOR STATOR	HI HI TEMP S.D.	NOTE 3	TE	1611	TAHH	1611	°F	338	MCC OF M-1601/ KBA-19001			659D1999 SHT. 2
145	MOTOR STATOR	HI TEMP AL		TE	1611	TAH	1611	°F	320	MCC OF M-1601/ KBA-19001			659D1999 SHT. 2
146	KBA-19001 PRECHILLER COMPRESSOR - DISCHARGE	HI HI PRESS S.D.	NOTE 3	PSHH	1611	PAHH	1611	psig	290	PLC-17B			659D1999 SHT. 2
147	COMPRESSOR LUBE OIL CIRCUIT	LO LO PRESS S.D.	NOTE 3	PSLL	1611	PALL	1611	psig	35	PLC-17B			659D1999 SHT. 2
148	COMPRESSOR LUBE OIL CIRCUIT	HI HI TEMP S.D.	NOTE 3	TSHH	1612	TAHH	1612	°F	200	PLC-17B			659D1999 SHT. 2
149	MOTOR STATOR	HI HI TEMP S.D.	NOTE 3	TE	1612	TAHH	1612	°F	338	MCC OF M-1601/ KBA-19001			659D1999 SHT. 2
150	MOTOR STATOR	HI TEMP AL		TE	1612	TAH	1612	°F	320	MCC OF M-1601/ KBA-19001			659D1999 SHT. 2
151	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**												
152	INLET TO VBA-19000 REFRIGERANT SUCTION SCRUBBER			HS	19000A								659D1999 SHT. 1
153	BYPASS TO INLET TO VBA-19000 REFRIGERANT SUCTION SCRUBBER			HS	19000B								659D1999 SHT. 1
154	INLET TO VBA-19001 REFRIGERANT SUCTION SCRUBBER			HS	19001A								659D1999 SHT. 1
155	BYPASS TO INLET TO VBA-19001 REFRIGERANT SUCTION SCRUBBER			HS	19001B								659D1999 SHT. 1
156	VBA-19025 REFRIGERANT ACCUMULATOR			HS	19025								659D1999 SHT. 3
157	OUTLET OF F-19001 COALESCER TOWARD EAL-19000A/B/C			HS	29005								659D1999 SHT. 2
158	OUTLET OF F-19001 COALESCER TOWARD EAL-29000A/B/C			HS	29006								659D1999 SHT. 2
159	REFRIGERANT SUPPLY FROM VBA-29025 TO KBA-19001			HS	29007								659D1999 SHT. 2
160	REFRIGERANT SUPPLY FROM VBA-19025 TO KBA-19001			HS	29008								659D1999 SHT. 2

ITEM	1	2	3	4	5	6	7		8	9	10	11	12	13	14	15	16				
SERVICE	Provider Are VBA-19000/01: REFRIGERANT SUCTION Shutdown Level 2	INLET TO VBA-19000 REFRIGERANT SUCTION SCRUBBER	BYPASS TO INLET TO VBA-19000 REFRIGERANT SUCTION SCRUBBER	INLET TO VBA-19001 REFRIGERANT SUCTION SCRUBBER FROM EGB-1998A/B	BYPASS TO INLET TO VBA-19001 REFRIGERANT SUCTION SCRUBBER FROM EBG-1998A/B	KBA-19000 PRECOOLING SYSTEM COMPRESSOR	KBA-19001 PRECOOLING SYSTEM COMPRESSOR	REFRIGERANT SUPPLY FROM VBA-19025 TO KBA-19001	OUTLET OF F-19001 COALESCER TOWARD EAL-19000A/B/C	EAL-19000A REFRIGERANT CONDENSER FAN A	EAL-19000B REFRIGERANT CONDENSER FAN B	EAL-19000C REFRIGERANT CONDENSER FAN C	EAL-19000D REFRIGERANT CONDENSER FAN D	EAL-19000E REFRIGERANT CONDENSER FAN E	EAL-19000G REFRIGERANT CONDENSER FAN F	EAL-19000G REFRIGERANT CONDENSER FAN G	EAL-19000G REFRIGERANT CONDENSER FAN H	VBA-19025 REFRIGERANT ACCUMULATOR SUCTION	INLET TO VBA-19001 REFRIGERANT SUCTION SCRUBBER FROM EGB-2998A/B	BYPASS TO INLET TO VBA-19001 REFRIGERANT SUCTION SCRUBBER	REFRIGERANT SUPPLY FROM VBA-29025 TO KBA-19001	OUTLET OF F-19001 COALESCER TOWARD EAL-29000A/B/C
RESULTING ACTION		CLOSE VALVE (deenergize	CLOSE VALVE	CLOSE VALVE (deenergize SDY-	CLOSE VALVE			CLOSE VALVE (deenergize XY-	CLOSE VALVE	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	STOP MOTOR	CLOSE VALVE	CLOSE VALVE (deenergize SDY-	CLOSE VALVE	CLOSE VALVE	CLOSE VALVE
EQUIP. NUMBER		SDV-19000A	SDV-19000B	SDV-19001A	SDV-19001B	KBA-19000	KBA-19001	XY-29008	XY-29005	MOTOR OF EAL-19000	MOTOR OF EAL-19000	MOTOR OF EAL-19000	MOTOR OF EAL-19000	MOTOR OF EAL-19000	MOTOR OF EAL-19000	MOTOR OF EAL-19000	SDV-19025	SDV-29001A	SDV-2901B	XY-29007	XY-29006
P&ID SHEET		659D1999 1	659D1999 1	659D1999 1	659D1999 1	659D1998 1	659D1998 1	659D1999 2	659D1999 2	659D1999 3	659D1999 3	659D1999 3	659D1999 3	659D1999 3	659D1999 3	659D1999 3	659D1999 3	659D1999 1	659D1999 1	659D1999 2	659D1999 2
137				C	C		S	C	C									C	C	C	C
138																					
139				C	C		S	C	C									C	C	C	C
140																					
141				C	C		S	C	C									C	C	C	C
142																					
143				C	C		S	C	C									C	C	C	C
144				C	C		S	C	C									C	C	C	C
145																					
146				C	C		S	C	C									C	C	C	C
147				C	C		S	C	C									C	C	C	C
148				C	C		S	C	C									C	C	C	C
149				C	C		S	C	C									C	C	C	C
150																					
151																					
152		C/O																			
153			C/O																		
154				C/O																	
155					C/O																
156																	C/O				
157									C/O												
158																				C/O	C/O
159								C/O													
160																					

NOTES:

1. PERMISSIVE FOR KBA-19000 TO START
AT KBA-19000 START THE FOLLOWING STEPS SHOULD OCCUR TO GET THE PERMISSIVE TO START THE UNIT:
SDV-19000B SHOULD BE OPENED TO CLEAR PDAHH-19000.
ONCE PDAHH-19000 IS CLEARED, SDV-19000A CAN BE OPENED AND KBA-19000 BE GIVEN THE PERMISSIVE TO START.
2. PERMISSIVE FOR KBA-19001 TO START
AT KBA-19001 START THE FOLLOWING STEPS SHOULD OCCUR TO GET THE PERMISSIVE TO START THE UNIT:
IF KBA-19001 IS SPARE OF KBA-19000 (VAPORS TAKEN FROM EGB-1998A/B)
SDV-19001B SHOULD BE OPENED TO CLEAR PDAHH-19001.
ONCE PDAHH-19001 IS CLEARED, SDV-19001A CAN BE OPENED
SDV-19001A AND XV-29005 AND XV-29008 SHALL BE OPENED TO GIVE THE PERMISSIVE TO START
IF KBA-19001 IS SPARE OF KBA-20000 (VAPORS TAKEN FROM EGB-2998A/B)
SDV-29001B SHOULD BE OPENED TO CLEAR PDAHH-29001.
ONCE PDAHH-29001 IS CLEARED, SDV-29001A CAN BE OPENED
SDV-29001A AND XV-29006 AND XV-29007 SHALL BE OPENED TO GIVE KBA-19001 THE PERMISSIVE TO START
3.The logic should be in the following order: 1St shutdown the compressor or compressors KBA-19000/01, 2nd close the shutdown valve.
4. If the compressor KBA-19000 is operating, and ZAO-19000A is desactivated (this meaning that the SDV-19000A is not totally open) then stop the compressor. The compressor shut down is activated due to the transition of the valve position, but then the
5. If the compressor KBA-19001 is operating, and ZAO-19001A AND ZAO-29001A are desactivated (this meaning that the SDV-19001A or SDV-29001A are not totally open) then stop the compressor. THE COMPRESSOR SHUT DOWN IS ACTIVATED DUE TO THE TRANSITION OF THE VALVE POSITION, BUT THEN THE COMPRESSOR KBA-19000 DOES NOT KEEP INTERLOCKED DUE TO ZAO-19000A DESACTIVATION.
6. Incongruity Alarm: When compressor KBA-19001 is operating, if ZAO-19001A AND ZIO-29007 are activated provided alarm to advise operator than refrigerant supply for compresor temperature control is taking from the wrong accumulator.
7. Incongruity Alarm: When compressor KBA-19001 is operating, if ZAO-29001A AND ZIO-29008are activated, provided alarm to advise operator than refrigerant supply for compresor temperature control is taking from the wrong accumulator.
~~8. Provide 1 min time delay to allow the operator to bypass the interlock in case of absence of propane leakage~~
9. In case of LALL-19025 activation, KBA-19001 shall be stopped only if SDV-19001A is opened.
10. PDAHH CLEARED IS A PERMISIVE TO START KBA-19001

CAUSE AND EFFECT MATRIX (NEW)

PERU CAMISEA SECOND EXPANSION PROJECT
PRECHILLING 2: REFRIGERANT SIDE

	TAG		P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
PRECHILLING 2: EBG-2998A/B & KBA-29000																	
1	PRECHILLING 2 REFRIGERANT SIDE			~~10~~													
2	ESD - 29000	PRECHILLING 2 REFRIGERANT SIDE SHUTDOWN Manual SOFT Push Button in Control Room (Control System)										X					
3	**KBA-29000: REFRIGERANT VAPORS ARE TAKEN FROM EBG-2998A/2998B**																
4	**REFRIGERANT SIDE**																
5																	
6	PDAHH - 29000	INLET SHUTDOWN VALVE TO VBA-29000 REFRIGERANT SUCTION SCRUBBER	523-750	1, 5	psid			10						X			
7	ZAO - 29000A	VBA-29000 REFRIGERANT SUCTION SCRUBBER	523-750	1,3,4									X				
8	LSHH - 29000	VBA-29000 REFRIGERANT SUCTION SCRUBBER	523-750	2	in			40						X			
9	UAL 29000	KBA-29000 PRECHILLER COMPRESSOR	523-751							X							
10	UALL 29000	KBA-29000 PRECHILLER COMPRESSOR	523-751	2													X
~~11~~	~~LSLL - 2900~~	~~VBA-29000 REFRIGERANT SUCTION SCRUBBER~~	~~523-750~~	~~8~~													~~X~~
12	VSHH - 29000A	EAL-29000A REFRIGERANT CONDENSER FAN A	523-752		G's			3						X			
13	VSHH - 29000B	EAL-29000A REFRIGERANT CONDENSER FAN B	523-752		G's			3						X			
14	VSHH - 29000C	EAL-29000B REFRIGERANT CONDENSER FAN C	523-752		G's			3						X			
15	VSHH - 29000D	EAL-29000B REFRIGERANT CONDENSER FAN D	523-752		G's			3						X			
16	VSHH - 29000E	EAL-29000C REFRIGERANT CONDENSER FAN E	523-752		G's			3						X			
17	VSHH - 29000F	EAL-29000C REFRIGERANT CONDENSER FAN F	523-752		G's			3						X			
18	VSHH - 29000G	EAL-29000D REFRIGERANT CONDENSER FAN G	523-752		G's			3						X			
19	VSHH - 29000H	EAL-29000D REFRIGERANT CONDENSER FAN H	523-752		G's			3						X			
20	LSLL - 29000	VBA-29000 REFRIGERANT SUCTION SCRUBBER	523-750	8	in						18						X
21	PSL - 29000	PBB-29000 PRECOOLING SUCTION SCRUBBER PUMP (SEAL)	523-750	Note 10	psig					hold				~~X~~			
23	LSLL - 29025	VBA-29025 REFRIGERANT ACCUMULATOR	523-752	7	in						12						X
24	LSHH - 2998	SHELL SIDE EBG-2998A/B PROPANE CHILLER/BUTANE CHILLER	523-753		%			57						X			
25																	
26	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																
27	HS - 29000A	INLET TO VBA-29000 REFRIGERANT SUCTION SCRUBBER	523-750														
28	HS - 29000B	BYPASS TO INLET TO VBA-29000 REFRIGERANT SUCTION SCRUBBER	523-750														
29	HS - 29025	OUTLET OF VBA-29025 REFRIGERANT ACCUMULATOR	523-752														
30																	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	19	20
		523-750	523-750	523-751	523-752	523-752	523-752	523-752	523-752	523-752	523-752	523-752	523-752	523-750	659D1999 sht. 1	659D1999 sht. 1	659D1999 sht. 2	659D1999 sht. 2	659D1999 sht. 2
		INLET TO VBA-29000 REFRIGERANT SUCTION SCRUBBER	BYPASS TO INLET TO VBA-29000 REFRIGERANT SUCTION SCRUBBER	KBA-29000 PRECOOLING SYSTEM COMPRESSOR	EAL-29000A REFRIGERANT CONDENSER FAN A	EAL-29000A REFRIGERANT CONDENSER FAN B	EAL-29000B REFRIGERANT CONDENSER FAN C	EAL-29000B REFRIGERANT CONDENSER FAN D	EAL-29000C REFRIGERANT CONDENSER FAN E	EAL-29000C REFRIGERANT CONDENSER FAN F	EAL-29000D REFRIGERANT CONDENSER FAN G	EAL-29000D REFRIGERANT CONDENSER FAN H	VBA-29025 REFRIGERANT ACCUMULATOR	PBB-29000 PRECOOLING SUCTION SCRUBBER PUMP	INLET TO VBA-19000 REFRIGERANT SUCTION SCRUBBER FROM EGB-2998	BYPASS TO INLET TO VBA-19000 REFRIGERANT SUCTION SCRUBBER FROM EGB-2998	KBA-19001 PRECOOLING SYSTEM COMPRESSOR	INLET TO EAL-29000 REFRIGERANT CONDENSER FROM KBA-19001	REFRIGERANT SUPPLY TO KBA-19001 FROM VBA-29025
	PRECHILLING REFRIGERANT SIDE Shutdown Level 2	SDV-29000A on SDV-29000A	SDV-29000B on SDV-29000B	KBA-29000	MOTOR OF EAL-29000 FAN A	MOTOR OF EAL-29000 FAN B	MOTOR OF EAL-29000 FAN C	MOTOR OF EAL-29000 FAN D	MOTOR OF EAL-29000 FAN E	MOTOR OF EAL-29000 FAN F	MOTOR OF EAL-29000 FAN G	MOTOR OF EAL-29000 FAN H	SDV-29025 on SDV-29025	PBB-29000 MOTOR	SDV-29001A on SDV-29001A	SDV-29001B on SDV-29001B	KBA-19001	XY-29006 on XY-29006	XY-29007 on XY-29007
PRECHILLING 2: EBG-2998A/B & KBA-29000																			
1		C	C	S	S	S	S	S	S	S	S	S	C	S	C	C		C	C
2	X																		
3																			
4																			
5																			
6		C																	
7				S															
8		C	C	S															
9																			
10		C	C	S															
~~11~~	~~X~~													~~S~~					
12					S														
13						S													
14							S												
15								S											
16									S										
17										S									
18											S								
19												S							
20														S					
21														~~S~~					
23		C	C	S									C		C	C	S	C	C
24													C						
25																			
26																			
27		C/O																	
28			C/O																
29													C/O						
30																			

NOTES

1. PERMISSIVE FOR KBA-29000 TO START
AT KBA-29000 START THE FOLLOWING STEPS SHOULD OCCUR TO GET THE PERMISSIVE TO START THE UNIT:
SDV-29000B SHOULD BE OPENED TO CLEAR PDAHH-29000.
ONCE PDAHH-29000 IS CLEARED, SDV-29000A CAN BE OPENED AND KBA-29000 BE GIVEN THE PERMISSIVE TO START.
2.THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST SHUTDOWN THE COMPRESSOR, 2ND CLOSE THE SHUTDOWN VALVE.
3. IF THE COMPRESSOR KBA-29000 IS OPERATING, AND ZAO-29000A IS DESACTIVATED (THIS MEANING THAT THE SDV-29000A IS NOT TOTALLY OPEN) THEN STOP THE COMPRESSOR.
THE COMPRESSOR SHUT DOWN IS ACTIVATED DUE TO THE TRANSITION OF THE VALVE POSITION, BUT THEN THE COMPRESSOR KBA-29000 DOES NOT KEEP INTERLOCKED DUE TO ZAO-29000A DESACTIVATION.
4. ZAO -29000A ACTIVATED IS A PERMISIVE TO START KBA-29000
5. PDAHH-29000 cleared is a permissive to open SDV-29001A and to start KBA-29000.
~~6. Provide 1 min time delay to allow the operator to bypass the interlock in case of absence of propane leakage~~
7. In case of LALL-29025 activation, KBA-19001 shall be stopped only if SDV-29001A is opened.
8. PBB-29000 STOPS UPON ACTIVATION LALL-29000 AND IS PERMISSIVE TO START TO UPON DESACTIVATION LALL-29000.
~~9.PSL must be in alarm condition to activate Shutdown of the pump, according to API Plan 53B~~
10. CONFIGURE A MAINTENANCE OVERRIDE SWITCH TO DEACTIVATE ALL INTERLOCKS ASSOCIATED TO THE PUMP PBB-29000

CAUSE AND EFFECT MATRIX (NEW)

PERU CAMISEA SECOND EXPANSION PROJECT
PISCO PLANT
PRECHILLING 2: KBA-29000

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low	COMPRESSOR PLC-27	1	2	3
																			523-750	523-750	523-751
																			INLET TO VBA-29000 REFRIGERANT SUCTION SCRUBBER	BYPASS TO INLET TO VBA-29000 REFRIGERANT SUCTION SCRUBBER	KBA-29000 PRECOOLING SYSTEM COMPRESSOR
																			SDY-29000A on SDV-29000A	SDY-29000B on SDV-29000B	KBA-29000
	PRECHILLING UNIT 2: COMPRESSOR KBA-29000																				
1			0																		
2	UPLL - 29000	KBA-29000 PRECHILLER COMPRESSOR (SIGNAL FROM SSS)	523-508	0																	
3	USS - 29000	KBA-29000 PRECHILLER COMPRESSOR (SIGNAL FROM SSS)	523-508		G's							X							C	C	S
	COMPRESSOR PLC-27																				
4	XAHH - 22601	COMPRESSOR HIGH VIBRATION	659D2214	6,7	G's									X					C	C	S
5	XAH - 22601	SUCTION END COMPRESSOR SHAFT	659D2215	6,7	psig																
6	PAL - 22601	COMPRESSOR LUBE OIL CIRCUIT	659D2216	6,7	psig																
7	PALL - 22601	COMPRESSOR LUBE OIL CIRCUIT	659D2217	6,7	%												X		C	C	S
8	LALL - 22601	PV-2601 OIL SEPARATOR OF KBA-29000 0	659D2218	6,7	AMP												X		C	C	S
9	IC - 22601	MOTOR CURRENT	659D2219	6,7	AMP																
10	IC - 22602	MOTOR CURRENT	659D2220	6,7	AMP																
11	IAHH - 22601	MOTOR CURRENT	659D2221	6,7	AMP									X					C	C	S
12	IAH - 22601	MOTOR CURRENT	659D2222	6,7	AMP																
13	IALL - 22601	MOTOR CURRENT	659D2223	6,7	G's												X		C	C	S
14	XAHH - 22602	DISCHARGE END COMPRESSOR SHAFT	659D2224	6,7	G's									X					C	C	S
15	XAH - 22602	DISCHARGE END COMPRESSOR SHAFT	659D2225	6,7	°F																
16	TAHH - 22602	KBA-29000 PRECHILLER COMPRESSOR - DISCHARGE	659D2226	6,7	°F									X					C	C	S
17	TAH - 22602	KBA-29000 PRECHILLER COMPRESSOR - DISCHARGE	659D2227	6,7	psid																
18	PDAHH - 22602	COMPRESSOR LUBE OIL CIRCUIT	659D2228	6,7	psid									X					C	C	S
19	PDAH - 22602	COMPRESSOR LUBE OIL CIRCUIT	659D2229	6,7	°F																
20	TAHH - 22603	COMPRESSOR LUBE OIL CIRCUIT	659D2230	6,7	°F									X					C	C	S
21	TAH - 22603	COMPRESSOR LUBE OIL CIRCUIT	659D2231	6,7	psig																
22	PAHH - 22603	KBA-29000 PRECHILLER COMPRESSOR - DISCHARGE	659D2232	6,7	psig									X					C	C	S
23	PAH - 22603	KBA-29000 PRECHILLER COMPRESSOR - DISCHARGE	659D2233	6,7	°F																
24	TAL - 22604	PV-2601 OIL SEPARATOR OF KBA-29000 0	659D2234	6,7	°F																
25	TALL - 22604	PV-2601 OIL SEPARATOR OF KBA-29000	659D2235	6,7	psig												X		C	C	S
26	PAL - 22604	KBA-29000 PRECHILLER COMPRESSOR - SUCTION	659D2236	6,7	psig																
27	PALL - 22604	KBA-29000 PRECHILLER COMPRESSOR - SUCTION 0	659D2237	6,7	°F																
28	TAHH - 22605	MOTOR BEARING	659D2238	6,7	°F									X					C	C	S
29	TAH - 22605	MOTOR BEARING	659D2239	6,7	psid																
30	PDAHH - 22605	COMPRESSOR LUBE OIL CIRCUIT	659D2240	6,7	psid									X					C	C	S
31	PDALL - 22605	COMPRESSOR LUBE OIL CIRCUIT	659D2241	6,7	°F									X					C	C	S
32	TAHH - 22606	MOTOR BEARING	659D2242	6,7	°F									X					C	C	S
33	TAH - 22606	MOTOR BEARING 0	659D2243	6,7	psig																
34	PAL - 22606	COMPRESSOR LUBE OIL CIRCUIT	659D2244	6,7	psig																
35	PALL - 22606	COMPRESSOR LUBE OIL CIRCUIT	659D2245	6,7	°F												X		C	C	S
36	TAHH - 22607	MOTOR STATOR	659D2246	6,7	°F									X					C	C	S
37	TAH - 22607	MOTOR STATOR	659D2247	6,7	psig																
38	PALL - 22607	KBA-19000 PRECHILLER COMPRESSOR - SUCTION	659D2248	6,7	°F												X		C	C	S
39	TAHH - 22608	MOTOR STATOR	659D2249	6,7	°F									X					C	C	S
40	TAH - 22608	MOTOR STATOR	659D2250	6,7	°F																
41	TAHH - 22609	MOTOR STATOR	659D2251	6,7	°F									X					C	C	S
42	TAH - 22609	MOTOR STATOR	659D2252	6,7	°F																
43	TAHH - 22610	MOTOR STATOR	659D2253	6,7	°F									X					C	C	S
44	TAH - 22610	MOTOR STATOR	659D2254	6,7	°F																
45	TAHH - 22610,5	KBA-29000 PRECHILLER COMPRESSOR - DISCHARGE 0	659D2255	6,7	°F									X					C	C	S
47	TAH - 22611,3	MOTOR STATOR	659D2257	6,7	psig																
48	PAHH - 22611,3	KBA-29000 PRECHILLER COMPRESSOR - DISCHARGE 0	659D2258	6,7	psig									X					C	C	S
49	PALL - 22611,3	COMPRESSOR LUBE OIL CIRCUIT	659D2259	6,7	°F												X		C	C	S
50	TAHH - 22612	COMPRESSOR LUBE OIL CIRCUIT	659D2260	6,7	°F									X					C	C	S
51	TAHH - 22612	MOTOR STATOR	659D2261	6,7	°F									X					C	C	S
52	TAH - 22612	MOTOR STATOR	659D2262	6,7																	
53																					

NOTES

1. PERMISSIVE FOR KBA-29000 TO START
AT KBA-29000 START THE FOLLOWING STEPS SHOULD OCCUR TO GET THE PERMISSIVE TO START THE UNIT:
SDV-29000B SHOULD BE OPENED TO CLEAR PDAHH-29000.
ONCE PDAHH-29000 IS CLEARED, SDV-29000A CAN BE OPENED AND KBA-29000 BE GIVEN THE PERMISSIVE TO START
2.THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST SHUTDOWN THE COMPRESSOR, 2ND CLOSE THE SHUTDOWN VALVE.
3. IF THE COMPRESSOR KBA-29000 IS OPERATING, AND ZAO-29000A IS DESACTIVATED (THIS MEANING THAT THE SDV-29000A IS NOT TOTALLY OPEN) THEN STOP THE COMPRESSOR.
THE COMPRESSOR SHUT DOWN IS ACTIVATED DUE TO THE TRANSITION OF THE VALVE POSITION, BUT THEN THE COMPRESSOR KBA-29000 DOES NOT KEEP INTERLOCKED DUE TO ZAO-29000A
4. ZAO -29000A ACTIVATED IS A PERMISIVE TO START KBA-29000
5. CAUSE AND EFFECT DIAGRAM OF KBA-22015/25 BY YORK (Document Nº **PCSE-523-P2-M-528**) 0
6. VENDOR DOCUMENT KBA-29000 BY YORK (Document Nº PCSE-523-P2-M-502)

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference:
PPAG-500-MC-K-606 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT)
PCAM-500-ET-Y-606 Revision 4 (based on PCAM-520-PL-Y-8206 Revision 5) (EPC2-PISCO PLANT)
VAPOR RECOVERY UNIT_Existing
SEE PROCESS FLOW DIAGRAM PCAM-534-PL-Y-8007
SEE NOTES IN WORKSHEET "Howe-Baker_Existing_

Effects (columns)

Col.	P&ID	Description	Note	Tag
1	534-PL-Y-8032	VBA-3150 PROPANE VAPOR RECOVERY SUCTION SCRUBBER SDV-3150		SDY-3150
2	534-PL-Y-8032	KBA-2000 PROPANE VAPOR RECOVERY COMPRESSOR		KBA-2000 USS-2000
3	534-PL-Y-8032	EAL-2002 PROPANE COMPRESSOR LUBE OIL COOLER		Motor EAL-2002
4	534-PL-Y-8033	EAL-4060 PROPANE VAPOR RECOVERY CONDENSER FAN A		Motor A EAL-4060
5	534-PL-Y-8033	EAL-4060 PROPANE VAPOR RECOVERY CONDENSER FAN B		Motor B EAL-4060
6	534-PL-Y-8033	VBA-3170 C3 VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-4060A		SDY-4060A
7	534-PL-Y-8033	VBA-3170 C3 VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-4060B		SDY-4060B
8	534-PL-Y-8033	VBA-3170 C3 VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-3170	Note 7	SDY-3170
9	534-PL-Y-8033	PBB-1105 C3 CONDENSATE RETURN PUMP		Motor PBB-1105
10	534-PL-Y-8033	PBB-1106 C3 CONDENSATE RETURN PUMP		Motor PBB-1106
11	534-PL-Y-8034	VBA-3155 C3/C4 VAPOR RECOVERY SUCTION SCRUBBER SDV-3155A		SDY-3155A
12	534-PL-Y-8034	VBA-3155 C3/C4 VAPOR RECOVERY SUCTION SCRUBBER SDV-3155B		SDY-3155B
13	534-PL-Y-8034	KBA-2005 C3/C4 VAPOR RECOVERY COMPRESSOR		KBA-2005 USS-2005
14	534-PL-Y-8034	EAL-2007 PROPANE COMPRESSOR LUBE OIL COOLER		Motor EAL-2007
15	534-PL-Y-8035	EAL-4070 C3/C4 VAPOR RECOVERY CONDENSER FAN A		Motor A EAL-4070
16	534-PL-Y-8035	EAL-4070 C3/C4 VAPOR RECOVERY CONDENSER FAN B		Motor B EAL-4070
17	534-PL-Y-8035	EAL-4070 C3/C4 VAPOR RECOVERY CONDENSER SDV-4070A		SDY-4070A
18	534-PL-Y-8035	EAL-4070 C3/C4 VAPOR RECOVERY CONDENSER SDV-4070B		SDY-4070B
19	534-PL-Y-8035	EAL-4070 C3/C4 VAPOR RECOVERY CONDENSER SDV-4070C		SDY-4070C
20	534-PL-Y-8035	EAL-4070 C3/C4 VAPOR RECOVERY CONDENSER SDV-4070D		SDY-4070D
21	523-PL-Y-8036	VBA-3160 BUTANE VAPOR RECOVERY SUCTION SCRUBBER SDV-3160		SDY-3160
22	523-PL-Y-8036	KBA-2010 BUTANE VAPOR RECOVERY COMPRESSOR		KBA-2010 USS-2010
23	534-PL-Y-8037	EAL-4080 BUTANE VAPOR RECOVERY CONDENSER FAN A		Motor A EAL-4080
24	534-PL-Y-8037	EAL-4080 BUTANE VAPOR RECOVERY CONDENSER FAN B		Motor B EAL-4080
25	534-PL-Y-8037	VBA-3180 C4 VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-4080A		SDY-4080A
26	534-PL-Y-8037	VBA-3180 C4 VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-4080B		SDY-4080B
27	534-PL-Y-8037	VBA-3180 C4 VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-3180	Note 7	SDY-3180
28	534-PL-Y-8037	PBB-1115 C4 CONDENSATE RETURN PUMP		Motor PBB-1115
29	534-PL-Y-8037	PBB-1116 C4 CONDENSATE RETURN PUMP		Motor PBB-1116
30	534-214	LIQUID PROPANE FROM EAL-4070 TO VBA-13170		SDY-14070C on SDV-14070C
31	534-214	HOT BY-PASS: VAPOR PROPANE FROM F-2006 TO VBA-13170		SDY-14070D on SDV-14070D
32	534-214	LIQUID BUTANE FROM EAL-4070 TO VBA-13180		SDY-14070A on SDV-14070A
33	534-214	HOT BY-PASS: VAPOR BUTANE FROM F-2006 TO VBA-13170		SDY-14070B on SDV-14070B
34	534-214	LIQUID PROPANE FROM EAL-4070 TO VBA-23170		SDY-24070C on SDV-24070C
35	534-214	HOT BY-PASS: VAPOR PROPANE FROM F-2006 TO VBA-23170		SDY-24070D on SDV-24070D

Causes

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
	VAPOR RECOVERY AREA_Existing																
1	**VAPOR RECOVERY AREA SHUTDOWN LEVEL 2**																
2																	
3	LSHH - 3150	VBA-3150 PROPANE VAPOR RECOVERY SUCTION SCBR	534-8032		in			49						X			
4	PT - 3150	VBA-3150 PROPANE VAPOR RECOVERY SUCTION SCBR	534-8032	2	in						1						X
5	VSHH - 2002	EAL-2002 PROPANE COMPRESSOR LUBE OIL COOLER	534-8032					X						X			
6	UALL - 2000	KBA-2000 PROPANE VAPOR RECOVERY COMPRESSOR (UNIT SD)	534-8032	3							X						X
7	UAL - 2000	KBA-2000 PROPANE VAPOR RECOVERY COMPRESSOR (UNIT SD)	534-8032	4						X							
8																	
9	VSHH - 4061	EAL-4060 C3 VAPOR RECOVERY CONDENSER FAN A	534-8033					X						X			
10	VSHH - 4062	EAL-4060 C3 VAPOR RECOVERY CONDENSER FAN B	534-8033					X						X			
11	LSLL - 3170	VBA-3170 C3 VAPOR RECOVERY CONDENSATE ACCUM.	534-8033		in						9						X
12	PSHH - 1105	PBB-1105 C3 CONDENSATE RETURN PUMP	534-8033	7	psig			12						X			
13	PSHH - 1106	PBB-1106 C3 CONDENSATE RETURN PUMP	534-8033	7	psig			12						X			
14	ZAC - 3170	PBB-1105 / 06 Suction Valve	534-8033	5								X					
15																	
16	LSHH - 3155	VBA-3155 PROPANE/BUTANE VAPOR RECOVERY SUCTION SCBR	534-8034		in			49						X			
17	PT - 3155	VBA-3155 PROPANE/BUTANE VAPOR RECOVERY SUCTION SCBR	534-8034	2	in						1						X
18	VSHH - 2007	EAL-2007 PROPANE/BUTANE COMPRESSOR LUBE OIL COOLER	534-8034					X						X			
19	UALL - 2005	KBA-2005 PROPANE/BUTANE VAPOR RECOVERY COMPRESSOR (UNIT SD)	534-8034	3							X						X
20	UAL - 2005	KBA-2005 PROPANE/BUTANE VAPOR RECOVERY COMPRESSOR (UNIT ALARM)	534-8034	4						X							
21																	
22	VSHH - 4070A	EAL-4070 C3/C4 VAPOR RECOVERY CONDENSER FAN A	534-8035					X						X			
23	VSHH - 4070B	EAL-4070 C3/C4 VAPOR RECOVERY CONDENSER FAN B	534-8035					X						X			
24																	
25	LSHH - 3160	VBA-3160 BUTANE VAPOR RECOVERY SUCTION SCBR	534-8036		in			68						X			
26	PT - 3160A	VBA-3160 BUTANE VAPOR RECOVERY SUCTION SCBR	534-8036	2	in						1						X
27	UALL - 2010	KBA-2010 BUTANE VAPOR RECOVERY COMPRESSOR (UNIT SD)	534-8036	3							X						X
28	UAL - 2010	KBA-2010 BUTANE VAPOR RECOVERY COMPRESSOR (UNIT ALARM)	534-8036	4						X							
29																	
30	VSHH - 4080A	EAL-4080 C3 VAPOR RECOVERY CONDENSER FAN A	534-8037					X						X			
31	VSHH - 4080B	EAL-4080 C3 VAPOR RECOVERY CONDENSER FAN B	534-8037					X						X			
32	LSLL - 3180	VBA-3180 C3 VAPOR RECOVERY CONDENSATE ACCUM.	534-8037		in						9						X
33	PSHH - 1115	PBB-1115 C3 CONDENSATE RETURN PUMP	534-8037	7	psig			12						X			
34	PSHH - 1116	PBB-1116 C3 CONDENSATE RETURN PUMP	534-8037	7	psig			12						X			
35	ZAC - 3180	PBB-1115 / 16 Suction Valve	534-8037	6								X					

Cause and effect matrix

Row	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
1	D	S	S	S	S	D	D	D	S	S	D	D	S	S	S	S	D	D	D	D	D	S	S	S	D	D	D	S	S	D	D	D	D	D	D
2																																			
3	D	S				D	D																												
4	D	S				D	D																												
5			S																																
6	D					D	D																												
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14									S	S																									
15																																			
16											D	D	S				D	D	D	D										D	D	D	D	D	D
17											D	D	S				D	D	D	D										D	D	D	D	D	D
18														S																					
19											D	D					D	D	D	D										D	D	D	D	D	D
20																																			
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32																												S	S						
33																											D	S	S						
34																											D	S	S						
35																												S	S						

NOTES

Note 1 Deleted.
Note 2 The Pressure Unit is inches of Water
Note 3 The Shutdown of the Compressor is performed by its own PLC and not by the SSS.
Note 4 Previous Shutdown Alarm.
Note 5 If the valve SDV-3170 is close the pumps PBB-1105 / 06 cannot be started.
Note 6 If the valve SDV-3180 is close the pumps PBB-1115 / 16 cannot be startec
Note 7 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST SHUTDOWN THE PUMPS, 2ND CLOSE THE SHUTDOWN VALVE.

BLOCK 56 - CAMISEA EXPANSION PROJECT
PISCO PLANT
CAUSE AND EFFECT MATRIX
PROPANE VAPOR RECOVERY UNIT KBA-12000 (Existing)
YORK PROCESS SYSTEMS JOB #294799
Reference: PPAG-500-ET-Y-607 Revision 2 (YORK)
SEE PROCESS FLOW DIAGRAM PCAM-534-PL-Y-8007
SEE NOTES

CAUSE AND EFFECT MATRIX (EXISTING)

ITEM	SERVICE	MALFUNCTION	NOTES	FIELD DEVICE	ANNUNCIATOR TAG	UNIT	VALUE	INPUT TO YORK'S PLC	INPUT TO PCS	INPUT TO SSS	P&ID SHEET	Propane VRU Area (KBA-12000) Shutdown Level 2	2	3	4	5	6	7	8	9	10	11
											ITEM NUMBER	1	2	3	4	5	6	7	8	9	10	11
											SERVICE		INLET TO VBA-13150 PROPANE VAPOR RECOVERY SUCTION SCRUBBER	KBA-12000 PROPANE VAPOR RECOVERY COMPRESSOR	EAL-12002 (HX-1401) OIL COOLER	EAL-14060 PROPANE VAPOR RECOVERY CONDENSER FAN A	EAL-14060 PROPANE VAPOR RECOVERY CONDENSER FAN B	INLET TO VBA-13170 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR	INLET TO VBA-13170 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR (BY PASS OF EAL-14060)	OUTLET OF VBA-13170 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-13170	PBB-11105 PROPANE CONDENSATE RETURN PUMP	PBB-11106 PROPANE CONDENSATE RETURN PUMP
											RESULTING ACTION		CLOSE VALVE (deenergize SDY-13150)		STOP MOTOR	STOP MOTOR	STOP MOTOR	CLOSE VALVE (deenergize SDY-14060A)	CLOSE VALVE (deenergize SDY-14060B)	CLOSE VALVE (deenergize SDY-13170A)	STOP MOTOR (NOTE 2)	STOP MOTOR (NOTE 2)
											EQUIP. NUMBER		SDV-13150	KBA-12000	EAL-12002 (HX-1401)	MOTOR OF EAL-14060	MOTOR OF EAL-14060	SDV-14060A	SDV-14060B	SDV-13170A	MOTOR OF PBB-11105	MOTOR OF PBB-11106
											P&ID SHEET		659D1997 1	659D1996 1	659D1996 1	659D1997 2	659D1997 2	659D1997 2	659D1997 2	659D1997 2	659D1997 2	659D1997 2
1	**PROPANE VAPOR RECOVERY UNIT KBA-12000. SHUTDOWN LEVEL 2.**	EMERGENCY S.D.								X			C	S	S	S	S	C	C	C (NOTE 1)	S	S
2																						
3	**PROPANE VAPOR RECOVERY UNIT KBA-12000**																					
4	F-12001 PROPANE VAPOR RECOVERY COMPRESSOR OIL FILTER	HI DIFF PRESS AL		PDIT 12001	PDAH 12001	psid	10		X		659D1997 SHT. 2											
5	F-12001 PROPANE VAPOR RECOVERY COMPRESSOR OIL FILTER	HI LEVEL AL		LSH 12001A	LAH 12001A	%	20		X		659D1997 SHT. 2											
6	F-12001 PROPANE VAPOR RECOVERY COMPRESSOR OIL FILTER	HI LEVEL AL		LSH 12001B	LAH 12001B	%	40		X		659D1997 SHT. 2											
7	VBA-13150 PROPANE VAPOR RECOVERY SUCTION SCRUBBER	HI HI LEVEL S.D.		LSHH 13150	LAHH 13150	%	50			X	659D1997 SHT. 1		C	S				C	C			
8	VBA-13150 PROPANE VAPOR RECOVERY SUCTION SCRUBBER	HI LEVEL AL		LIT 13150	LAH 13150	%	40		X		659D1997 SHT. 1											
9	VBA-13170 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR	HI LEVEL AL		LIT 13170	LAH 13170	%	37		X		659D1997 SHT. 2											
10	VBA-13170 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR	LO LEVEL AL		LIT 13170	LAL 13170	%	12		X		659D1997 SHT. 2											
11	VBA-13170 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR	LO LO LEVEL S.D.		LSLL 13170	LALL 13170	%	4			X	659D1997 SHT. 2										S	S
12	SDV-13170 SUCTION VALVE OF PBB-11105/11106		2	ZSO 13170	ZAO 13170		OFF			X	659D1997 SHT. 2										S (NOTE 2)	S (NOTE 2)
13	VBA-13170 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR	HI PRESS AL		PIT 13170	PAH 13170A	psig	260		X		659D1997 SHT. 2											
14	VBA-13170 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR	LO PRESS AL		PIT 13170	PAL 13170A	psig	150		X		659D1997 SHT. 2											
15	EAL-14060 PROPANE VAPOR RECOVERY CONDENSER	HI TEMP AL		TI 14060	TAH 14060	°F	125		X		659D1997 SHT. 2											
16	EAL-14060 PROPANE VAPOR RECOVERY CONDENSER FAN A	HI HI VIB S.D.		VSHH 14060A	VAHH 14061A	G's	3			X	659D1997 SHT. 2					S						
17	EAL-14060 PROPANE VAPOR RECOVERY CONDENSER FAN B	HI HI VIB S.D.		VSHH 14060B	VAHH 14060B	G's	3			X	659D1997 SHT. 2						S					
18	**KBA-12000 PROPANE VRU COMPRESSOR**																					
19	KBA-12000 PROPANE VRU (SIGNAL FROM SSS)	PERMISSIVE RUN			UPLL 12000			PLC-14			659D1997 SHT. 1											
20	KBA-12000 PROPANE VRU (SIGNAL FROM SSS)	EMERGENCY S.D.			USS 12000			PLC-14			659D1997 SHT. 1		C	S				C	C			
21	KBA-12000 PROPANE VRU	COMMON ALARM			UAL 12000					X	659D1997 SHT. 1											
22	KBA-12000 PROPANE VRU	UNIT SHUTDOWN			UALL 12000					X	659D1997 SHT. 1		C					C	C			
23	MOTOR CURRENT	FORCE UNLOAD		IE 1401	IC 1401	AMP	155	PLC-14			659D1996 SHT. 1			FORCE UNLOAD								
24	MOTOR CURRENT	STOP LOAD		IE 1402	IC 1402	AMP	148	PLC-14			659D1996 SHT. 1			STOP LOAD								
25	MOTOR CURRENT	HI HI CURR S.D.		IE 1402	IAHH 1402	AMP	170	PLC-14			659D1996 SHT. 1		C	S				C	C			
26	MOTOR CURRENT	HI CURR AL		IE 1402	IAH 1402	AMP	162	PLC-14			659D1996 SHT. 1											
27	MOTOR CURRENT	LO LO CURR S.D.		IE 1402	IALL 1402	AMP	37	PLC-14			659D1996 SHT. 1		C	S				C	C			
28	PV-1501 OIL SEPARATOR	LO LO LEVEL S.D.		LSL 1401	LALL 1401	%	10	PLC-14			659D1996 SHT. 1		C	S				C	C			
29	COMPRESSOR LUBE OIL CIRCUIT	LO PRESS AL		PE 1401	PAL 1401	psig	30	PLC-14			659D1996 SHT. 1											
30	COMPRESSOR LUBE OIL CIRCUIT	LO LO PRESS S.D.		PE 1401	PALL 1401	psig	25	PLC-14			659D1996 SHT. 1		C	S				C	C			
31	SUCTION END COMPRESSOR SHAFT	HI HI RADIAL VIB S.D.		XE 1401	XAHH 1401	gF	10.0 (1 sec delay)	PLC-14			659D1996 SHT. 1 648D1981 SHT. 3		C	S				C	C			
32	SUCTION END COMPRESSOR SHAFT	HI RADIAL VIB AL		XE 1401	XAH 1401	gF	3.5 (99 sec delay)	PLC-14			659D1996 SHT. 1 648D1981 SHT. 3											
33	COMPRESSOR LUBE OIL CIRCUIT	HI HI DIFF PRESS S.D.		PE 1402	PDAHH 1402	psid	20	PLC-14			659D1996 SHT. 1		C	S				C	C			
34	COMPRESSOR LUBE OIL CIRCUIT	HI DIFF PRESS AL		PE 1402	PDAH 1402	psid	15	PLC-14			659D1996 SHT. 1											
35	KBA-12000 PROPANE VRU - DISCHARGE	HI HI TEMP S.D.		TE 1402	TAHH 1403	°F	250	PLC-14			659D1996 SHT. 1		C	S				C	C			
36	KBA-12000 PROPANE VRU - DISCHARGE	HI TEMP AL		TE 1402	TAH 1403	°F	230	PLC-14			659D1996 SHT. 1											
37	DISCHARGE END COMPRESSOR SHAFT	HI HI RADIAL VIB S.D.		XE 1402	XAHH 1402	gF	3,5	PLC-14			659D1996 SHT. 1 648D1981 SHT. 3		C	S				C	C			
38	DISCHARGE END COMPRESSOR SHAFT	HI RADIAL VIB AL		XE 1402	XAH 1402	gF	3,5	PLC-14			659D1996 SHT. 1 648D1981 SHT. 3											
39	KBA-12000 PROPANE VRU - DISCHARGE	HI HI PRESS S.D.		PE 1403	PAHH 1403	psig	290	PLC-14			659D1996 SHT. 1		C	S				C	C			
40	KBA-12000 PROPANE VRU - DISCHARGE	HI PRESS AL		PE 1403	PAH 1403	psig	280	PLC-14			659D1996 SHT. 1											
41	COMPRESSOR LUBE OIL CIRCUIT	HI HI TEMP S.D.		TE 1403	TAHH 1403	°F	200	PLC-14			659D1996 SHT. 1		C	S				C	C			
42	COMPRESSOR LUBE OIL CIRCUIT	HI TEMP AL		TE 1403	TAH 1403	°F	180	PLC-14			659D1996 SHT. 1											
43	EAL-12002 (HX-1401) PROPANE COMPRESSOR LUBE OIL COOLER	HI VIB AL		XSH 1403	XAHH 1403	G's	3			X	659D1996 SHT. 1				S							
44	KBA-12000 PROPANE VRU - SUCTION	LO PRESS AL		PE 1404	PAL 1404	psig	0,2	PLC-14			659D1996 SHT. 1											
45	KBA-12000 PROPANE VRU - SUCTION	LO LO PRESS S.D.		PE 1404	PALL 1404	psig	0,1	PLC-14			659D1996 SHT. 1		C	S				C	C			
46	PV-1501 OIL SEPARATOR	LO TEMP AL		TE 1404	TAL 1404	°F	55	PLC-14			659D1996 SHT. 1											
47	PV-1501 OIL SEPARATOR	LO LO TEMP S.D.		TE 1404	TALL 1404	°F	49	PLC-14			659D1996 SHT. 1		C	S				C	C			
48	MOTOR BEARING	HI HI TEMP S.D.		TE 1405	TAHH 1405	°F	203	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1		C	S				C	C			
49	MOTOR BEARING	HI TEMP AL		TE 1405	TAH 1405	°F	194	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1											
50	MOTOR BEARING	HI HI TEMP S.D.		TE 1406	TAHH 1406	°F	203	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1		C	S				C	C			
51	MOTOR BEARING	HI TEMP AL		TE 1406	TAH 1406	°F	194	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1											
52	MOTOR STATOR	HI HI TEMP S.D.		TE 1407	TAHH 1407	°F	338	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1		C	S				C	C			
53	MOTOR STATOR	HI TEMP AL		TE 1407	TAH 1407	°F	320	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1											
54	MOTOR STATOR	HI HI TEMP S.D.		TE 1408	TAHH 1408	°F	338	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1		C	S				C	C			
55	MOTOR STATOR	HI TEMP AL		TE 1408	TAH 1408	°F	320	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1											
56	MOTOR STATOR	HI HI TEMP S.D.		TE 1409	TAHH 1409	°F	338	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1		C	S				C	C			
57	MOTOR STATOR	HI TEMP AL		TE 1409	TAH 1409	°F	320	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1											
58	MOTOR STATOR	HI HI TEMP S.D.		TE 1410	TAHH 1410	°F	338	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1		C	S				C	C			
59	MOTOR STATOR	HI TEMP AL		TE 1410	TAH 1410	°F	320	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1											
60	KBA-12000 PROPANE VRU - DISCHARGE	HI HI PRESS S.D.		PSHH 1411	PAHH 1411	psig	293 (1 sec delay)	PLC-14			659D1996 SHT. 1 648D1981 SHT. 2		C	S				C	C			
61	COMPRESSOR LUBE OIL CIRCUIT	LO LO PRESS S.D.		PSLL 1411	PALL 1411	psig	35 (5 sec delay)	PLC-14			659D1996 SHT. 1 648D1981 SHT. 2		C	S				C	C			
62	KBA-12000 PROPANE VRU - DISCHARGE	HI HI TEMP S.D.		TSHH 1411	TAHH 1411	°F	250 (1 sec delay)	PLC-14			659D1996 SHT. 1 648D1981 SHT. 2		C	S				C	C			
63	MOTOR STATOR	HI HI TEMP S.D.		TE 1411	TAHH 1411	°F	338	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1		C	S				C	C			
64	MOTOR STATOR	HI TEMP AL		TE 1411	TAH 1411	°F	320	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1											
65	COMPRESSOR LUBE OIL CIRCUIT	HI HI TEMP S.D.		TSHH 1412	TAHH 1412	°F	200	PLC-14			659D1996 SHT. 1		C	S				C	C			
66	MOTOR STATOR	HI HI TEMP S.D.		TE 1412	TAHH 1412	°F	338	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1		C	S				C	C			
67	MOTOR STATOR	HI TEMP AL		TE 1412	TAH 1412	°F	320	MCC OF M-1401/ KBA-12000			659D1996 SHT. 1											
68	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																					
69	INLET TO VBA-13150 PROPANE VAPOR RECOVERY SUCTION SCRUBBER			HS 13150							659D1997 SHT. 1		C/O									
70	VBA-13150 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR (INLET)			HS 14060A							659D1997 SHT. 2							C/O				
71	VBA-13180 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR (BY PASS OF EAL-14060)			HS 14060B							659D1997 SHT. 2								C/O			
72	VBA-13150 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR (OUTLET)			HS 13170							659D1997 SHT. 2									C/O		
73	LIQUID PROPANE FROM EAL-4070 TO VBA-13170			HS 14070C							PCAM-534-PL-Y-214											
74	HOT BY-PASS: VAPOR PROPANE FROM F-2006 TO VBA-13170			HS 14070D							PCAM-534-PL-Y-214											

NOTES:

1. THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: FIRST STOP THE PBB-11105/11106 PUMPS, THEN CLOSE THE SDV-13170 SHUTDOWN VALVE.
2. IF ZSO-13170 IS NOT ACTIVATED (SDV-13170 VALVE IN OFF POSITION OR NOT TOTALLY OPEN), PBB-11105/11106 PUMPS CAN NOT BE STARTED OR IF ITS ARE RUNNING ITS MUST BE STOPPED.
3. VRU PROPANE COMPRESSOR KBA-12000 - RUNS PROPANE ONLY
SHUTDOWN VALVES ASSOCIATED WITH KBA-12000 ARE SDV-13150 (SDY-13150), SDV-14060A (SDY-14060A), SDV-14060B (SDY-14060B)

BLOCK 56 - CAMISEA EXPANSION PROJECT
PISCO PLANT
CAUSE AND EFFECT MATRIX
BUTANE VAPOR RECOVERY UNIT KBA-12010 (Existing)
YORK PROCESS SYSTEMS JOB #294799
Reference: PPAG-500-ET-Y-607 Revision 2 (YORK)
SEE PROCESS FLOW DIAGRAM PCAM-534-PL-Y-8007
SEE NOTES

CAUSE AND EFFECT MATRIX (EXISTING)

													ITEM NUMBER	1	2	3	4	5	6	7	8	9	10
													SERVICE	**Butane VRU Area (KBA-12010) Shutdown Level 2**	INLET TO VBA-13160 BUTANE VAPOR RECOVERY SUCTION SCRUBBER	KBA-12010 BUTANE VAPOR RECOVERY COMPRESSOR	EAL-14080 BUTANE VAPOR RECOVERY CONDENSER FAN A	EAL-14080 BUTANE VAPOR RECOVERY CONDENSER FAN B	VBA-13180 BUTANE VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-14080A (INLET)	VBA-13180 BUTANE VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-14080B (BY PASS OF EAL-14080)	VBA-13180 BUTANE VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-13180 (OUTLET)	PBB-11115 BUTANE CONDENSATE RETURN PUMP	PBB-11116 BUTANE CONDENSATE RETURN PUMP
													RESULTING ACTION		CLOSE VALVE (deenergize SDY-13160)		STOP MOTOR	STOP MOTOR	CLOSE VALVE (deenergize SDY-14080A)	CLOSE VALVE (deenergize SDY-14080B)	CLOSE VALVE (deenergize SDY-13180) (NOTES 1, 2)	STOP MOTOR (NOTE 2)	STOP MOTOR (NOTE 2)
													EQUIP. NUMBER		SDV-13160	KBA-12010	MOTOR OF EAL-14080	MOTOR OF EAL-14080	SDV-14080A	SDV-14080B	SDV-13180	MOTOR OF PBB-11115	MOTOR OF PBB-11116
ITEM	SERVICE	MALFUNCTION	NOTES	FIELD DEVICE		ANNUNCIATOR TAG		UNIT	VALUE	INPUT TO YORK'S PLC	INPUT TO PCS	INPUT TO SSS	P&ID SHEET		659D1995 1	659D1994 1	659D1995 2	659D1995 2	659D1995 2	659D1995 2	659D1995 2	659D1995 2	659D1995 2
1	**BUTANE VAPOR RECOVERY UNIT KBA-12010. SHUTDOWN LEVEL 2.**	EMERGENCY S.D.													C	S	S	S	C	C	C (NOTE 1)	S	S
2																							
3	**BUTANE VAPOR RECOVERY UNIT KBA-12010**																						
4	F-12011 BUTANE VAPOR RECOVERY COMPRESSOR OIL FILTER	HI DIFF PRESS AL		PDIT	12011	PDAH	12011	psid	10		X		659D1995 SHT. 2										
5	F-12011 BUTANE VAPOR RECOVERY COMPRESSOR OIL FILTER	HI LEVEL AL		LSH	12011A	LAH	12011A	%	20		X		659D1995 SHT. 2										
6	F-12011 BUTANE VAPOR RECOVERY COMPRESSOR OIL FILTER	HI LEVEL AL		LSH	12011B	LAH	12011B	%	40		X		659D1995 SHT. 2										
7	VBA-13160 BUTANE VAPOR RECOVERY SUCTION SCRUBBER	HI HI LEVEL S.D.		LSHH	13160	LAHH	13160	%	50			X	659D1995 SHT. 1		C	S			C	C			
8	VBA-13160 BUTANE VAPOR RECOVERY SUCTION SCRUBBER	HI LEVEL AL		LIT	13160	LAH	13160	%	40		X		659D1995 SHT. 1										
9	VBA-13180 BUTANE VAPOR RECOVERY CONDENSATE ACCUMULATOR	HI LEVEL AL		LIT	13180	LAH	13180	%	37		X		659D1995 SHT. 2										
10	VBA-13180 BUTANE VAPOR RECOVERY CONDENSATE ACCUMULATOR	LO LEVEL AL		LIT	13180	LAL	13180	%	12		X		659D1995 SHT. 2										
11	VBA-13180 BUTANE VAPOR RECOVERY CONDENSATE ACCUMULATOR	LO LO LEVEL S.D.		LSLL	13180	LALL	13180	%	4			X	659D1995 SHT. 2									S	S
12	SDV-13180 SUCTION VALVE OF PBB-11115/11116		NOTE 2	ZSO	13180	ZAO	13180		OFF			X	659D1995 SHT. 2									S (NOTE 2)	S (NOTE 2)
13	VBA-13180 BUTANE VAPOR RECOVERY CONDENSATE ACCUMULATOR	HI PRESS AL		PIT	13180	PAH	13180A	psig	180		X		659D1995 SHT. 2										
14	VBA-13180 BUTANE VAPOR RECOVERY CONDENSATE ACCUMULATOR	LO PRESS AL		PIT	13180	PAL	13180A	psig	55		X		659D1995 SHT. 2										
15	EAL-14080 BUTANE VAPOR RECOVERY CONDENSER	HI TEMP AL		TI	14080	TAH	14080	°F	125		X		659D1995 SHT. 2										
16	EAL-14080 BUTANE VAPOR RECOVERY CONDENSER FAN A	HI HI VIB S.D.		VSHH	14080A	VAHH	14080A	G's	3			X	659D1995 SHT. 2				S						
17	EAL-14080 BUTANE VAPOR RECOVERY CONDENSER FAN B	HI HI VIB S.D.		VSHH	14080B	VAHH	14080B	G's	3			X	659D1995 SHT. 2					S					
18	**KBA-12010 BUTANE VRU COMPRESSOR**																						
19	KBA-12010 BUTANE VRU (SIGNAL FROM SSS)	PERMISSIVE RUN				UPLL	12010			PLC-16			659D1995 SHT. 1										
20	KBA-12010 BUTANE VRU (SIGNAL FROM SSS)	EMERGENCY S.D.				USS	12010			PLC-16			659D1995 SHT. 1		C	S			C	C			
21	KBA-12010 BUTANE VRU	COMMON ALARM				UAL	12010					X	659D1995 SHT. 1										
22	KBA-12010 BUTANE VRU	UNIT SHUTDOWN				UALL	12010					X	659D1995 SHT. 1		C				C	C			
23	MOTOR CURRENT	HI HI CURR S.D.		IE	1501	IAHH	1501	AMP	55	PLC-16			659D1994 SHT. 1		C	S			C	C			
24	MOTOR CURRENT	HI CURR AL		IE	1501	IAH	1501	AMP	52	PLC-16			659D1994 SHT. 1										
25	MOTOR CURRENT	LO LO CURR S.D.		IE	1501	IALL	1501	AMP	12	PLC-16			659D1994 SHT. 1		C	S			C	C			
26	MOTOR CURRENT	FORCE UNLOAD		IE	1501	IC	1501	AMP	50	PLC-16			659D1994 SHT. 1			FORCE UNLOAD							
27	MOTOR CURRENT	STOP LOAD		IE	1502	IC	1502	AMP	48	PLC-16			659D1994 SHT. 1			STOP LOAD							
28	PV-1501 OIL SEPARATOR	LO LO LEVEL S.D.		LSL	1501	LSLL	1501	%	10	PLC-16			659D1994 SHT. 1		C	S			C	C			
29	COMPRESSOR LUBE OIL CIRCUIT	LO PRESS AL		PE	1501	PAL	1501	psig	30	PLC-16			659D1994 SHT. 1										
30	COMPRESSOR LUBE OIL CIRCUIT	LO LO PRESS S.D.		PE	1501	PALL	1501	psig	25	PLC-16			659D1994 SHT. 1		C	S			C	C			
31	SUCTION END COMPRESSOR SHAFT	HI HI RADIAL VIB S.D.		XE	1501	XAHH	1501	gF	10.0 (1 sec delay)	PLC-16			659D1994 SHT. 1 648D1979 SHT. 3		C	S			C	C			
32	SUCTION END COMPRESSOR SHAFT	HI RADIAL VIB AL		XE	1501	XAH	1501	gF	3.5 (99 sec delay)	PLC-16			659D1994 SHT. 1 648D1979 SHT. 3										
33	COMPRESSOR LUBE OIL CIRCUIT	HI HI DIFF PRESS S.D.		PE	1502	PDAHH	1502	psid	20	PLC-16			659D1994 SHT. 1		C	S			C	C			
34	COMPRESSOR LUBE OIL CIRCUIT	HI DIFF PRESS AL		PE	1502	PDAH	1502	psid	15	PLC-16			659D1994 SHT. 1										
35	KBA-12010 BUTANE VRU - DISCHARGE	HI HI TEMP S.D.		TE	1502	TAHH	1502	°F	250	PLC-16			659D1994 SHT. 1		C	S			C	C			
36	KBA-12010 BUTANE VRU - DISCHARGE	HI TEMP AL		TE	1502	TAH	1502	°F	230	PLC-16			659D1994 SHT. 1										
37	DISCHARGE END COMPRESSOR SHAFT	HI HI RADIAL VIB S.D.		XE	1502	XAHH	1502	gF	10.0 (1 sec delay)	PLC-16			659D1994 SHT. 1 648D1979 SHT. 3		C	S			C	C			
38	DISCHARGE END COMPRESSOR SHAFT	HI RADIAL VIB AL		XE	1502	XAH	1502	gF	3.5 (99 sec delay)	PLC-16			659D1994 SHT. 1 648D1979 SHT. 3										
39	KBA-12010 BUTANE VRU - DISCHARGE	HI HI PRESS S.D.		PE	1503	PAHH	1503	psig	180	PLC-16			659D1994 SHT. 1		C	S			C	C			
40	KBA-12010 BUTANE VRU - DISCHARGE	HI PRESS AL		PE	1503	PAH	1503	psig	170	PLC-16			659D1994 SHT. 1										
41	COMPRESSOR LUBE OIL CIRCUIT	HI HI TEMP S.D.		TE	1503	TAHH	1503	°F	200	PLC-16			659D1994 SHT. 1		C	S			C	C			
42	COMPRESSOR LUBE OIL CIRCUIT	HI TEMP AL		TE	1503	TAH	1503	°F	180	PLC-16			659D1994 SHT. 1										
43	KBA-12010 BUTANE VRU - SUCTION	LO PRESS AL		PE	1504	PAL	1504	psig	0,2	PLC-16			659D1994 SHT. 1										
44	KBA-12010 BUTANE VRU - SUCTION	LO LO PRESS S.D.		PE	1504	PALL	1504	psig	0,1	PLC-16			659D1994 SHT. 1		C	S			C	C			
45	PV-1501 OIL SEPARATOR	LO TEMP AL		TE	1504	TAL	1504	°F	55	PLC-16			659D1994 SHT. 1										
46	PV-1501 OIL SEPARATOR	LO LO TEMP S.D.		TE	1504	TALL	1504	°F	49	PLC-16			659D1994 SHT. 1		C	S			C	C			
47	MOTOR BEARING	HI HI TEMP S.D.		TE	1505	TAHH	1505	°F	203	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1		C	S			C	C			
48	MOTOR BEARING	HI TEMP AL		TE	1505	TAH	1505	°F	194	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1										
49	MOTOR BEARING	HI HI TEMP S.D.		TE	1506	TAHH	1506	°F	203	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1		C	S			C	C			
50	MOTOR BEARING	HI TEMP AL		TE	1506	TAH	1506	°F	194	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1										
51	MOTOR STATOR	HI HI TEMP S.D.		TE	1507	TAHH	1507	°F	338	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1		C	S			C	C			
52	MOTOR STATOR	HI TEMP AL		TE	1507	TAH	1507	°F	320	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1										
53	MOTOR STATOR	HI HI TEMP S.D.		TE	1508	TAHH	1508	°F	338	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1		C	S			C	C			
54	MOTOR STATOR	HI TEMP AL		TE	1508	TAH	1508	°F	320	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1										
55	MOTOR STATOR	HI HI TEMP S.D.		TE	1509	TAHH	1509	°F	338	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1		C	S			C	C			
56	MOTOR STATOR	HI TEMP AL		TE	1509	TAH	1509	°F	320	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1										
57	MOTOR STATOR	HI HI TEMP S.D.		TE	1510	TAHH	1510	°F	338	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1		C	S			C	C			
58	MOTOR STATOR	HI TEMP AL		TE	1510	TAH	1510	°F	320	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1										
59	KBA-12010 BUTANE VRU - DISCHARGE	HI HI PRESS S.D.		PSHH	1511	PAHH	1511	psig	180 (1 sec delay)	PLC-16			659D1994 SHT. 1 648D1979 SHT. 2		C	S			C	C			
60	COMPRESSOR LUBE OIL CIRCUIT	LO LO PRESS S.D.		PSLL	1511	PALL	1511	psig	35 (5 sec delay)	PLC-16			659D1994 SHT. 1 648D1979 SHT. 2		C	S			C	C			
61	KBA-12010 BUTANE VRU - DISCHARGE	HI HI TEMP S.D.		TSHH	1511	TAHH	1511	°F	250 (1 sec delay)	PLC-16			659D1994 SHT. 1 648D1979 SHT. 2		C	S			C	C			
62	MOTOR STATOR	HI HI TEMP S.D.		TE	1511	TAHH	1511	°F	338	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1		C	S			C	C			
63	MOTOR STATOR	HI TEMP AL		TE	1511	TAH	1511	°F	320	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1										
64	COMPRESSOR LUBE OIL CIRCUIT	HI HI TEMP S.D.		TSHH	1512	TAHH	1512	°F	200 (5 sec delay)	PLC-16			659D1994 SHT. 1 648D1979 SHT. 2		C	S			C	C			
65	MOTOR STATOR	HI HI TEMP S.D.		TE	1512	TAHH	1512	°F	338	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1		C	S			C	C			
66	MOTOR STATOR	HI TEMP AL		TE	1512	TAH	1512	°F	320	MCC OF M-1501/ KBA-12010			659D1994 SHT. 1										
67	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																						
68	INLET TO VBA-13160 BUTANE VAPOR RECOVERY SUCTION SCRUBBER			HS	13160								659D1995 SHT. 1		C/O								
69	VBA-13180 BUTANE VAPOR RECOVERY CONDENSATE ACCUMULATOR (INLET)			HS	14080A								659D1995 SHT. 2						C/O				
70	VBA-13180 BUTANE VAPOR RECOVERY CONDENSATE ACCUMULATOR (BY PASS OF EAL-14080)			HS	14080B								659D1995 SHT. 2							C/O			
71	VBA-13180 BUTANE VAPOR RECOVERY CONDENSATE ACCUMULATOR (OUTLET)			HS	13180								659D1995 SHT. 2								C/O		
72	LIQUID BUTANE FROM EAL-4070 TO VBA-13180			HS	14070A								PCAM-534-PL-Y-214										
73	HOT BY-PASS: VAPOR BUTANE FROM F-2006 TO VBA-13180			HS	14070B								PCAM-534-PL-Y-214										

NOTES:

1. THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: FIRST STOP THE PBB-11115/11116 PUMPS, THEN CLOSE THE SDV-13180 SHUTDOWN VALVE.
2. IF ZSO-13180 IS NOT ACTIVATED (SDV-13180 VALVE IN OFF POSITION OR NOT TOTALLY OPEN), PBB-11115/11116 PUMPS CAN NOT BE STARTED OR IF ITS ARE RUNNING ITS MUST BE STOPPED.
3. VRU BUTANE COMPRESSOR KBA-12010 - RUNS BUTANE ONLY
SHUTDOWN VALVES ASSOCIATED WITH KBA-12010 ARE SDV-13160 (SDY-13160), SDV-14080A (SDY-14080A), SDV-14080B (SDY-14080B)

CAUSE AND EFFECT MATRIX (NEW)

PERU CAMISEA SECOND EXPANSION PROJECT
PISCO PLANT
PROPANE VRU 3

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
PROPANE VAPOR RECOVERY UNIT 3: KBA-22000																	
1	**PROPANE VRU 3 SHUTDOWN LEVEL 2**																
2																	
3	LSHH - 23150	VBA-23150 PROPANE VAPOR RECOVERY SUCTION SCBR	534-769		in			62						X			
4	VSHH - 22002	EAL-22002 PROPANE COMPRESSOR LUBE OIL COOLER	659D2213					X						X			
5	UALL - 22000	KBA-22000 PROPANE VAPOR RECOVERY COMPRESSOR (UNIT SD)	534-769	1							X						X
6	UAL - 22000	KBA-22000 PROPANE VAPOR RECOVERY COMPRESSOR (UNIT SD)	534-769	2						X							
7	LSHH - 23170	VBA-23170 C3 VAPOR RECOVERY CONDENSATE ACCUM	534-770		in			38						X			
8	VSHH - 24060A	EAL-24060 C3 VAPOR RECOVERY CONDENSER FAN A	534-770					X						X			
9	VSHH - 24060B	EAL-24060 C3 VAPOR RECOVERY CONDENSER FAN B	534-770					X						X			
10	LSLL - 23170	VBA-23170 C3 VAPOR RECOVERY CONDENSATE ACCUM	534-770		in						6						X
	LAHH - 23171	VBA-23170 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR	534-770		in			38									
11	PSHH - 21105	PBB-21105 C3 CONDENSATE RETURN PUMP (SEAL)	534-770		psig			7						~~X~~			
12	LSLL - 21105	PBB-21105 C3 CONDENSATE RETURN PUMP (SEAL)	534-770	6							hold						X
13	PSHH - 21106	PBB-21106 C3 CONDENSATE RETURN PUMP (SEAL)	534-770		psig			7						~~X~~			
14	LSLL - 21106	PBB-21106 C3 CONDENSATE RETURN PUMP (SEAL)	534-770	7							hold						X
15	ZAO - 23170	PBB-21105 / 06 Suction Valve	534-770	3									X				
16	ZAO - 23150	KBA-22000 PROPANE VAPOR RECOVERY COMPRESSOR INLET VALVE	534-769	5									X				
17	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																
18	HS - 23150	INLET TO VBA-23150 PROPANE VAPOR RECOVERY SUCTION SCRUBBER	534-769														
19	HS - 24060A	VBA-23170 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR (INLET)	534-770														
20	HS - 24060B	VBA-23170 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR (BY PASS OF EAL-24060)	534-770														
21	HS - 23170	VBA-23170 PROPANE VAPOR RECOVERY CONDENSATE ACCUMULATOR (OUTLET)	534-770														
22	HS - 24070C	LIQUID PROPANE FROM EAL-4070 TO VBA-23170	534-214														
23	HS - 24070D	HOT BY-PASS: VAPOR PROPANE FROM F-2006 TO VBA-23170	534-214														
24																	

	1	2	3	4	5	6	7	8	9	10	11	12
	534-769	534-769	HOLD	534-770	534-770	534-770	534-770	534-770	534-770	534-770	534-214	534-214
	VBA-23150 PROPANE VAPOR RECOVERY SUCTION SCRUBBER SDV-23150	KBA-22000 PROPANE VAPOR RECOVERY COMPRESSOR	EAL-22002 PROPANE COMPRESSOR LUBE OIL COOLER	EAL-24060 PROPANE VAPOR RECOVERY CONDENSER FAN A	EAL-24060 PROPANE VAPOR RECOVERY CONDENSER FAN B	VBA-23170 C3 VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-24060A	VBA-23170 C3 VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-24060B	VBA-23170 C3 VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-23170 Note 4	PBB-21105 C3 CONDENSATE RETURN PUMP	PBB-21106 C3 CONDENSATE RETURN PUMP	LIQUID PROPANE FROM EAL-4070 TO VBA-23170 SDV-24070C	HOT BY-PASS: VAPOR PROPANE FROM F-2006 TO VBA-23170 SDV-24070D
	SDY-23150	KBA-22000 USS-22000	Motor EAL-22002	Motor A EAL-24060	Motor B EAL-24060	SDY-24060A	SDY-24060B	SDY-23170	Motor PBB-21105	Motor PBB-21106	SDY-24070C	SDY-24070D
PROPANE VAPOR RECOVERY UNIT 3: KBA-22000												
1	D	S	S	S	S	D	D	D	S	S	D	D
2												
3	D	S				D	D					
4		S	S									
5	D					D	D					
6												
7		S										
8				S								
9					S							
10									S	S		
		S						D				
11								~~D~~	~~S~~	~~S~~		
12								D	S			
13								~~D~~	~~S~~	~~S~~		
14								D		S		
15									S	S		
16	D	S				D	D					
17												
18	C/O											
19						C/O						
20							C/O					
21								C/O				
22											C/O	
23												C/O
24												

NOTES

Note 1 The Shutdown of the Compressor is performed by its own PLC and not by the SSS.
Note 2 Previous Shutdown Alarm.
Note 3 IF ZSO-23170 IS NOT ACTIVATED (SDV-23170 VALVE IN OFF POSITION OR NOT TOTALLY OPEN), PBB-21105/21106 PUMPS CANNOT BE STARTED OR IF THESE ARE RUNNING, MUST BE STOPPED.
Note 4 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: 1ST SHUTDOWN THE PUMPS, 2ND CLOSE THE SHUTDOWN VALVE.
Note 5 IF ZSO-23150 IS NOT ACTIVATED (SDV-23150 VALVE IN OFF POSITION OR NOT TOTALLY OPEN), KBA-22000 CANNOT BE STARTED OR IF IT IS RUNNING, MUST BE STOPPED.
Note 6 AFTER 10 MIN OF LSLL-21105 ACTIVATION PUMP PBB-21105 SHALL BE STOPPED AND SDV-23170 CLOSED. MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED TO DEACTIVATE ALL INTERLOCKS ASSOCIATED TO THE PUMP THAT HAS BEEN STOPPED.
Note 7 AFTER 10 MIN OF LSLL-21106 ACTIVATION PUMP PBB-21106 SHALL BE STOPPED AND SDV-23170 CLOSED. MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED TO DEACTIVATE ALL INTERLOCKS ASSOCIATED TO THE PUMP THAT HAS BEEN STOPPED

CAUSE AND EFFECT MATRIX (NEW)

PERU CAMISEA SECOND EXPANSION PROJECT
PISCO PLANT
PROPANE VRU 3

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low	KBA-22000 PROPANE VRU COMPRESSOR (PLC-24)	1	2	3	4
																			534-769	534-769	534-770	534-770
																			VBA-23150 PROPANE VAPOR RECOVERY SUCTION SCRUBBER SDV-23150	KBA-22000 PROPANE VAPOR RECOVERY COMPRESSOR	VBA-23170 C3 VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-24060A	VBA-23170 C3 VAPOR RECOVERY CONDENSATE ACCUMULATOR SDV-24060B
																			SDY-23150	KBA-22000 USS-22000	SDY-24060A	SDY-24060B
	PROPANE VAPOR RECOVERY UNIT 3: KBA-22000																					
1	**KBA-22000 PROPANE VRU COMPRESSOR (PLC-24)**																					
2																						
3	UPLL - 22000	KBA-22000 PROPANE VRU (SIGNAL FROM SSS)	534-769														X					
4	USS - 22000	KBA-22000 PROPANE VRU (SIGNAL FROM SSS)	534-769									X							C	S	C	C
	KBA-22000 PROPANE VRU COMPRESSOR (PLC-24)																					
9	IC - 22401	MOTOR CURRENT	659D2213 sh1	2																FORCE UNLOAD		
10	IC - 22402	MOTOR CURRENT	659D2213 sh1	2																STOP LOAD		
11	IAHH - 22402	MOTOR CURRENT	659D2213 sh1	2										X					C	S	C	C
12	IAH - 22402	MOTOR CURRENT	659D2213 sh1	2											X							
13	IALL - 22402	MOTOR CURRENT	659D2213 sh1	2													X		C	S	C	C
14	LALL - 22401	VBA-22002 OIL SEPARATOR	659D2213 sh1	2													X		C	S	C	C
15	PAL - 22401	COMPRESSOR LUBE OIL CIRCUIT	659D2213 sh1	2												X						
16	PALL - 22401	COMPRESSOR LUBE OIL CIRCUIT	659D2213 sh1	2													X		C	S	C	C
17	XAHH - 22401	SUCTION END COMPRESSOR SHAFT	659D2213 sh1	2										X					C	S	C	C
18	XAH - 22401	SUCTION END COMPRESSOR SHAFT	659D2213 sh1	2											X							
19	PDAHH - 22402	COMPRESSOR LUBE OIL CIRCUIT	659D2213 sh1	2										X					C	S	C	C
20	PDAH - 22402	COMPRESSOR LUBE OIL CIRCUIT	659D2213 sh1	2											X							
21	TAHH - 22402	KBA-22000 PROPANE VRU - DISCHARGE	659D2213 sh1	2										X					C	S	C	C
22	TAH - 22402	KBA-22000 PROPANE VRU - DISCHARGE	659D2213 sh1	2											X							
23	XAHH - 22402	DISCHARGE END COMPRESSOR SHAFT	659D2213 sh1	2										X					C	S	C	C
24	XAH - 22402	DISCHARGE END COMPRESSOR SHAFT	659D2213 sh1	2											X							
25	PAHH - 22403	KBA-22000 PROPANE VRU - DISCHARGE	659D2213 sh1	2										X					C	S	C	C
26	PAH - 22403	KBA-22000 PROPANE VRU - DISCHARGE	659D2213 sh1	2											X							
27	TAHH - 22403	COMPRESSOR LUBE OIL CIRCUIT	659D2213 sh1	2										X					C	S	C	C
28	TAH - 22403	COMPRESSOR LUBE OIL CIRCUIT	659D2213 sh1	2											X							
29	PAL - 22404	KBA-22000 PROPANE VRU - SUCTION	659D2213 sh1	2												X						
30	PALL - 22404	KBA-22000 PROPANE VRU - SUCTION	659D2213 sh1	2													X		C	S	C	C
31	TAL - 22404	VBA-22002 OIL SEPARATOR	659D2213 sh1	2												X						
32	TALL - 22404	VBA-22002 OIL SEPARATOR	659D2213 sh1	2													X		C	S	C	C
33	TAHH - 22405	MOTOR BEARING	659D2213 sh1	2										X					C	S	C	C
34	TAH - 22405	MOTOR BEARING	659D2213 sh1	2											X							
35	TAHH - 22406	MOTOR BEARING	659D2213 sh1	2										X					C	S	C	C
36	TAH - 22406	MOTOR BEARING	659D2213 sh1	2											X							
37	TAHH - 22407	MOTOR STATOR	659D2213 sh1	2										X					C	S	C	C
38	TAH - 22407	MOTOR STATOR	659D2213 sh1	2											X							
39	TAHH - 22408	MOTOR STATOR	659D2213 sh1	2										X					C	S	C	C
40	TAH - 22408	MOTOR STATOR	659D2213 sh1	2											X							
41	TAHH - 22409	MOTOR STATOR	659D2213 sh1	2										X					C	S	C	C
42	TAH - 22409	MOTOR STATOR	659D2213 sh1	2											X							
43	TAHH - 22410	MOTOR STATOR	659D2213 sh1	2										X					C	S	C	C
44	TAH - 22410	MOTOR STATOR	659D2213 sh1	2											X							
45	PAHH - 22411	KBA-22000 PROPANE VRU - DISCHARGE	659D2213 sh1	2										X					C	S	C	C
46	PALL - 22411	COMPRESSOR LUBE OIL CIRCUIT	659D2213 sh1	2													X		C	S	C	C
47	TAHH - 22411	KBA-22000 PROPANE VRU - DISCHARGE	659D2213 sh1	2										X					C	S	C	C
48	TAHH - 22411	MOTOR STATOR	659D2213 sh1	2										X					C	S	C	C
49	TAH - 22411	MOTOR STATOR	659D2213 sh1	2											X							
50	TAHH - 22412	COMPRESSOR LUBE OIL CIRCUIT	659D2213 sh1	2										X					C	S	C	C
51	TAHH - 22412	MOTOR STATOR	659D2213 sh1	2										X					C	S	C	C
52	TAH - 22412	MOTOR STATOR	659D2213 sh1	2											X							
53			~~534-502~~																			

NOTES

1. CAUSE AND EFFECT DIAGRAM OF KBA-22000 BY YORK (Document Nº PCSE-534-P2-M-525)
2 . ALL SETTING VALUE WILL BE COMPLETED WITH VENDOR DATA

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)
and PPAG-500-MC-K-106 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT)
REFRIGERATED STORAGE_Existing & New

Causes

No.	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
		REFRIGERATED STORAGE & PUMPING															
1		**REFRIGERATED BUTANE STORAGE & PUMPING SHUTDOWN LEVEL 2**															
2		**REFRIGERATED PROPANE STORAGE & PUMPING SHUTDOWN LEVEL 2**															
3	ESD - 6013	Refrigerated Butane Storage Shutdown Manual SOFT Push Button in CCR										X					
4	ESD - 6014	Refrigerated Propane Storage Shutdown Manual SOFT Push Button in CCR										X					
5		**TKBJ-3005 PROPANE STORAGE TANK**															
6	LAHH - 3005	TKBJ-3005 Propane Storage Tank	533-208	Note 7	in			894						X			
7	LALL - 3005	Upon LALL-3005 activation if TKBJ-3005 is being unloaded, then stop PBB-1325/1365 AND PBB-1090/1095/1100 pumps.	533-208		in						52						X
8	~~ZSC - 3005~~	~~TKBJ-3005 Propane Storage Tank outlet valve CLOSE, and TKBJ-3005 is being unloaded, then stop PBB-1325/1365 AND PBB-1090/1095/1100 pumps.~~	~~533-208~~	~~Note 1, 19~~								~~X~~					
9	ZSO - 3005	TKBJ-3005 Propane Storage Tank outlet valve OPEN	533-208	Note 19								X					
10	ZSO - 13009	TKBJ-3005 Propane Storage Tank recirculation valve OPEN	533-208	Note 19								X					
11	ZSO - 1093	PBB-1090 Suction Valve OPEN	533-209	Note 19								X					
12	ZSO - 1098	PBB-1095 Suction Valve OPEN	545-209	Note 19								X					
13	ZSO - 1103	PBB-1100 Suction Valve OPEN	545-209	Note 19								X					
14		**TKBJ-13005 PROPANE STORAGE TANK**															
15	LSHH - 13005	TKBJ-13005 Propane Storage Tank	533-608	Note 7	in			894						X			
16	LAHH - 13006	TKBJ-13005 Propane Storage Tank	533-608	Note 7	in			894						X			
17	LAH - 13006	TKBJ-13005 Propane Storage Tank	533-608		in				838								
18	LAL - 13006	TKBJ-13005 Propane Storage Tank	533-608		in					104							
19	LALL - 13006	Upon LALL-13006 activation if TKBJ-13005 is being unloaded, then stop PBB-1325/1365 AND PBB-1090/1095/1100 pumps.	533-608		in						52						X
20	LSLL - 13005	Upon LALL-13005 activation if TKBJ-13005 is being unloaded, then stop PBB-1325/1365 AND PBB-1090/1095/1100 pumps.	533-608		in						52						X
21																	
22	ZSO - 13005	TKBJ-13005 Propane Storage Tank outlet valve OPEN	533-608	Note 19								X					
23	ZSO - 13006	TKBJ-13005 Propane Storage Tank recirculation valve OPEN	533-608	Note 19								X					
24	ZSO - 1093	PBB-1090 Suction Valve OPEN	533-209	Note 19								X					
25	ZSO - 1098	PBB-1095 Suction Valve OPEN	533-209	Note 19								X					
26	ZSO - 1103	PBB-1100 Suction Valve OPEN	533-209	Note 19								X					
27		**TKBJ-23005 PROPANE STORAGE TANK**															
28	LSHH - 23005	TKBJ-23005 Propane Storage Tank	533-609	Note 7	in			894						X			
29	LAHH - 23006	TKBJ-23005 Propane Storage Tank	533-609	Note 7	in			894						X			
30	LAH - 23006	TKBJ-23005 Propane Storage Tank	533-609		in				838								
31	LAL - 23006	TKBJ-23005 Propane Storage Tank	533-609		in					104							
32	LALL - 23006	Upon LALL-23006 activation if TKBJ-23005 is being unloaded, then stop PBB-1325/1365 AND PBB-1090/1095/1100 pumps.	533-609		in						52						X
33	LSLL - 23005	Upon LALL-23005 activation if TKBJ-23005 is being unloaded, then stop PBB-1325/1365 AND PBB-1090/1095/1100 pumps.	533-609		in						52						X
34																	
35	ZSO - 23005	TKBJ-23005 Propane Storage Tank outlet valve OPEN	533-609	Note 19								X					
36	ZSO - 23008	TKBJ-23005 Propane Storage Tank recirculation valve OPEN	533-609	Note 19								X					
37	ZSO - 1093	PBB-1090 Suction Valve OPEN	533-209	Note 19								X					
38	ZSO - 1098	PBB-1095 Suction Valve OPEN	533-209	Note 19								X					
39	ZSO - 1103	PBB-1100 Suction Valve OPEN	533-209	Note 19								X					
40		**PBB-1325/1365 PROPANE COOL DOWN PUMPS**															
41	PSHH - 1325	PBB-1325 Propane Cool Down Pump Seal Pot	533-208		psig			12									
42	SSC - 1325	PSHH-1325 + AT-6802 (Gas Detector, see PCAM-680-PL-Y-416-1)	533-208	Note 8								X					
43	PSHH - 1365	PBB-1365 Propane Cool Down Pump Seal Pot	533-208		psig			12									
44	SSC - 1365	PSHH-1365 + AT-6802 (Gas Detector, see PCAM-680-PL-Y-416-1)	533-208	Note 8								X					
45	ZIC - 1326	PBB-1325 Propane Cool Down Pump Discharge	533-208	Note 4								X					
46	ZIC - 1366	PBB-1365 Propane Cool Down Pump Discharge	533-208	Note 4								X					
47		**PBB-1090/1095/1100 PROPANE SHIP LOADING PUMPS**															
48	PSHH - 1090	PBB-1090 Propane Ship Loading Seal Pot	545-209		psig			12									
49	SSC - 1090	PSHH-1090 and (AT-6814 or AT-6815), Gas Detectors, see PCAM-680-PL-Y-416-1	545-209	Note 9								X					
50	ZIC - 1091	PBB-1090 Propane Ship Loading Pump Discharge	545-209	Note 4								X					
51	ZIC - 1093	PBB-1090 Suction Valve	545-209	Note 19								X					
52	PSHH - 1095	PBB-1095 Propane Ship Loading Seal Pot	545-209		psig			12									
53	SSC - 1095	PSHH-1095 and or (AT-6814 or AT-6815), Gas Detectors, see PCAM-680-PL-Y-416-1	545-209	Note 9								X					
54	ZIC - 1096	PBB-1095 Propane Ship Loading Pump Discharge	545-209	Note 4								X					
55	ZIC - 1098	PBB-1095 Suction Valve	545-209	Note 2								X					
56	PSHH - 1100	PBB-1100 Propane Ship Loading Seal Pot	545-209		psig			12									
57	SSC - 1100	PSHH-1100 and (AT-6814 or AT-6815), Gas Detectors, see PCAM-680-PL-Y-416-1	545-209	Note 9								X					
58	ZIC - 1101	PBB-1100 Propane Ship Loading Pump Discharge	545-209	Note 4								X					
59	ZIC - 1103	PBB-1100 Suction Valve	545-209	Note 19								X					
60		**TKBJ-3010 BUTANE STORAGE TANK**															
61	LSHH - 3010	TKBJ-3010 Butane Storage Tank	533-210	Note 7	in			894						X			
62	LALL - 3010	Upon LALL-3010 activation if TKBJ-3010 is being unloaded, then stop PBB-1120/1125 pumps.	533-210		in						41						X
63	~~ZIC - 3010~~	~~TKBJ-3010 Butane Storage Tank outlet valve CLOSE, and TKBJ-3010 is being unloaded, then stop PBB-1120/1125 pumps.~~	~~533-210~~	~~Note 20~~								~~X~~					
64	ZSO - 3010	TKBJ-3010 Butane Storage Tank outlet valve OPEN	533-210	Note 20								X					
65	ZSO - 13015	TKBJ-3010 Butane Storage Tank recirculation valve OPEN	533-210	Note 20								X					
66	ZSO - 1123	PBB-1120 Suction Valve OPEN	545-211	Note 20								X					
67	ZSO - 1125	PBB-1125 Suction Valve OPEN	545-211	Note 20								X					
68		**TKBJ-13010 BUTANE STORAGE TANK**															
69	LSHH - 13010	TKBJ-13010 Butane Storage Tank	533-610	Note 7	in			894						X			
70	LAHH - 13011	TKBJ-13010 Butane Storage Tank	533-610	Note 7	in			894						X			
71	LAH - 13011	TKBJ-13010 Butane Storage Tank	533-610		in				838								
72	LAL - 13011	TKBJ-13010 Butane Storage Tank	533-610		in					108							
73	LALL - 13011	Upon LALL-13011 activation if TKBJ-13010 is being unloaded, then stop PBB-1120/1125 pumps.	533-610		in						56						X
74	LSLL - 13010	Upon LALL-13010 activation if TKBJ-13010 is being unloaded, then stop PBB-1120/1125 pumps.	533-610		in						56						X
75																	
76	ZSO - 13010	TKBJ-13010 Butane Storage Tank outlet valve OPEN	533-610	Note 20								X					
77	ZSO - 13013	TKBJ-13010 Butane Storage Tank recirculation valve OPEN	533-610	Note 20								X					
78	ZSO - 1123	PBB-1120 Suction Valve OPEN	454-211	Note 20								X					
79	ZSO - 1125	PBB-1125 Suction Valve OPEN	454-211	Note 20								X					
80		**TKBJ-23010 BUTANE STORAGE TANK**															
81	LSHH - 23010	TKBJ-23010 Butane Storage Tank	533-611	Note 7	in			894						X			
82	LAHH - 23011	TKBJ-23010 Butane Storage Tank	533-611	Note 7	in			894						X			
83	LAH - 23011	TKBJ-23010 Butane Storage Tank	533-611		in				838								
84	LAL - 23011	TKBJ-23010 Butane Storage Tank	533-611		in					108							
85	LALL - 23011	Upon LALL-23011 activation if TKBJ-23010 is being unloaded, then stop PBB-1120/1125 pumps.	533-611		in						56						X
86	LSLL - 23010	Upon LALL-23010 activation if TKBJ-23010 is being unloaded, then stop PBB-1120/1125 pumps.	533-611		in						56						X
87																	
88	ZSO - 23010	TKBJ-23010 Butane Storage Tank outlet valve OPEN	533-611	Note 20								X					
89	ZSO - 23013	TKBJ-23010 Butane Storage Tank recirculation valve OPEN	533-611	Note 20								X					
90	ZSO - 1123	PBB-1120 Suction Valve OPEN	545-211	Note 20								X					
91	ZSO - 1125	PBB-1125 Suction Valve OPEN	545-211	Note 20								X					
92		**PBB-1120/1125 BUTANE SHIP LOADING PUMPS**															
93	PSHH - 1120	PBB-1120 Butane Ship Loading Pump Seal Pot	545-211	Note ~~13~~, 18	psig			12									
94	SSC - 1120	PSHH-1120 + AT-6803 (Gas Detection, see PCAM-680-PL-Y-416-1)	545-211	13								X					
95	ZIC - 1123	PBB-1120 Butane Ship Loading Pump Suction Valve	545-211	Note 20								X					
96	ZIC - 1121	PBB-1120 Discharge Valve	545-211	Note 4								X					
97	PSHH - 1125	PBB-1125 Butane Ship Loading Pump Seal Pot	545-211	Note ~~13~~, 18	psig			12									
98	SSC - 1125	PSHH-1125 + AT-6803 (Gas Detection, see PCAM-680-PL-Y-416-1)	545-211	13								X					
99	ZIC - 1125	PBB-1125 Butane Ship Loading Pump Suction Valve	545-211	Note 20								X					
100	ZIC - 1126	PBB-1125 Discharge Valve	545-211	Note 4								X					
101																	
102	TAH - 3013	Propane Return Line	550-236-1		°F				5						X		
103	TAL - 3016	Butane Return Line	550-236-1	~~12~~	°F					5							
104	DAL - 3002	Butane to Loading Arms	550-236-1	~~12~~	lb/ft3					36,5							
105	~~XY - 3002~~	~~Fluid switch~~	~~550-236-1~~	~~12~~								~~X~~					
106	ESD - 6920	Loading System Shutdown from Berth.	EPC-E	6								X					
107	ESD - 6921	Loading / Cooldown Systems Shutdown from Berth.	EPC-E	10								X					
108	TAHH - 1015	Loading Header Temperature at the Berth	EPC-E		°F			0						X			
109	SSC - 3013-16	Butane loading Operation	550-236-1	5								X					
110	SSC - BERTH	PBB-1325/65 Permissive	533-208	15								X					
111	SSC - PROP	Loading Pumps Simultaneity.	545-209	16								X					
112	SSC - BUT	Loading Pumps Simultaneity.	545-211	16								X					
113																	
114		**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**															
115	HS - 13008	TKBJ-3005 Propane Storage Tank Inlet	533-208														
116	HS - 23028	TKBJ-3005 Propane Storage Tank Inlet	533-208														
117	HS - 3005	TKBJ-3005 Propane Storage Tank Outlet	533-208														
118	HS - 13009	TKBJ-3005 Propane Storage Tank Recirculation	533-208														
119	HS - 13004	TKBJ-13005 Propane Storage Tank Inlet	533-608														
120	HS - 23024	TKBJ-13005 Propane Storage Tank Inlet	533-608														
121	HS - 13005	TKBJ-13005 Propane Storage Tank Outlet	533-608														
122	HS - 13006	TKBJ-13005 Propane Storage Tank Recirculation	533-608														
123	HS - 23006	TKBJ-23005 Propane Storage Tank Inlet	533-609														
124	HS - 23026	TKBJ-23005 Propane Storage Tank Inlet	533-609														
125	HS - 23005	TKBJ-23005 Propane Storage Tank Outlet	533-609														
126	HS - 23008	TKBJ-23005 Propane Storage Tank Recirculation	533-609														
127	HS - 1093	PBB-1090 Suction	545-209														
128	HS - 1098	PBB-1095 Suction	545-209														
129	HS - 1103	PBB-1100 Suction	545-209														
130	HS - 13014	TKBJ-3010 Butane Storage Tank Inlet	533-210														
131	HS - 3010	TKBJ-3010 Butane Storage Tank Outlet	533-210														
132	HS - 13015	TKBJ-3010 Butane Storage Tank Recirculation	533-210														
133	HS - 13011	TKBJ-13010 Butane Storage Tank Inlet	533-610														
134	HS - 13010	TKBJ-13010 Butane Storage Tank Outlet	533-610														
135	HS - 13013	TKBJ-13010 Butane Storage TankRecirculation	533-610														
136	HS - 23011	TKBJ-23010 Butane Storage Tank Inlet	533-611														
137	HS - 23010	TKBJ-23010 Butane Storage Tank Outlet	533-611														
138	HS - 23013	TKBJ-23010 Butane Storage Tank Recirculation	533-611														
139	HS - 1123	PBB-1120 Butane Ship Loading Pump Suction	545-210														
140	HS - 1125	PBB-1125 Butane Ship Loading Pump Suction	545-210														
141	HS - 3013	Propane Return Line form Ship Loading Butane Line	550-236-1														
142	HS - 3006	Propane Ship Loading Line	550-236-1														
143	HS - 3016	Butane Return Line from Ship Loading Butane Line	550-236-1														
144	HS - 3011	Butane Ship Loading Line	550-236-1														
145	HS - 3004	Propane Return Line from Ship Loading Propane Line	550-236-1														
146																	
147																	
148																	

Effects, columns 1–17

No.	1 REFRIGERATED BUTANE STORAGE & PUMPING SHUTDOWN LEVEL 2	2 REFRIGERATED PROPANE STORAGE & PUMPING SHUTDOWN LEVEL 2	3 Refrigerated Butane Storage & Pumping SD Level 2 Alarm to Berth (SDA-6831)	4 Refrigerated Propane Storage & Pumping SD Level 2 Alarm to Berth (SDA-6830)	5 ~~520-8014~~ ~~Refrigerated Propane Product from EPC-4010~~ (~~SDY-3130A on PV-3130A~~ (Tag of this valve changes to PV-1996C))	6 533-208 TKBJ-3005 Propane Storage Tank Inlet (XY-13008 on XV-13008)	7 533-208 TKBJ-3005 Propane Storage Tank Inlet (XY-23028 on XV-23028)	8 533-208 TKBJ-3005 Propane Storage Tank Outlet, Note 19 (XY-3005 on XV-3005)	9 533-208 TKBJ-3005 Propane Storage Tank Recirculation, Note 19 (XY-13009 on XV-13009)	10 533-608 TKBJ-13005 Propane Storage Tank Inlet (XY-13004 on XV-13004)	11 533-608 TKBJ-13005 Propane Storage Tank Inlet (XY-23024 on XV-23024)	12 533-608 TKBJ-13005 Propane Storage Tank Outlet, Note 19 (XY-13005 on XV-13005)	13 533-608 TKBJ-13005 Propane Storage Tank Recirculation, Note 19 (XY-13006 on XV-13006)	14 533-609 TKBJ-23005 Propane Storage Tank Inlet (XY-23006 on XV-23006)	15 533-609 TKBJ-23005 Propane Storage Tank Inlet (XY-23026 on XV-23026)	16 533-609 TKBJ-23005 Propane Storage Tank Outlet, Note 19 (XY-23005 on XV-23005)	17 533-609 TKBJ-23005 Propane Storage Tank Recirculation, Note 19 (XY-23008 on XV-23008)
1			X														
2				X				D (CLOSE)	E (CLOSE)			D (CLOSE)	E (CLOSE)			D (CLOSE)	E (CLOSE)
3	X																
4		X															
6					~~D~~ (Delete this interlock)	Close (Note 7)	Close (Note 7)			Open according selected sequence (Note 7)	Open according selected sequence (Note 7)			Open according selected sequence (Note 7)	Open according selected sequence (Note 7)		
15						Open according selected sequence (Note 7)	Open according selected sequence (Note 7)			Close (Note 7)	Close (Note 7)			Open according selected sequence (Note 7)	Open according selected sequence (Note 7)		
16						Open according selected sequence (Note 7)	Open according selected sequence (Note 7)			Close (Note 7)	Close (Note 7)			Open according selected sequence (Note 7)	Open according selected sequence (Note 7)		
28						Open according selected sequence (Note 7)	Open according selected sequence (Note 7)			Open according selected sequence (Note 7)	Open according selected sequence (Note 7)			Close (Note 7)	Close (Note 7)		
29						Open according selected sequence (Note 7)	Open according selected sequence (Note 7)			Open according selected sequence (Note 7)	Open according selected sequence (Note 7)			Close (Note 7)	Close (Note 7)		
42								D (CLOSE)				D (CLOSE)				D (CLOSE)	
44								D (CLOSE)				D (CLOSE)				D (CLOSE)	
115						C/O											
116							C/O										
117								C/O									
118									C/O								
119										C/O							
120											C/O						
121												C/O					
122													C/O				
123														C/O			
124															C/O		
125																C/O	
126																	C/O

Effects, columns 18–31

No.	18 533-208 Propane Cool Down Pump, Note 15, 19 (Motor PBB-1325)	19 533-208 Propane Cool Down Pump, Note 15, 19 (Motor PBB-1365)	20 545-209 PBB-1090 Suction, Notes 18, 19 (XY-1093 on XV-1093)	21 545-209 Propane Ship Loading Pump, Note 16, 19 (Motor PBB-1090)	22 545-209 PBB-1095 Suction, Notes 18, 19 (XY-1098 on XV-1098)	23 545-209 Propane Ship Loading Pump, Note 16, 19 (Motor PBB-1095)	24 545-209 PBB-1100 Suction, Notes 18, 19 (XY-1103 on XV-1103)	25 545-209 Propane Ship Loading Pump, Note 16, 19 (Motor PBB-1100)	26 ~~520-8014~~ ~~Refrigerated Butane Product from EPC-4020~~ (~~SDY-3135B on FV-3135B~~)	27 533-210 TKBJ-3010 Butane Storage Tank Inlet (XY-13014 on XV-13014)	28 533-210 TKBJ-3010 Butane Storage Tank Outlet, Note 20 (XY-3010 on XV-3010)	29 533-210 TKBJ-3010 Butane Storage Tank Recirculation, Note 20 (XY-13015 on XV-13015)	30 533-610 TKBJ-13010 Butane Storage Tank Inlet (XY-13011 on XV-13011)	31 533-610 TKBJ-13010 Butane Storage Tank Outlet, Note 20 (XY-13010 on XV-13010)
1											D (CLOSE)	E (CLOSE)		D (CLOSE)
2	S	S	D (CLOSE)	S	D (CLOSE)	S	D (CLOSE)	S						
7	S (If XV-3005 is not closed)	S (If XV-3005 is not closed)		S (If XV-3005 is not closed)		S (If XV-3005 is not closed)		S (If XV-3005 is not closed)						
8	~~S (If TKBJ-3005 is being unloaded)~~	~~S (If TKBJ-3005 is being unloaded)~~		~~S (If TKBJ-3005 is being unloaded)~~		~~S (If TKBJ-3005 is being unloaded)~~		~~S (If TKBJ-3005 is being unloaded)~~						
9–13	SEE NOTE 19 PERMISSIVE TO START	SEE NOTE 19 PERMISSIVE TO START		SEE NOTE 19 PERMISSIVE TO START		SEE NOTE 19 PERMISSIVE TO START		SEE NOTE 19 PERMISSIVE TO START						
19	S (If XV-13005 is not closed)	S (If XV-13005 is not closed)		S (If XV-13005 is not closed)		S (If XV-13005 is not closed)		S (If XV-13005 is not closed)						
20	S (If XV-13005 is not closed)	S (If XV-13005 is not closed)		S (If XV-13005 is not closed)		S (If XV-13005 is not closed)		S (If XV-13005 is not closed)						
22–26	SEE NOTE 19 PERMISSIVE TO START	SEE NOTE 19 PERMISSIVE TO START		SEE NOTE 19 PERMISSIVE TO START		SEE NOTE 19 PERMISSIVE TO START		SEE NOTE 19 PERMISSIVE TO START						
32	S (If XV-23005 is not closed)	S (If XV-23005 is not closed)		S (If XV-23005 is not closed)		S (If XV-23005 is not closed)		S (If XV-23005 is not closed)						
33	S (If XV-23005 is not closed)	S (If XV-23005 is not closed)		S (If XV-23005 is not closed)		S (If XV-23005 is not closed)		S (If XV-23005 is not closed)						
35–39	SEE NOTE 19 PERMISSIVE TO START	SEE NOTE 19 PERMISSIVE TO START		SEE NOTE 19 PERMISSIVE TO START		SEE NOTE 19 PERMISSIVE TO START		SEE NOTE 19 PERMISSIVE TO START						
42	S	S		S		S		S						
44	S	S		S		S		S						
45	S													
46		S												
49			D (CLOSE)	S										
50				S										
51				S										
53					D (CLOSE)	S								
54						S								
55						S								
57							D (CLOSE)	S						
58								S						
59								S						
61									~~D~~ (Delete this interlock)	Close (Note 7)			Open according selected sequence (Note 7)	
69										Open according selected sequence (Note 7)			Close (Note 7)	
70										Open according selected sequence (Note 7)			Close (Note 7)	
81										Open according selected sequence (Note 7)			Open according selected sequence (Note 7)	
82										Open according selected sequence (Note 7)			Open according selected sequence (Note 7)	
106				S		S		S						
107	S	S		S		S		S						
110	S	S												
111				S		S		S						
127			C/O											
128					C/O									
129							C/O							
130										C/O				
131											C/O			
132												C/O		
133													C/O	
134														C/O

Effects, columns 32–47

No.	32 533-610 TKBJ-13010 Butane Storage Tank Recirculation, Note 20 (XY-13013 on XV-13013)	33 533-611 TKBJ-23010 Butane Storage Tank Inlet (XY-23011 on XV-23011)	34 533-611 TKBJ-23010 Butane Storage Tank Outlet, Note 20 (XY-23010 on XV-23010)	35 533-611 TKBJ-23010 Butane Storage TankRecirculation, Note 20 (XY-23013 on XV-23013)	36 545-211 PBB-1120 Butane Ship Loading Pump Suction, Notes 18, 20 (XY-1123 on XV-1123)	37 545-211 Butane Ship Loading Pump, Note 16, 20 (Motor PBB-1120)	38 545-211 PBB-1125 Butane Ship Loading Pump Suction, Notes 18, 20 (XY-1125 on XV-1125)	39 545-211 Butane Ship Loading Pump, Note 16, 20 (Motor PBB-1125)	40 550-236-1 Propane Return Line form Ship Loading Butane Line, Note 5 (XY-3013 on XV-3013)	41 550-236-1 Propane Ship Loading Line (XY-3006 on XV-3006)	42 550-236-1 Butane Return Line from Ship Loading Butane Line, Note 5 (XY-3016 on XV-3016)	43 550-236-1 Butane Ship Loading Line (XY-3011 on XV-3011)	44 550-236-1 Propane Return Line from Ship Loading Propane Line (XY-3004 on XV-3004)	45 533-208 TKBJ-3005 Propane Storage Tank Inlet (XY-23028 on XV-23028)	46 533-608 TKBJ-13005 Propane Storage Tank Inlet (XY-23024 on XV-23024)	47 533-609 TKBJ-23005 Propane Storage Tank Inlet (XY-23026 on XV-23026)
1	E (CLOSE)		D (CLOSE)	E (CLOSE)	D (CLOSE)	S	D (CLOSE)	S								
6														Close (Note 7)	Open according selected sequence (Note 7)	Open according selected sequence (Note 7)
15														Open according selected sequence (Note 7)	Close (Note 7)	Open according selected sequence (Note 7)
16														Open according selected sequence (Note 7)	Close (Note 7)	Open according selected sequence (Note 7)
28														Open according selected sequence (Note 7)	Open according selected sequence (Note 7)	Close (Note 7)
29														Open according selected sequence (Note 7)	Open according selected sequence (Note 7)	Close (Note 7)
61		Open according selected sequence (Note 7)														
62						S (If XV-3010 is not closed)		S (If XV-3010 is not closed)								
63						~~S (If TKBJ-3010 is being unloaded)~~		~~S (If TKBJ-3010 is being unloaded)~~								
64–67						SEE NOTE 20 PERMISSIVE TO		SEE NOTE 20 PERMISSIVE TO								
69		Open according selected sequence (Note 7)														
70		Open according selected sequence (Note 7)														
73						S (If XV-13010 is not closed)		S (If XV-13010 is not closed)								
74						S (If XV-13010 is not closed)		S (If XV-13010 is not closed)								
76–79						SEE NOTE 20 PERMISSIVE TO		SEE NOTE 20 PERMISSIVE TO								
81		Close (Note 7)														
82		Close (Note 7)														
85						S (If XV-23010 is not closed)		S (If XV-23010 is not closed)								
86						S (If XV-23010 is not closed)		S (If XV-23010 is not closed)								
88–91						SEE NOTE 20 PERMISSIVE TO		SEE NOTE 20 PERMISSIVE TO								
94					D	S										
95						S										
96						S										
98							D (CLOSE)	S								
99								S								
100								S								
102													D (CLOSE)			
105									~~E (Delete this interlock)~~		~~D (Delete this interlock)~~					
106						S		S								
107						S		S	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)			
108													D (CLOSE)			
109									D (CLOSE)		D (CLOSE)					
112						S		S								
135	C/O															
136		C/O														
137			C/O													
138				C/O												
139					C/O											
140							C/O									
141									C/O							
142										C/O						
143											C/O			C/O		
144												C/O			C/O	
145													C/O			C/O

CAUSE AND EFFECT MATRIX (EXISTING)
PROYECTO EPC2-PISCO PLANT

NOTES

~~Note 1 If XV-3005 is closed the pumps PBB-1325/1365/1090/1095/1100 cannot be started.~~
~~Note 2 If XV-1093/1098/1103 is closed the corresponding pump PBB-1090/95/100 cannot be started.~~
~~Note 3 If XV-3010 is closed the pumps PBB-1125/1120 cannot be started.~~
Note 4 If ZIC is activated, the corresponding pump cannot be started.
Note 5 Provide interlock to prevent that this valves are open during butane ship loading operation.
Note 6 All Ship Loading Pumps shall be stopped in case of an ESD at Berth.
Note 7 ~~Alarm shall inform operator to open FV-3135 A, in order to send the production to the Pressurized Butane Storage.~~

PROVIDE A SELECTOR SWITCH FOR THE OPERATOR TO CHOOSE WHAT TANK IS THE NEXT TO BE LOADED. ALARM THE OPERATOR TO CHOOSE THE NEXT TANK TO BE LOADED. WHEN THE FILLING TANK IS EQUAL TO THE SELECTED NEXT TANK, AN ALARM MUST BE ACTIVATED TO ADVICE THE OPERATOR TO CHOOSE A DIFERENT NEXT TANK. IN CASE OF ACTIVATION OF THE LAHH OF THE FILLING TANK, OPEN THE **INLET VALVES** AND THE PUMP RETURN VALVE OF THE NEXT TANK (PREVIOUSLY SELECTED BY OPERATOR), AND 15 SECONDS AFTER LAHH ACTIVATION CLOSE THE **INLET VALVES** AND THE PUMP RETURN VALVE OF THE FILLING TANK. 0

Note 8 If PSHH-1325 and AT-6802 (Gas Detector, see PCAM-680-PL-Y-416-1) are in alarm condition, then PBB-1325/1365/1090/1095/1100 must be stopped and XV-3005/13005/23005 must be closed.
If PSHH-1365 and AT-6802 (Gas Detector, see PCAM-680-PL-Y-416-1) are in alarm condition then PBB-1325/1365/1090/1095/1100 must be stopped and XV-3005/13005/23005 must be closed.
Note 9 If the PSHH and (AT-6814 or AT-6815) (Gas Detectors, see PCAM-680-PL-Y-416-1) are in alarm condition then the pump corresponding to the PSHH must be stopped and its suction valve must be closed.
Note 10 All Ship Loading Pumps and Cool Down Pumps shall be stopped in case of an ESD at Berth.
Note 11 ~~Alarm shall inform operator to open FV-3130 B, in order to send the production to the Pressurized Propane Storage.~~

~~Note 12 Both TAL and DAL must be in alarm condition to activate fluid switch.~~
Note 13 If the PSHH and the AT-6803 (Gas Detector, see PCAM-680-PL-Y-416-1) are in alarm condition then the pump corresponding to the PSHH must be stopped and its suction valve must be closed
Note 14 When PBB-1120/1125 are started in order to start the Butane Ship Loading procedure, a timer must also start and inform after 102 minutes that "Butane has probably reach the Berth".
Note 15 Provide interlock so that pumps PBB-1325/1365 can be started only if XV-3006 (see PCAM-550-PL-Y-236-1) and XV-6260 are open and XV-6200/6210 are close (permissive) (see PCAM-550-PL-Y-237).
Note 16 Provide interlocks so that if any of the Propane, Butane or Naphtha Ship Loading Pumps are running, then none of the other two can be started.
~~Note 17 If XV-1123/1125 is closed the corresponding pump PBB-1120/25 cannot be started.~~
Note 18 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: FIRST STOP THE PUMP, THEN CLOSE THE VALVE.
Note 19 PERMISSIVE TO START PUMPS IF TKBJ-3005, TKBJ-13005 OR TKBJ-23005 PROPANE STORAGE TANKS ARE TO BE UNLOADED:

PROVIDE INTERLOCK SO THAT PUMPS PBB-1325/PBB-1365 CAN ONLY STARTS IF AT LEAST ONE OF THE FOLLOWING PAIRS OF VALVES IS OPEN: (XV-3005 **OR** XV-13005 **OR** XV-23005) **AND** (XV-13009 **OR** XV-13006 **OR** XV-23008):
IF THE PUMPS ARE RUNNING AND NONE OF THESE PAIRS OF VALVES IS OPEN, THEN THE PUMPS MUST BE STOPPED.

PROVIDE INTERLOCK SO THAT PUMP PBB-1090 CAN ONLY STARTS IF THE XV-1093 **AND (**XV-3005 **OR** XV-13005 **OR** XV-23005**) AND (**XV-13009 **OR** XV-13006 **OR** XV-23008**)** ARE OPEN
IF THE PUMP IS RUNNING AND NONE OF THESE SETS OF THREE VALVES IS OPEN, THEN THE PUMP MUST BE STOPPED.

PROVIDE INTERLOCK SO THAT PUMP PBB-1095 CAN ONLY STARTS IF THE XV-1098 **AND (**XV-3005 **OR** XV-13005 **OR** XV-23005**) AND (**XV-13009 **OR** XV-13006 **OR** XV-23008**) ARE** OPEN
IF THE PUMP IS RUNNING AND NONE OF THESE SETS OF THREE VALVES IS OPEN, THEN THE PUMP MUST BE STOPPED.

PROVIDE INTERLOCK SO THAT PUMP PBB-1100 CAN ONLY STARTS IF THE XV-1103 **AND (**XV-3005 **OR** XV-13005 **OR** XV-23005**) AND (**XV-13009 **OR** XV-13006 **OR** XV-23008**)** ARE OPEN
IF THE PUMP IS RUNNING AND NONE OF THESE SETS OF THREE VALVES IS OPEN, THEN THE PUMP MUST BE STOPPED.

Note 20 PERMISSIVE TO START PUMPS IF TKBJ-3010, TKBJ-13010 OR TKBJ-23010 BUTANE STORAGE TANKS ARE TO BE UNLOADED:

PROVIDE INTERLOCK SO THAT PUMP PBB-1120 CAN ONLY STARTS IF XV-1123 **AND (**XV-3010 **OR** XV-13010 **OR** XV-23010**) AND (**XV-13015 **OR** XV-13013 **OR** XV-23013**)** ARE OPEN.
IF THE PUMP IS RUNNING AND NONE OF THESE SETS OF THREE VALVES IS OPEN, THEN THE PUMP MUST BE STOPPED.

PROVIDE INTERLOCK SO THAT PUMP PBB-1125 CAN ONLY STARTS IF THE XV-1125 **AND (**XV-3010 **OR** XV-13010 **OR** XV-23010**) AND (**XV-13015 **OR** XV-13013 **OR** XV-23013**)** ARE OPEN.
IF THE PUMP IS RUNNING AND NONE OF THESE SETS OF THREE VALVES IS OPEN, THEN THE PUMP MUST BE STOPPED.

Note 21 DELETED
Note 22 DELETED
Note 23 : DELETED
Note 24 : DELETED

NOTE 25: IF XV-13005 OR XV-23005 ARE NOT CLOSED (IF ZIC-13005 OR ZIC-23005 IS "OFF"), XV-3005 MUST BE CLOSED UPON ACTIVATION OF LAHH-3005. (THIS INTERLOCK PREVENTS TKBJ-3005 FROM OVERFILLING DUE TO TANKS ELEVATION DIFFERENCE)

NOTE 26: IF XV-13010 OR XV-23010 ARE NOT CLOSED (IF ZIC-13010 OR ZIC-23010 IS "OFF"), XV-3010 MUST BE CLOSED UPON ACTIVATION OF LAHH-3010. (THIS INTERLOCK PREVENTS TKBJ-3010 FROM OVERFILLING DUE TO TANKS ELEVATION DIFFERENCE)

NOTE 27:MODIFY EXISTING INTERLOCK SO THAT UPON ACTIVATION OF LAHH-23005 OR LAHH-23006 **FIRST OPEN** (XV-13009 AND XV-13008 AND XV-23028) OR (XV-13006 AND XV-13004 AND XV-23024) AND 15 SECONDS AFTER LAHH ACTIVATION (XV-23008 AND XV-23006 AND XV-230 0 CLOSE.

NOTE 28:MODIFY EXISTING INTERLOK SO THAT UPON ACTIVATION OF LAHH -13005 OR LAHH13006 FIRST OPEN (XV-13009 AND XV-13008 AND **XV-23023**) OR (XV-23028 and XV-23006 AND XV-23026) AND 15 SECOND AFTER LAHH ACTIVATION (XV-13006 AND XV-13004 AND XV-23024) CLOSE. 0
NOTE 29:MODIFY EXISTING INTERLOK SO THAT UPON ACTIVATION OF LAHH -3005 FIRST OPEN (XV-13004 AND XV-13008 AND XV-23024) OR (XV -23006 and XV-23008 AND XV-23026) AND 15 SECOND AFTER LAHH ACTIVATION (XV-13008 AND XV-13009 AND XV. 0

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT) AND
and PPAG-500-MC-K-106 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT) PRESSURIZED STORAGE

Future EPC- Truck Loading Expansion is in BLUE (Blue marks are out of EPC-22 Scope)

Causes

Row	TAG			Loop Service	P&ID	Notes	Unit	Alarms ON	Alarms OFF	Alarms High High	Alarms High	Alarms Low	Alarms Low Low	Interlocks ON	Interlocks OFF	Interlocks High High	Interlocks High	Interlocks Low	Interlocks Low Low
	PRESSURIZED STORAGE_Existing																		
1	**PRESSURIZED BUTANE STORAGE SHUTDOWN LEVEL 2**																		
2	**PRESSURIZED PROPANE STORAGE SHUTDOWN LEVEL 2**																		
3	ESD	-	6011	Pressurized Butane Storage Shutdown Manual SOFT Push Button in CCR										X					
4	ESD	-	6012	Pressurized Propane Storage Shutdown Manual SOFT Push Button in CCR										X					
5																			
6	~~ZSO~~	~~-~~	~~3278~~	~~Off Spec Butane Line~~	~~520-205~~	~~3~~		~~X~~						~~X~~					
7	~~ZSO~~	~~-~~	~~3279~~	~~Off Spec Propane Line~~	~~520-205~~	~~3~~		~~X~~						~~X~~					
8																			
9	LSHH	-	3190	VBA-3190 Pressurized Propane Vessel	538-220	~~4~~	in			106						X			
10	LSLL	-	3190	VBA-3190 Pressurized Propane Vessel	538-220	1, 15	in						8						X
11	LSHH	-	3195	VBA-3195 Pressurized Propane Vessel	538-220-2	~~4~~	in			106						X			
12	LSLL	-	3195	VBA-3195 Pressurized Propane Vessel	538-220-2	1, 15	in						8						X
13	PSLL	-	1130	Propane Recirculation Pumps Header	538-220		psig						6						X
14	LAHH	-	23200	VBA-23200 Pressurized Propane Vessel	538-768	6	in			106						X (1oo2)			
15	LAHH	-	23201	VBA-23200 Pressurized Propane Vessel	538-768	6	in			106									
16	LAH	-	23201	VBA-23200 Pressurized Propane Vessel	538-768		in				83								
17	LALL	-	23200	VBA-23200 Pressurized Propane Vessel	538-768	7, 1, 15	in						8						X (1oo2)
18	LALL	-	23201	VBA-23200 Pressurized Propane Vessel	538-768	7, 1, 15	in						8						
19	LAL	-	23201	VBA-23200 Pressurized Propane Vessel	538-768		in					18							
20	LAHH	-	23205	VBA-23205 Pressurized Propane Vessel	538-768-2	8	in			106						X (1oo2)			
21	LAHH	-	23206	VBA-23205 Pressurized Propane Vessel	538-768-2	8	in			106									
22	LAH	-	23206	VBA-23205 Pressurized Propane Vessel	538-768-2		in				83								
23	LALL	-	23205	VBA-23205 Pressurized Propane Vessel	538-768-2	9, 1, 15	in						8						X (1oo2)
24	LALL	-	23206	VBA-23205 Pressurized Propane Vessel	538-768-2	9, 1, 15	in						8						
25	LAL	-	23206	VBA-23205 Pressurized Propane Vessel	538-768-2		in					18							
26	ZSO	-	3191	VBA-3190 Outlet valve to Recirculation pumps OPEN	538-220	10								X					
27	ZSO	-	23194	VBA-3190 Return valve from Recirculation pumps OPEN	538-220	10								X					
28	ZSO	-	3196	VBA-3195 Outlet valve to Recirculation pumps OPEN	538-220-2	10								X					
29	ZSO	-	23199	VBA-3195 Return valve from Recirculation pumps OPEN	538-220-2	10								X					
30	ZSO	-	23202	VBA-23200 Outlet valve to Recirculation pumps OPEN	538-768	10								X					
31	ZSO	-	23204	VBA-23200 Return valve from Recirculation pumps OPEN	538-768	10								X					
32	ZSO	-	23207	VBA-23205 Outlet valve to Recirculation pumps OPEN	538-768-2	10								X					
33	ZSO	-	23206	VBA-23205 Return valve from Recirculation pumps OPEN	538-768-2	10								X					
34	ZSO	-	23192	VBA-3190 Outlet valve to Truck Loading pumps OPEN	538-220	11								X					
35	ZSO	-	23193	VBA-3190 Return valve from Truck Loading pumps OPEN	538-220	11								X					
36	ZSO	-	23197	VBA-3195 Outlet valve to Truck Loading pumps OPEN	538-220-2	11								X					
37	ZSO	-	23198	VBA-3195 Return valve from Truck Loading pumps OPEN	538-220-2	11								X					
38	ZSO	-	23203	VBA-23200 Outlet valve to Truck Loading pumps OPEN	538-768	11								X					
39	ZSO	-	23201	VBA-23200 Return valve from Truck Loading pumps OPEN	538-768	11								X					
40	ZSO	-	23209	VBA-23205 Outlet valve to Truck Loading pumps OPEN	538-768-2	11								X					
41	ZSO	-	23208	VBA-23205 Return valve from Truck Loading pumps OPEN	538-768-2	11								X					
42	~~SSC~~	-	~~3191-96~~	~~ZIC-3191 + ZIC-3196~~	~~538-220~~	~~1~~								~~X~~					
43	~~SSC~~	-	~~3190-95~~	~~ZIC-3190 + ZIC-3195~~	~~538-220~~	~~4~~								~~X~~					
44																			
45	LSHH	-	3215	VBA-3215 Pressurized Butane Vessel	538-222	~~5~~	in			112						X			
46	LSLL	-	3215	VBA-3215 Pressurized Butane Vessel	538-222	2, 14	in						8						X
47	LSHH	-	3220	VBA-3220 Pressurized Butane Vessel	538-222-2	~~5~~	in			112						X			
48	LSLL	-	3220	VBA-3220 Pressurized Butane Vessel	538-222-2	2, 14	in						8						X
49	PSLL	-	1145	Butane Recirculation Pump Header	538-222		psig						6						X
50	ZSO	-	3216	VBA-3215 Outlet valve to Recirculation pumps OPEN	538-222	12								X					
51	ZSO	-	23219	VBA-3215 Return valve from Recirculation pumps OPEN	538-222	12								X					
52	ZSO	-	3221	VBA-3220 Outlet valve to Recirculation pumps OPEN	538-222-2	12								X					
53	ZSO	-	23224	VBA-3220 Return valve from Recirculation pumps OPEN	538-222-2	12								X					
54	ZSO	-	23217	VBA-3215 Outlet valve to Truck Loading pumps OPEN	538-222	13								X					
55	ZSO	-	23218	VBA-3215 Return valve from Truck Loading pumps OPEN	538-222	13								X					
56	ZSO	-	23222	VBA-3220 Outlet valve to Truck Loading pumps OPEN	538-222-2	13								X					
57	ZSO	-	23223	VBA-3220 Return valve from Truck Loading pumps OPEN	538-222-2	13								X					
58	~~SSC~~	-	~~3216-21~~	~~ZIC-3216 + ZIC-3221~~	~~538-222~~	~~2~~								~~X~~					
59	~~SSC~~	-	~~3215-20~~	~~ZIC-3215 + ZIC-3220~~	~~538-222~~	~~5~~								~~X~~					
60																			
61	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																		
62	HS	-	13192	Flow control of presurized propane to bullets (not VRU's propane)	520-205														
63	HS	-	13292	Propane from VRUs to bullets	534-214														
64	HS	-	13287	Propane Product (Unit 1) to Pressurized Storage	520-205														
65	HS	-	13284	Propane Product (Unit 2) to Pressurized Storage	520-605														
66	HS	-	23284	Propane Product (Unit 3) to Pressurized Storage	520-731														
67	HS	-	3192	Presurized Propane Storage Inlet Header	538-220														
68	HS	-	3190	VBA-3190 Feed Line	538-220														
69	HS	-	3191	VBA-3190 Outlet Line to Recirculation header	538-220														
70	HS	-	23192	VBA-3190 Outlet Line to Truck Loading Pump Suction Header	538-220														
71	HS	-	23193	VBA-3190 Return line from Truck loading pumps	538-220														
72	HS	-	23194	VBA-3190 Return line from Recirculation pumps	538-220														
73	HS	-	3195	VBA-3195 Feed Line	538-220-2														
74	HS	-	3196	VBA-3195 Outlet Line to Recirculation header	538-220-2														
75	HS	-	23197	VBA-3195 Outlet Line to Truck Loading Pump Suction Header	538-220-2														
76	HS	-	23198	VBA-3195 Return line from Truck loading pumps	538-220-2														
77	HS	-	23199	VBA-3195 Return line from Recirculation pumps	538-220-2														
78	HS	-	23200	VBA-23200 Feed Line	538-768														
79	HS	-	23202	VBA-23200 Outlet Line to Recirculation header	538-768														
80	HS	-	23203	VBA-23200 Outlet Line to Truck Loading Pump Suction Header	538-768														
81	HS	-	23201	VBA-23200 Return line from Truck loading pumps	538-768														
82	HS	-	23204	VBA-23200 Return line from Recirculation pumps	538-768														
83	HS	-	23205	VBA-23205 Feed Line	538-768-2														
84	HS	-	23207	VBA-23205 Outlet Line to Recirculation header	538-768-2														
85	HS	-	23209	VBA-23205 Outlet Line to Truck Loading Pump Suction Header	538-768-2														
86	HS	-	23208	VBA-23205 Return line from Truck loading pumps	538-768-2														
87	HS	-	23206	VBA-23205 Return line from Recirculation pumps	538-768-2														
88	HS	-	13222	Flow control of presurized butane to bullets (not VRU's butane)	520-205														
89	HS	-	13293	Butane from VRUs to bullets	534-214														
90	HS	-	13286	Butane Product (Unit 1) to Pressurized Storage	520-205														
91	HS	-	13285	Butane Product (Unit 2) to Pressurized Storage	520-605														
92	HS	-	23285	Butane Product (Unit 3) to Pressurized Storage	520-731														
93	HS	-	3222	Presurized Butane Storage Inlet Header	538-222														
94	HS	-	3215	VBA-3215 Feed Line	538-222														
95	HS	-	3216	VBA-3215 Outlet Line to Recirculation header	538-222														
96	HS	-	23217	VBA-3215 Outlet Line to Truck Loading pump suction Header	538-222														
97	HS	-	23218	VBA-3215 Return line from Truck loading pumps	538-222														
98	HS	-	23219	VBA-3215 Return line from Recirculation pumps	538-222														
99	HS	-	3220	VBA-3220 Feed Line	538-222-2														
100	HS	-	3221	VBA-3220 Outlet Line to Recirculation header	538-222-2														
101	HS	-	23222	VBA-3220 Outlet Line to Truck Loading pump suction Header	538-222-2														
102	HS	-	23223	VBA-3220 Return line from Truck loading pumps	538-222-2														
103	HS	-	23224	VBA-3220 Return line from Recirculation pumps	538-222-2														

Effects (columns 1–19)

Row	1 PRESSURIZED BUTANE STORAGE SHUTDOWN LEVEL 2	2 PRESSURIZED PROPANE STORAGE SHUTDOWN LEVEL 2	3 Alarm To Loading Control System (LCS) / SDA-6842	4 520-205 Flow control of presurized propane to bullets (not VRU's propane) / SDY-13192 on FV-13192	5 534-214 Propane from VRUs to bullets / XY-13292 on XV-13292	6 520-205 Propane Product (Unit 1) to Pressurized Storage / XY-13287 on XV-13287	7 520-605 Propane Product (Unit 2) to Pressurized Storage / XY-13284 on XV-13284	8 520-731 Propane Product (Unit 3) to Pressurized Storage / XY-23284 on XV-23284	9 538-220 Presurized Propane Storage Inlet Header / ~~Note 3~~ / XY-3192 on XV-3192	10 538-220 VBA-3190 Feed Line / ~~Note 4~~ / XY-3190 on XV-3190	11 538-220 VBA-3190 Outlet Line to Recirculation header / ~~Note 1~~ / XY-3191 on XV-3191	12 538-220 VBA-3190 Outlet Line to Truck Loading Pump Suction Header / XY-23192 on XV-23192	13 538-220 VBA-3190 Return line from Truck loading pumps / XY-23193 on XV-23193	14 538-220 VBA-3190 Return line from Recirculation pumps / XY-23194 on XV-23194	15 538-220-2 VBA-3195 Feed Line / ~~Note 4~~ / XY-3195 on XV-3195	16 538-220-2 VBA-3195 Outlet Line to Recirculation header / ~~Note 1~~ / XY-3196 on XV-3196	17 538-220-2 VBA-3195 Outlet Line to Truck Loading Pump Suction Header / XY-23197 on XV-23197	18 538-220-2 VBA-3195 Return line from Truck loading pumps / XY-23198 on XV-23198	19 538-220-2 VBA-3195 Return line from Recirculation pumps / XY-23199 on XV-23199
1			X																
2			X						D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)
3	X																		
4		X																	
7									~~D~~										
9										D (CLOSE)			D (CLOSE)	D (CLOSE)					
10											D (CLOSE)	D (CLOSE)							
11															D (CLOSE)			D (CLOSE)	D (CLOSE)
12																D (CLOSE)	D (CLOSE)		
13											D (CLOSE)					D (CLOSE)			
62				C/O															
63					C/O														
64						C/O													
65							C/O												
66								C/O											
67									C/O										
68										C/O									
69											C/O								
70												C/O							
71													C/O						
72														C/O					
73															C/O				
74																C/O			
75																	C/O		
76																		C/O	
77																			C/O

Future EPC- Truck Loading Expansion is in BLUE (Blue marks are out of EPC-22 Scope)

Effects (columns 20–39)

Row	20 538-768 VBA-23200 Feed Line / XY-23200 on XV-23200	21 538-768 VBA-23200 Outlet Line to Recirculation header / XY-23202 on XV-23202	22 538-768 VBA-23200 Outlet Line to Truck Loading Pump Suction Header / XY-23203 on XV-23203	23 538-768 VBA-23200 Return line from Truck loading pumps / XY-23201 on XV-23201	24 538-768 VBA-23200 Return line from Recirculation pumps / XY-23204 on XV-23204	25 538-768-2 VBA-23205 Feed Line / XY-23205 on XV-23205	26 538-768-2 VBA-23205 Outlet Line to Recirculation header / XY-23207 on XV-23207	27 538-768-2 VBA-23205 Outlet Line to Truck Loading Pump Suction Header / XY-23209 on XV-23209	28 538-768-2 VBA-23205 Return line from Truck loading pumps / XY-23208 on XV-23208	29 538-768-2 VBA-23205 Return line from Recirculation pumps / XY-23206 on XV-23206	30 538-804 Propane Recirculation Pump / Motor PBB-1130	31 538-804 Propane Recirculation Pump / Motor PBB-1135	32 538-804 Propane Truck Loading Pump / Motor PBB-21130	33 538-804 Propane Truck Loading Pump / Motor PBB-21135	34 538-804 Propane Truck Loading Pump / Motor PBB-21140	36 520-205 Flow control of presurized butane to bullets (not VRU's butane) / SDY-13222 on FV-13222	37 534-214 Butane from VRUs to bullets / XY-13293 on XV-13293	38 520-205 Butane Product (Unit 1) to Pressurized Storage / XY-13286 on XV-13286	39 520-605 Butane Product (Unit 2) to Pressurized Storage / XY-13285 on XV-13285
2	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	S	S	S	S	S				
10											S (See Note 1) (See note 15)	S (See Note 1) (See note 15)	S (See Note 15)	S (See Note 15)	S (See Note 15)				
12											S (See Note 1) (See note 15)	S (See Note 1) (See note 15)	S (See Note 15)	S (See Note 15)	S (See Note 15)				
13											S	S							
14	D (CLOSE)			D (CLOSE)	D (CLOSE)														
17		D (CLOSE)	D (CLOSE)								S (See Note 1) (See note	S (See Note 1) (See note	S (See Note 15)	S (See Note 15)	S (See Note 15)				
20						D (CLOSE)			D (CLOSE)	D (CLOSE)									
23							D (CLOSE)	D (CLOSE)			S (See Note 1) (See note	S (See Note 1) (See note	S (See Note 15)	S (See Note 15)	S (See Note 15)				
26											SEE NOTE 10 PERMISSIVE TO START PROPANE RECIRCULATION PUMPS								
34													SEE NOTE 11 PERMISSIVE TO START PROPANE TRUCK LOADING PUMPS						
42											~~S~~	~~S~~							
43											~~S~~	~~S~~							
78	C/O																		
79		C/O																	
80			C/O																
81				C/O															
82					C/O														
83						C/O													
84							C/O												
85								C/O											
86									C/O										
87										C/O									
88																C/O			
89																	C/O		
90																		C/O	
91																			C/O

Future EPC- Truck Loading Expansion is in BLUE (Blue marks are out of EPC-22 Scope)

Effects (columns 40–56)

Row	40 520-731 Butane Product (Unit 3) to Pressurized Storage / XY-23285 on XV-23285	41 538-222 Presurized Butane Storage Inlet Header / ~~Note 3~~ / XY-3222 on XV-3222	42 538-222 VBA-3215 Feed Line / ~~Note 5~~ / XY-3215 on XV-3215	43 538-222 VBA-3215 Outlet Line to Recirculation header / ~~Note 2~~ / XY-3216 on XV-3216	44 538-222 VBA-3215 Outlet Line to Truck Loading pump suction Header / XY-23217 on XV-23217	45 538-222 VBA-3215 Return line from Truck loading pumps / XY-23218 on XV-23218	46 538-222 VBA-3215 Return line from Recirculation pumps / XY-23219 on XV-23219	47 538-222-2 VBA-3220 Feed Line / ~~Note 5~~ / XY-3220 on XV-3220	48 538-222-2 VBA-3220 Outlet Line to Recirculation header / ~~Note 2~~ / XY-3221 on XV-3221	49 538-222-2 VBA-3220 Outlet Line to Truck Loading pump suction Header / XY-23222 on XV-23222	50 538-222-2 VBA-3220 Return line from Truck loading pumps / XY-23223 on XV-23223	51 538-222-2 VBA-3220 Return line from Recirculation pumps / XY-23224 on XV-23224	52 538-806 Butane Recirculation Pump / Motor PBB-1140	53 538-806 Butane Recirculation Pump / Motro PBB-1145	54 538-806 Butane Truck Loading Pump / Motro PBB-21165	55 538-806 Butane Truck Loading Pump / Motro PBB-21170	56 538-806 Butane Truck Loading Pump / Motro PBB-21175
1	~~D (CLOSE)~~	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	S	S	S	S	S
6		~~D~~															
45			D (CLOSE)			D (CLOSE)	D (CLOSE)										
46				D (CLOSE)	D (CLOSE)								S (See Note 2) (See note 14)	S (See Note 2) (See note 14)	S (See Note 14)	S (See Note 14)	S (See Note 14)
47								D (CLOSE)			D (CLOSE)	D (CLOSE)					
48									D (CLOSE)	D (CLOSE)			S (See Note 2) (See note 14)	S (See Note 2) (See note 14)	S (See Note 14)	S (See Note 14)	S (See Note 14)
49				D (CLOSE)					D (CLOSE)				S	S			
50													SEE NOTE 12 PERMISSIVE TO START BUTANE RECIRCULATION PUMPS				
54															SEE NOTE 13 PERMISSIVE TO START BUTANE TRUCK LOADING PUMPS		
58													~~S~~	~~S~~			
59													~~S~~	~~S~~			
92	C/O																
93		C/O															
94			C/O														
95				C/O													
96					C/O												
97						C/O											
98							C/O										
99								C/O									
100									C/O								
101										C/O							
102											C/O						
103												C/O					

NOTES

Note 1 If XV-3191, XV-3196, XV-23202 and XV-23207 are simultaneously closed, then the pumps PBB-1130/1135 ~~cannot be started~~ Shall be stopped
Note 2 If XV-3216 and XV-3221 are simultaneously closed, then the pumps PBB-1140/1145 ~~cannot be started~~ Shall be stopped
~~Note 3 Provide Interlock to prevent the valves XV-3192 and XV-3222 from opening when corresponding off spec valves are open.~~
~~Note 4 If XV-3190 and XV-3195 are simultaneously closed, then the pumps PBB-1130/1135 cannot be started.~~
~~Note 5 If XV-3215 and XV-3220 are simultaneously closed, then the pumps PBB-1140/1145 cannot be started.~~
Note 6 1oo2 (One Out Of Two) - Interlock will be activated by LAHH-23200 **OR** LAHH-23201
Note 7 1oo2 (One Out Of Two) - Interlock will be activated by LALL-23200 **OR** LALL-23201
Note 8 1oo2 (One Out Of Two) - Interlock will be activated by LAHH-23205 **OR** LAHH-23206
Note 9 1oo2 (One Out Of Two) - Interlock will be activated by LALL-23205 **OR** LALL-23206
Note 10 Permissive to start Propane Recirculation pumps
PROVIDE INTERLOCK SO THAT PUMPS **PBB-1130/PBB-1135** CAN ONLY START IF AT LEAST ONE OF THE FOLLOWING PAIRS OF VALVES IS OPENED: (XV-3191 **AND** XV-23194) **OR** (XV-3196 **AND** XV-23199) **OR** (XV-23202 **AND** XV-23204) **OR** (XV-23207 **AND** XV-23206). THE OTHERS XV VALVES SHAL
IF THE PUMPS ARE RUNNING AND NONE OF THESE PAIRS OF VALVES IS OPENED, THEN THE PUMPS MUST BE STOPPED. MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED
Note 11 Permissive to start Propane Truck Loading pumps
PROVIDE INTERLOCK SO THAT PUMPS **PBB-21130/21135/21140** CAN ONLY START IF AT LEAST ONE OF THE FOLLOWING PAIRS OF VALVES IS OPENED: (XV-23192 **AND** XV-23193) **OR** (XV-23197 **AND** XV-23198) **OR** (XV-23203 **AND** XV-23201) **OR** (XV-23209 **AND** XV-23208). THE OTHERS XV
IF THE PUMPS ARE RUNNING AND NONE OF THESE PAIRS OF VALVES IS OPENED, THEN THE PUMPS MUST BE STOPPED. MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED
Note 12 Permissive to start Butane Recirculation pumps
PROVIDE INTERLOCK SO THAT PUMPS **PBB-1140/PBB-1145** CAN ONLY START IF AT LEAST ONE OF THE FOLLOWING PAIRS OF VALVES IS OPENED: (XV-3216 **AND** XV-23219) **OR** (XV-3221 **AND** XV-23224). THE OTHERS XV VALVES SHALL BE KEPT IN CLOSED POSITION FOR THE BULLET WHICH IS I

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)
AND PPAG-500-MC-K-106 Revision 6

0

Causes (ALARMS / INTERLOCKS)

No.	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
	CONDENSATE STORAGE																
1	**TKBJ-3000 CONDENSATE STORAGE & PUMPING SHUTDOWN LEVEL 2**																
2	ESD - 3000	TKBJ-3000 Condensate Storage & Pumping Shutdown				X						X					
3	**TKBJ-13000 CONDENSATE STORAGE & PUMPING SHUTDOWN LEVEL 2**																
4	ESD - 13000	TKBJ-13000 Condensate Storage & Pumping Shutdown				X						X					
5	**TKBJ-23000 CONDENSATE STORAGE & PUMPING SHUTDOWN LEVEL 2**																
6	ESD - 23000	TKBJ-23000 Condensate Storage & Pumping Shutdown				X						X					
7	**TKBJ-3000 CONDENSATE SURGE TANK AND PBB-1030/1035**																
8	LSHH - 3000	TKBJ-3000 Condensate Surge Tank	520-206		in			540						X			
9	LSLL - 3000	TKBJ-3000 Condensate Surge Tank	520-206		in						44						X
10	PSHH - 1030	PBB-1030 Naphtha Tower Feed Pump Seal Pot	520-206	NOTE 3	psig			12									
11	LSLL - 1030	PBB-1030 Naphtha Tower Feed Pump Seal Pot	520-206	NOTE 3							X						
12	XY - 1030	PBB-1030 Naphtha Tower Feed Pump Seal Pot	520-206	NOTES 2 3		X						X					
13	PSLL - 1035	PBB-1035 Naphtha Tower Feed Pump Seal Pot	520-206	NOTE 3	psig			12									
14	LSLL - 1035	PBB-1035 Naphtha Tower Feed Pump Seal Pot	520-206	NOTE 3							X						
15	XY - 1035	PBB-1035 Naphtha Tower Feed Pump Seal Pot	520-206	NOTES 2, 3		X						X					
16	ZIO - 23021	TKBJ-3000 Recirculation is OPEN	520-206	NOTE 1								X					
17	ZIO - 3000	PBB-1030/1035 Suction Valve is OPEN	520-206	NOTE 1			~~X~~					X	~~X~~				
18	**TKBJ-13000 CONDENSATE SURGE TANK AND PBB-11030/11035**																
19	LSHH - 13000	TKBJ-13000 Condensate Surge Tank	520-606	NOTE 12	in			540						X			
20	LALL - 13001	TKBJ-13000 Condensate Surge Tank	520-606	NOTE 10	in						44						X
21	PSHH - 11030	PBB-11030 Naphtha Tower Feed Pump Seal Pot	520-606	NOTE 7	psig			16						X			
22	LSLL - 11030	PBB-11030 Naphtha Tower Feed Pump Seal Pot	520-606		in						8						
23																	
24	PSHH - 11035	PBB-11035 Naphtha Tower Feed Pump Seal Pot	520-606	NOTE 7	psig			16						X			
25	LSLL - 11035	PBB-11035 Naphtha Tower Feed Pump Seal Pot	520-606		in						8						
26																	
27	~~ZSO - 13000~~	~~PBB-11030/11035 Suction Valve~~	~~520-606~~	~~NOTE 4~~			~~X~~						~~X~~				
28	ZIO - 23023	TKBJ-13000 Recirculation is OPEN	520-606	NOTE 4								X					
29	ZIO - 13000	TKBJ-13000 Outlet is OPEN	520-606	NOTE 4								X					
30	ZSO - 11033	Manual block valve 207508: Jumpover between the discharge of PBB-1030/1035 Naphta Tower Feed Pumps and PBB-11030/11035.	525-207	NOTE 8		X											
31	**TKBJ-23000 CONDENSATE SURGE TANK AND PBB-21030/21035**																
32	LSHH - 23000	TKBJ-23000 Condensate Surge Tank	520-738	NOTE 11	in			540						X			
33	LALL - 23001	TKBJ-23000 Condensate Surge Tank	520-738	NOTE 10	in						44						X
34	PSHH - 21030	PBB-21030 Naphtha Tower Feed Pump Seal Pot	520-738	NOTA 3	psig	X		7									
35	LSLL - 21030	PBB-21030 Naphtha Tower Feed Pump Seal Pot	520-738	NOTE 9	in						20						X
36	LSHH - 21030	PBB-21030 Naphtha Tower Feed Pump Seal Pot	520-738		in			28									
37	PSHH - 21035	PBB-21030 Naphtha Tower Feed Pump Seal Pot	520-738		psig	X		7									
38	LSLL - 21035	PBB-21030 Naphtha Tower Feed Pump Seal Pot	520-738	NOTE 9	in						20						X
39	LSHH - 21035	PBB-21030 Naphtha Tower Feed Pump Seal Pot	520-738		in			28									
40	ZIO - 23027	TKBJ-23000 Recirculation is OPEN	520-738	NOTE 4								X					
41	ZIO - 23000	TKBJ-23000 Outlet is OPEN	520-738	NOTE 4								X					
42	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																
43	HS - 13001	TKBJ-3000 Inlet	520-206														
44	HS - 23021	TKBJ-3000 Recirculation	520-206														
45	HS - 3000	TKBJ-3000 Outlet	520-206														
46	HS - 13003	TKBJ-13000 Inlet	520-606														
47	HS - 23023	TKBJ-13000 Recirculation	520-606														
48	HS - 13000	TKBJ-13000 Outlet	520-606														
49	HS - 23007	TKBJ-23000 Inlet	520-738														
50	HS - 23027	TKBJ-23000 Recirculation	520-738														
51	HS - 23000	TKBJ-23000 Outlet	520-738														

Effects

Effect columns:
1. TKBJ-3000 CONDENSATE STORAGE & PUMPING SHUTDOWN LEVEL 2
2. TKBJ-13000 CONDENSATE STORAGE & PUMPING SHUTDOWN LEVEL 2
3. TKBJ-23000 CONDENSATE STORAGE & PUMPING SHUTDOWN LEVEL 2
4. 520-206 – TKBJ-3000 Inlet – Note 5 – XY-13001 on XV-13001
5. 520-206 – TKBJ-3000 Recirculation – XY-23021 on XV-23021
6. 520-206 – TKBJ-3000 Outlet – Notes 1, 2 – XY-3000 on XV-3000
7. 520-206 – Naphtha Tower Feed Pump – Note 1 – Motor PBB-1030
8. 520-206 – Naphtha Tower Feed Pump – Note 1 – Motor PBB-1035
9. 520-606 – TKBJ-13000 Inlet – XY-13003 on XV-13003
10. 520-606 – TKBJ-13000 Recirculation – XY-23023 on XV-23023
11. 520-606 – TKBJ-13000 Outlet – Notes 2, 4 – XY-13000 on XV-13000
12. 520-606 – Naphtha Tower Feed Pump – Note 4 – Motor PBB-11030
13. 520-606 – Naphtha Tower Feed Pump – Note 4 – Motor PBB-11035
14. 520-738 – TKBJ-23000 Inlet – XY-23007 on XV-23007
15. 520-738 – TKBJ-23000 Recirculation – XY-23027 on XV-23027
16. 520-738 – TKBJ-23000 Outlet – Notes 2, 4 – XY-23000 on XV-23000
17. 520-738 – Naphtha Tower Feed Pump – Note 4 – Motor PBB-21030
18. 520-738 – Naphtha Tower Feed Pump – Note 4 – Motor PBB-21035

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1				D (CLOSE)	D (CLOSE)	D (CLOSE)	S	S										
2	X				~~D (CLOSE)~~													
3									D (CLOSE)	D (CLOSE)	D (CLOSE)	S	S					
4		X									~~D (CLOSE)~~							
5														D (CLOSE)	D (CLOSE)	D (CLOSE)	S	S
6			X															
7																		
8				D (CLOSE)	D (CLOSE)													
9							S	S										
10																		
11																		
12						D (CLOSE)	S	S										
13																		
14																		
15						D (CLOSE)	S	S										
16							Permissive to start pumps											
17																		
18																		
19									D (CLOSE)	D (CLOSE)								
20												S	S					
21											D (CLOSE)	S	S					
22																		
23																		
24											D (CLOSE)	S	S					
25																		
26																		
27												~~S~~	~~S~~					
28												Permissive to start pumps						
29																		
30																		
31																		
32														D (CLOSE)	D (CLOSE)			
33																	S	S
34																		
35																D (CLOSE)	S	
36																	~~S~~	~~S~~
37																		
38																D (CLOSE)		S
39																	~~S~~	~~S~~
40																	Permissive to start pumps	
41																		
42																		
43				C/O														
44					C/O													
45						C/O												
46									C/O									
47										C/O								
48											C/O							
49														C/O				
50															C/O			
51																C/O		

NOTES

Note 1 ~~If the valve XV-3000 is closed the pumps PBB-1030/1035 cannot be started. PROVIDE INTERLOCK SO THAT PUMPS PBB-1030/1035 CAN ONLY START IF XV-3000 AND XV-23021 ARE OPENED~~

Note 2 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: FIRST STOP THE PUMP, THEN CLOSE THE VALVE.

Note 3 LSLL,PSHH must be in alarm condition to activate Shutdown of the pump.

Note 4 ~~If the valve XV-13000 is closed the pumps PBB-11030/11035 cannot be started.~~
PROVIDE INTERLOCK SO THAT PUMPS PBB-11030/11035 CAN ONLY START IF XV-13000 AND XV-23023 ARE OPENED. IF THE PUMPS ARE RUNNING THIS VALVES CLOSE, THEN THE PUMPS MUST BE STOPPED.
PROVIDE INTERLOCK SO THAT PUMPS PBB-21030/21035 CAN ONLY START IF XV-23000 AND XV-23027 ARE OPENED. IF THE PUMPS ARE RUNNING THIS VALVES CLOSE, THEN THE PUMPS MUST BE STOPPED

~~Note 5 Upon low-low level in CBA-3070 Debutanizer (LALL-4015A in PCS and/or LALL-4015 in SSS, see 520-8012), CLOSE XV-13001. See interlock in worksheet "FRACTIONATION UNIT 1_Existing".~~

~~Note 6~~

Note 7 PSHH -11030 or PSHH-11035 must be in alarm to activate shutdown of PBB-11030/35 and XV-13000

Note 8 ZSO-11033 indicates that both topping 1 and topping 2 inlets are communicated

Note 9 AFTER 10 MIN OF LSLL-21030 ACTIVATION PUMP PBB-21030 SHALL BE STOPPED AND XV-23000 CLOSED. MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED TO DEACTIVATE ALL INTERLOCKS ASSOCIATED TO THE PUMP THAT HAS BEEN STOPPED.
AFTER 10 MIN OF LSLL-21035 ACTIVATION PUMP PBB-21035 SHALL BE STOPPED AND XV-23000 CLOSED. MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED TO DEACTIVATE ALL INTERLOCKS ASSOCIATED TO THE PUMP THAT HAS BEEN STOPPED.

~~Note 10 PBB-21030/21035 suction and PBB-11030/11035 suction are connected. Condensate tanks TKBJ-13000 and TKBJ-23000 operate as one tank. MAINTENANCE OVERRIDE SWITCH SHALL BE CONFIGURED~~

~~Note 11 PROVIDE INTERLOCK SO THAT UPON ACTIVATION OF LAHH-23000, XV-23007 AND XV-230027 CLOSE.~~

Note 12 MODIFY EXITING INTERLOCK SO THAT UPON ACTIVATION OF LAHH-13000, XV-13003 AND XV-23023 CLOSE.

CAUSE AND EFFECT MATRIX (EXISTING)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)
AND PPAG-500-MC-K-106 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT)
NAPHTHA AND DIESEL STORAGE_Existing and New

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low	1	3	4	5	6	7	8	9	10	11	12	13	14	15	16
																				~~525-8022~~	530-216	530-216	530-216	530-616	530-616	530-616	545-217	545-217	545-217	545-217	545-217	545-217
																			Naphtha Storage & Pumping SD Level 2 Alarm to Berth	~~TKBJ-3020 Naphtha storage tank inlet~~	TKBJ-3020 Naphtha Storage Tank Inlet	TKBJ-3020 Naphtha Storage Tank Outlet	TKBJ-3020 Naphtha Storage Tank Recirculation	TKBJ-13020 Naphtha Storage Tank Inlet	TKBJ-13020 Naphtha Storage Tank Outlet	TKBJ-13020 Naphtha Storage Tank Recirculation	PBB-1155 Naphtha Ship Loading Pump Suction	Naphtha Ship Loading Pump	PBB-1160 Naphtha Ship Loading Pump Suction	Naphtha Ship Loading Pump	PBB-1165 Naphtha Ship Loading Pump Suction	Naphtha Ship Loading Pump
																						Notes 1, 2	Note 1		Notes 1, 2	Note 1	Notes 1, 2	Note 12, 13	Notes 1, 2	Note 12, 13	Notes 1, 2	Note 12, 13
																		NAPHTHA STORAGE & PUMPING SHUTDOWN LEVEL 2	SDA-6832	~~SDY-4550A ON FV-4550A PRODUCT NAPHTHA~~	XY-13023 on XV-13023	XY-3020 on XV-3020	XY-13024 on XV-13024	XY-13021 on XV-13021	XY-13020 on XV-13020	XY-13022 on XV-13022	XY-1158 on XV-1158	Motor PBB-1155	XY-1163 on XV-1163	Motor PBB-1160	XY-1168 on XV-1168	Motor PBB-1165
NAPHTHA STORAGE																																
1	**NAPHTHA STORAGE & PUMPING SHUTDOWN LEVEL 2**																		X		D (CLOSE)	D (CLOSE)	E (CLOSE)	D (CLOSE)	D (CLOSE)	E (CLOSE)	D (CLOSE)	S	D (CLOSE)	S	D (CLOSE)	S
3	ESD - 6015	Naphtha Storage & Pumping Shutdown Manual SOFT Push Button in CCR										X						X														
5	**TKBJ-3020 NAPHTHA STORAGE TANK**																															
6	LSHH - 3020	TKBJ-3020 Naphtha Storage Tank	530-216	NOTE 6	in			778						X	~~X~~					~~D~~ (Delete this interlock)	Close (Note 6)			Open (Note 6)								
7	LSLL - 3020	Upon LALL-3020 activation if TKBJ-3020 is being unloaded, then stop PBB-1155/1160/1165 pumps.	530-216	NOTE 1	in						30						X											**S (If XV-3020 is not closed)**		**S (If XV-3020 is not closed)**		**S (If XV-3020 is not closed)**
8	~~ZSC - 3020~~	~~TKBJ-3020 Naphtha Storage Tank outlet valve CLOSE, and TKBJ-3020 is being unloaded, then stop PBB-1155/1160/1165 pumps.~~	~~530-216~~	~~NOTE 1~~								~~X~~																~~S (If TKBJ-3020 is being unloaded)~~		~~S (If TKBJ-3020 is being unloaded)~~		~~S (If TKBJ-3020 is being unloaded)~~
9	ZSO - 3020	TKBJ-3020 Nafta Storage Tank outlet valve OPEN	530-216	NOTE 1								X																				
10	ZSO - 13024	TKBJ-3020 Nafta Storage Tank recirculation valve OPEN	530-216	NOTE 1								X																				
11	ZSO - 1158	PBB-1155 Suction Valve OPEN	545-217	NOTE 1								X																SEE NOTE 1 PERMISSIVE TO START PUMP		SEE NOTE 1 PERMISSIVE TO START PUMP		SEE NOTE 1 PERMISSIVE TO START PUMP
12	ZSO - 1163	PBB-1160 Suction Valve OPEN	545-217	NOTE 1								X																				
13	ZSO - 1168	PBB-1165 Suction Valve OPEN	545-217	NOTE 1								X																				
14	**TKBJ-13020 NAPHTHA STORAGE TANK**																															
15	LSHH - 13020	TKBJ-13020 Naphtha Storage Tank	530-616	NOTE 6	in			778						X	~~X~~						Open (Note 6)			Close (Note 6)								
16	LALL - 13021	Upon LALL-13021 activation if TKBJ-13020 is being unloaded, then stop PBB-1155/1160/1165 pumps.	530-616	NOTE 1	in						30						X											**S (If XV-13020 is not closed)**		**S (If XV-13020 is not closed)**		**S (If XV-13020 is not closed)**
17																																
18	ZSO - 13020	TKBJ-13020 Nafta Storage Tank outlet valve OPEN	530-616	NOTE 1								X																				
19	ZSO - 13022	TKBJ-13020 Nafta Storage Tank recirculation valve OPEN	530-616	NOTE 1								X																				
20	ZSO - 1158	PBB-1155 Suction Valve OPEN	545-217	NOTE 1								X																SEE NOTE 1 PERMISSIVE TO START PUMP		SEE NOTE 1 PERMISSIVE TO START PUMP		SEE NOTE 1 PERMISSIVE TO START PUMP
21	ZSO - 1163	PBB-1160 Suction Valve OPEN	545-217	NOTE 1								X																				
22	ZSO - 1168	PBB-1165 Suction Valve OPEN	545-217	NOTE 1								X																				
23	**NAPHTHA SHIP LOADING PUMPS**																															
24	PSHH - 1155	PBB-1155 Naphtha Ship Loading Pump Seal Pot	545-217	NOTE 2	psig			12						X													D (CLOSE)	S				
25	~~SSC - 1155~~	~~PSHH-1155 + AT-6824 (Gas Detector, see PCAM-680-PL-Y-416-1)~~	~~545-217~~	~~NOTE 7~~								~~X~~															~~D~~	~~S~~				
26	ZIC - 1156	PBB-1155 Naphtha Ship Loading Pump Discharge Valve	545-217	NOTE 5																								S				
27	~~ZIC - 1158~~	~~PBB-1155 Suction Valve~~	~~545-217~~	~~NOTE 1~~								~~X~~																~~S~~				
28	PSHH - 1160	PBB-1160 Naphtha Ship Loading Pump Seal Pot	545-217	NOTE 2	psig			12						X															D (CLOSE)	S		
29	~~SSC - 1160~~	~~PSHH-1160 + AT-6824 (Gas Detector, see PCAM-680-PL-Y-416-1)~~	~~545-217~~	~~NOTE 7~~								~~X~~																	~~D~~	~~S~~		
30	ZIC - 1161	PBB-1160 Naphtha Ship Loading Pump Discharge Valve	545-217	NOTE 5																										S		
31	~~ZIC - 1163~~	~~PBB-1160 Suction Valve~~	~~545-217~~	~~NOTE 1~~								~~X~~																		~~S~~		
32	PSHH - 1165	PBB-1165 Naphtha Ship Loading Pump Seal Pot	545-217	NOTE 2	psig			12						X																	D (CLOSE)	S
33	~~SSC - 1165~~	~~PSHH-1165 + AT-6824 (Gas Detector, see PCAM-680-PL-Y-416-1)~~	~~545-217~~	~~NOTE 7~~								~~X~~																			~~D~~	~~S~~
34	ZIC - 1166	PBB-1165 Naphtha Ship Loading Pump Discharge Valve	545-217	NOTE 5																												S
35	~~ZIC - 1168~~	~~PBB-1165 Suction Valve~~	~~545-217~~	~~NOTE 1~~								~~X~~																				~~S~~
36																																
37	**ESD - 6920**	**Loading System Shutdown from Berth.**	**EPC-E**	**NOTE 10**								**X**																**S**		**S**		**S**
38	**ESD - 6921**	**Loading / Cooldown Systems Shutdown from Berth.**	**EPC-E**	**NOTE 11**								**X**																**S**		**S**		**S**
39	**SSC - NAPHTHA**	**Loading Pumps Simultaneity.**	**545-217**	**NOTE 12**								**X**																**S**		**S**		**S**
40	**SSC - 6200/10**	**Propane/Butane Loading Valves at Berth**	**EPC-E**	**NOTE 13**								**X**																**S**		**S**		**S**
41	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																															
42	HS - 13023	TKBJ-3020 Naphtha Storage Tank Inlet	530-216																		C/O											
43	HS - 3020	TKBJ-3020 Naphtha Storage Tank Outlet	530-216																			C/O										
44	HS - 13024	TKBJ-3020 Naphtha Storage Tank Recirculation	530-216																				C/O									
45	HS - 13021	TKBJ-13020 Naphtha Storage Tank Inlet	530-616																					C/O								
46	HS - 13020	TKBJ-13020 Naphtha Storage Tank Outlet	530-616																						C/O							
47	HS - 13022	TKBJ-13020 Naphtha Storage Tank Recirculation	530-616																							C/O						
48	HS - 1158	PBB-1155 Naphtha Ship Loading Pump Suction	545-217																								C/O					
49	HS - 1163	PBB-1160 Naphtha Ship Loading Pump Suction	545-217																										C/O			
50	HS - 1168	PBB-1165 Naphtha Ship Loading Pump Suction	545-217																												C/O	

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)
AND PPAG-500-MC-K-106 Revision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT)
NAPHTHA AND DIESEL STORAGE_Existing and New

Causes

No.	TAG	Loop Service	P&ID	Notes	Unit	Alarms ON	Alarms OFF	Alarms High High	Alarms High	Alarms Low	Alarms Low Low	Interlocks ON	Interlocks OFF	Interlocks High High	Interlocks High	Interlocks Low	Interlocks Low Low
	NAPHTHA AND DIESEL STORAGE																
1	**DIESEL STORAGE & PUMPING SHUTDOWN LEVEL 2**																
2	ESD - 6020	Diesel Storage & Pumping Shutdown Manual SOFT Push Button in CCR										X					
3	**TKBJ-3030 DIESEL STORAGE TANK**																
4	LSHH - 3030	TKBJ-3030 Diesel Storage Tank	535-219	NOTE 9	in			648						X			
5	LIC - 3030	**Mixer MX-3030 on TKBJ-3030: Stop on level 102" when emptying (levels to be confirmed).**	535-219		in				114	102		THIS STOP CONTROL					
6	LSLL - 3030	Upon activation of LALL-3030 stop the pumps that are unloading the TKBJ-3030	535-219	NOTE 3	in						49						X
7	~~ZSC - 3031~~	~~TKBJ-3030 Diesel Storage Tank outlet valve CLOSE, and TKBJ-3030 is being unloaded, stop the pumps that are unloading the TKBJ-3030 (see NOTE 3)~~	~~535-219~~	~~NOTE 3~~								~~X~~					
8	ZSO - 3031	TKBJ-3030 Diesel Storage Tank outlet valve OPEN	535-219	NOTE 3								X					
9	ZSO - 13039	TKBJ-3030 Diesel Storage Tank recirculation valve XV-13039 OPEN	535-219	NOTE 3								X					
10	ZSO - 13040	TKBJ-3030 Diesel Storage Tank outlet valve XV-13040 OPEN	535-219	NOTE 3								X					
11	ZSO - 23040	TKBJ-3030 Diesel Storage Tank outlet valve XV-23040 OPEN	535-219	NOTE 3								X					
12	ZSO - 13038	TKBJ-3030 Diesel Storage Tank recirculation valve XV-13038 OPEN	535-219	NOTE 3								X					
13	ZSO - 11413	PBB-11410 Suction Valve XV-11413 OPEN	535-219	NOTE 3								X					
14	ZSO - 11419	PBB-11415 Suction Valve XV-11419 OPEN	535-219	NOTE 3								X					
15	ZSO - 1413	PBB-1410 Suction Valve XV-1413 OPEN	535-219-2	NOTE 3								X					
16	ZSO - 1419	PBB-1415 Suction Valve XV-1419 OPEN	535-219-2	NOTE 3								X					
17	**TKBJ-13030 DIESEL STORAGE TANK**																
18	LAHH - 13031	TKBJ-13030 Diesel Storage Tank	535-619	NOTE 9	in			699						X			
19	LIC - 13030	Mixer MX-13030 on TKBJ-13030: Stop on level 102" when emptying.	535-619		in				114	102		THIS STOP CONTROL					
20	LALL - 13031	Upon activation of LALL-13031 stop the pumps that are unloading the TKBJ-13030	535-619	NOTE 3	in						55						X
21																	
22	ZSO - 13031	TKBJ-13030 Diesel Storage Tank outlet valve OPEN	535-619	NOTE 3								X					
23	ZSO - 13034	TKBJ-13030 Diesel Storage Tank recirculation valve XV-13034 OPEN	535-219	NOTE 3								X					
24	ZSO - 13035	TKBJ-13030 Diesel Storage Tank outlet valve XV-13035 OPEN	535-619	NOTE 3								X					
25	ZSO - 23037	TKBJ-13030 Diesel Storage Tank outlet valve XV-23037 OPEN	535-619	NOTE 3								X					
26	ZSO - 13033	TKBJ-13030 Diesel Storage Tank recirculation valve XV-13033 OPEN	535-619	NOTE 3								X					
27	ZSO - 11413	PBB-11410 Suction Valve XV-11413 OPEN	535-219	NOTE 3								X					
28	ZSO - 11419	PBB-11415 Suction Valve XV-11419 OPEN	535-219	NOTE 3								X					
29	ZSO - 1413	PBB-1410 Suction Valve XV-1413 OPEN	535-219-2	NOTE 3								X					
30	ZSO - 1419	PBB-1415 Suction Valve XV-1419 OPEN	535-219-2	NOTE 3								X					
31	**TKBJ-23030 DIESEL STORAGE TANK**																
32	LAHH - 23031	TKBJ-23030 Diesel Storage Tank	535-619	NOTE 9	in			699						X			
33	LIC - 23030	Mixer MX-13030 on TKBJ-13030: Stop on level 102" when emptying.	535-619		in				114	102		THIS STOP CONTROL LOOP TO BE PROGRAMMED IN THE PCS					
34	LALL - 23031	Upon activation of LALL-23031 stop the pumps that are unloading the TKBJ-23030	535-619	NOTE 3	in						55						X
35	ZSO - 23031	TKBJ-23030 Diesel Storage Tank outlet valve OPEN	535-619	NOTE 3								X					
36	ZSO - 23034	TKBJ-23030 Diesel Storage Tank recirculation valve XV-23034 OPEN	535-619	NOTE 3								X					
37	ZSO - 23035	TKBJ-23030 Diesel Storage Tank outlet valve XV-23035 OPEN	535-619	NOTE 3								X					
38	ZSO - 23036	TKBJ-23030 Diesel Storage Tank recirculation valve XV-23033 OPEN	535-619	NOTE 3								X					
39	ZSO - 23037	TKBJ-23030 Diesel Storage Tank Outlet to Diesel ship Loading Pumps	535-619	NOTE 3								X					
40	ZSO - 23038	TKBJ-23030 Diesel Storage Tank Outlet to Truck Loading Pumps	535-619	NOTE 3								X					
41	ZSO - 23040	TKBJ-23030 Diesel Storage Tank Outlet to Truck Loading Pumps	535-619	NOTE 3								X					
42	**DIESEL SHIP LOADING PUMPS**																
43	PSHH - 1410	PBB-1410 Diesel Ship Loading Pump Seal Pot	535-219-2	NOTE 2	psig			12						X			
44	ZIC - 1411	PBB-1410 Diesel Ship Loading Pump Discharge Valve	535-219-2	NOTE 5													
45	ZIC - 1413	PBB-1410 Suction Valve	535-219-2									X					
46	PSHH - 1415	PBB-1415 Diesel Ship Loading Pump Seal Pot	535-219-2	NOTE 2	psig			12						X			
47	ZIC - 1416	PBB-1415 Diesel Ship Loading Pump discharge Valve	535-219-2	NOTE 5													
48	ZIC - 1419	PBB-1415 Suction Valve	535-219-2									X					
49	PAHH - 11410A	PBB-11410 Diesel Ship Loading Pump Outer Seal Pot	535-219-3	NOTES 14, 2	psig			12				X					
50	LALL - 11410A	PBB-11410 Diesel Ship Loading Pump Outer Seal Pot	535-219-3	NOTES 14, 2	in						18						X
51																	
52	PAHH - 11410B	PBB-11410 Diesel Ship Loading Pump Inner Seal Pot	535-219-3		psig			12									
53	LALL - 11410B	PBB-11410 Diesel Ship Loading Pump Inner Seal Pot	535-219-3		in						18						X
54																	
55	ZIC - 11411	PBB-11410 Diesel Ship Loading Pump Discharge Valve	535-219-3	NOTE 5													
56	ZIC - 11413	PBB-11410 Suction Valve	535-219-3	~~NOTE 4~~								X					
57	PAHH - 11415A	PBB-11415 Diesel Ship Loading Pump Outer Seal Pot	535-219-3	NOTES 14, 2	psig			12				X					
58	LALL - 11415A	PBB-11415 Diesel Ship Loading Pump Outer Seal Pot	535-219-3	NOTES 14, 2	in						18						X
59																	
60	PAHH - 11415B	PBB-11415 Diesel Ship Loading Pump Inner Seal Pot	535-219-3		psig			12									
61	LALL - 11415B	PBB-11415 Diesel Ship Loading Pump Inner Seal Pot	535-219-3		in						18						X
62																	
63	ZIC - 11416	PBB-11415 Diesel Ship Loading Pump Discharge Valve	535-219-3	NOTE 5													
64	ZIC - 11419	PBB-11415 Suction Valve	535-219-3									X					
65	**DIESEL TRUCK LOADING PUMPS**																
66	PSHH - 1175	PBB-1175 Diesel Truck Loading Pump Seal Pot	535-219	NOTE 14	psig			12									
67	LSLL - 1175	PBB-1175 Diesel Truck Loading Pump Seal Pot	535-219	NOTE 14, 16							~~X~~	X					
68	XY - 1175	PBB-1175 Diesel Truck Loading Pump Seal Pot	535-219	NOTES 8, 14		X						X					
69	PSHH - 1180	PBB-1180 Diesel Truck Loading Pump Seal Pot	535-219	NOTE 14	psig			12									
70	LSLL - 1180	PBB-1180 Diesel Truck Loading Pump Seal Pot	535-219	NOTE 14							X						
71	XY - 1180	PBB-1180 Diesel Truck Loading Pump Seal Pot	535-219	NOTES 8, 14		X						X					
72																	
73	ESD - 6920	Loading System Shutdown from Berth.	EPC-E	NOTE 10								X					
74	ESD - 6921	Loading / Cooldown Systems Shutdown from Berth.	EPC-E	NOTE 11								X					
75	SSC - NAPHTHA	Loading Pumps Simultaneity.	545-217	NOTE 12								X					
76	SSC - 6200/10	Propane/Butane Loading Valves at Berth	EPC-E	NOTE 13								X					
77	**HAND SWITCHES IN THE PCS THAT CLOSE/OPEN VALVES THROUGH THE SSS**																
78	HS - 13037	TKBJ-3030 Diesel Storage Tank Inlet	533-219														
79	HS - 3031	TKBJ-3030 Diesel Storage Tank Outlet	533-219														
80	HS - 13040	TKBJ-3030 Diesel Storage Tank Outlet to Ship Loading Pumps PBB-11410/11415	533-219														
81	HS - 23040	TKBJ-3030 Diesel Storage Tank Outlet to Ship Loading Pumps PBB-1410/1415	533-219														
82	HS - 13041	TKBJ-3030 Diesel Storage Tank Outlet to Truck Loading Pumps PBB-1175/1180	533-219														
83	HS - 13038	TKBJ-3030 Diesel Storage Tank Recirculation From Ship Loading Pumps	533-219														
84	HS - 13039	TKBJ-3030 Diesel Storage Tank Recirculation From to Truck Loading Pumps	533-219														
85	HS - 13032	TKBJ-13030 Diesel Storage Tank Inlet	535-619														
86	HS - 13031	TKBJ-13030 Diesel Storage Tank Outlet	535-619														
87	HS - 13035	TKBJ-13030 Diesel Storage Tank Outlet to Ship Loading Pumps PBB-11410/11415	535-619														
88	HS - 23037	TKBJ-13030 Diesel Storage Tank Outlet to Ship Loading Pumps PBB-1410/1415	535-619														
89	HS - 13036	TKBJ-13030 Diesel Storage Tank Outlet to Truck Loading Pumps PBB-1175/1180	535-619														
90	HS - 13033	TKBJ-13030 Diesel Storage Tank Recirculation From Ship Loading Pumps	535-219														
91	HS - 13034	TKBJ-13030 Diesel Storage Tank Recirculation From to Truck Loading Pumps	535-219														
92	HS - 1413	PBB-1410 Diesel Ship Loading Pump Suction	535-219-2														
93	HS - 1419	PBB-1415 Diesel Ship Loading Pump Suction	535-219-2														
94	HS - 11413	PBB-11410 Diesel Ship Loading Pump Suction	535-219-3														
95	HS - 11419	PBB-11415 Diesel Ship Loading Pump Suction	535-219-3														
96	HS - 6300	Inlet to Diesel to Truck Loading Stations MZZ-6260/6270/6280/6290	540-231														
97	HS - 3045	Line for Utility Diesel	620-419														
98	HS - 3030	Product to Oil Tanking	535-219														
99	HS - 23032	TKBJ-23030 Diesel Storage Tank Inlet	535-619														
100	HS - 23031	TKBJ-23030 Diesel Storage Tank Outlet	535-619														
101	HS - 23038	TKBJ-23030 Diesel Storage Tank Outlet to Ship Loading Pumps PBB-1410/1415	535-619														
102	HS - 23035	TKBJ-23030 Diesel Storage Tank Outlet to Ship Loading Pumps PBB-11410/11415	535-619														
103	HS - 23036	TKBJ-23030 Diesel Storage Tank Outlet to Truck Loading Pumps PBB-1175/1180	535-619														
104	HS - 23033	TKBJ-23030 Diesel Storage Tank Recirculation From Ship Loading Pumps	535-619														
105	HS - 23034	TKBJ-23030 Diesel Storage Tank Recirculation From to Truck Loading Pumps	535-219														

Effects 1–20

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P&ID			~~525-8022~~	535-219	535-219	535-219	535-219	535-219	535-219	535-219	535-219	535-619	535-619	535-619	535-619	535-619	535-219	535-219	535-619	535-219-2
Service	DIESEL STORAGE & PUMPING SHUTDOWN LEVEL 2	Diesel Storage & Pumping SD Level 2 Alarm to Berth	~~TKBJ-3030 Diesel Storage Tank inlet~~	TKBJ-3030 Diesel Storage Tank Inlet	TKBJ-3030 Diesel Storage Tank Outlet	TKBJ-3030 Diesel Storage Tank Outlet to Ship Loading Pumps PBB-11410/15	TKBJ-3030 Diesel Storage Tank Outlet to Ship Loading Pumps PBB-1410/1415	**TKBJ-3030 Diesel Storage Tank Outlet to Truck Loading Pumps**	TKBJ-3030 Diesel Storage Tank Recirculation From Ship Loading Pumps	TKBJ-3030 Diesel Storage Tank Recirculation From to Truck Loading Pumps	MX-3030 Diesel Storage Tank Mixer	TKBJ-13030 Diesel Storage Tank Inlet	TKBJ-13030 Diesel Storage Tank Outlet	TKBJ-13030 Diesel Storage Tank Outlet to Ship Loading Pumps PBB-11410/11415	TKBJ-13030 Diesel Storage Tank Outlet to Ship Loading Pumps PBB-1410/1415	**TKBJ-13030 Diesel Storage Tank Outlet to Truck Loading Pumps**	TKBJ-13030 Diesel Storage Tank Recirculation From Ship Loading Pumps	TKBJ-13030 Diesel Storage Tank Recirculation From to Truck Loading Pumps	MX-13030 Diesel Storage Tank Mixer	PBB-1410 Diesel Ship Loading Pump Suction
Note				Note 9	Notes 2, 3	Note 2	Note 2		Note 3	Note 3		Note 9	Notes 2, 3	Note 2	Note 2		Note 3	Note 3		Notes 2, 3
Tag		SDA-6833	~~SDY-4670A on FV-4670A DIESEL PRODUCT~~	XY-13037 on XV-13037	XY-3031 on XV-3031	XY-13040 on XV-13040	XY-23040 on XV-23040	**XY-13041 on XV-13041 ~~(FUTURE)~~**	XY-13038 on XV-13038	XY-13039 on XV-13039	Motor of MX-3030	XY-13032 on XV-13032	XY-13031 on XV-13031	XY-13035 on XV-13035	XY-23037 on XV-23037	**XY-13036 on XV-13036 ~~(FUTURE)~~**	XY-13033 on XV-13033	XY-13034 on XV-13034	Motor of MX-13030	XY-1413 on XV-1413
1		X		D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	E (CLOSE)	E (CLOSE)	S	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	E (CLOSE)	E (CLOSE)	S	D (CLOSE)
2	X																			
3																				
4			~~D~~ (Delete this interlock)	Close (Note 9)					Close (Note 9)	Close (Note 9)		Open according selected sequence (Note 9)					Open according selected sequence (Note 9)	Open according selected sequence (Note 9)		
5											STOP									
6											S									
7–17																				
18				Open (Note 9)					Open according selected sequence (Note 9)	Open according selected sequence (Note 9)		Close (Note 9)					Close (Note 9)	Close (Note 9)		
19																			STOP	
20																			S	
21–31																				
32				Open (Note 9)					Open (Note 9)	Open (Note 9)		Open (Note 9)					Open (Note 9)	Open (Note 9)		
33																				
34																			S	
35–42																				
43																				D (CLOSE)
44–77																				
78				C/O																
79					C/O															
80						C/O														
81							C/O													
82								C/O												
83									C/O											
84										C/O										
85												C/O								
86													C/O							
87														C/O						
88															C/O					
89																C/O				
90																	C/O			
91																		C/O		
92																				C/O
93–105																				

Effects 21–40

No.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
P&ID	535-219-2	535-219-2	535-219-2	535-219-3	535-219-3	535-219-3	535-219-3	535-219	535-219	540-231	620-419	535-219	535-619	535-619	535-619	535-619	535-619	535-219	535-219	535-619
Service	Diesel Ship Loading Pump	PBB-1415 Diesel Ship Loading Pump Suction	Diesel Ship Loading Pump	PBB-11410 Diesel Ship Loading Pump Suction	Diesel Ship Loading Pump	PBB-11415 Diesel Ship Loading Pump Suction	Diesel Ship Loading Pump	Diesel Truck Loading Pump	Diesel Truck Loading Pump	Inlet to Diesel to Truck Loading Stations MZZ-6260/6270/6280/6290	Line for Utility Diesel	Product to Oil Tanking	TKBJ-23030 Diesel Storage Tank Inlet	TKBJ-23030 Diesel Storage Tank Outlet	TKBJ-23030 Diesel Storage Tank Outlet to Ship Loading Pumps PBB-1410/1415	TKBJ-23030 Diesel Storage Tank Outlet to Ship Loading Pumps PBB-11410/11415	**TKBJ-23030 Diesel Storage Tank Outlet to Truck Loading Pumps**	TKBJ-23030 Diesel Storage Tank Recirculation From Ship Loading Pumps	TKBJ-23030 Diesel Storage Tank Recirculation From to Truck Loading Pumps	MX-23030 Diesel Storage Tank Mixer
Note	Notes 2, 3	Notes 2, 3	Notes 2, 3	Notes 2, 3		Notes 2, 3							Note 9	Notes 2, 3	Note 2	Note 2		Note 3	Note 3	
Tag	Motor PBB-1410	XY-1419 on XV-1419	Motor PBB-1415	XY-11413 on XV-11413	Motor PBB-11410	XY-11419 on XV-11419	Motor PBB-11415	Motor PBB-1175	Motor PBB-1180	XY-6300 on XV-6300	SV-3045 on HV-3045	SDY-3030 on SDV-3030	XY-23032 on XV-23032	XY-23031 on XV-23031	XY-23038 on XV-23038	XY-23035 on XV-23035	**XY-23036 on XV-23036 ~~(FUTURE)~~**	XY-23033 on XV-23033	XY-23034 on XV-23034	Motor of MX-23030
1	S	D (CLOSE)	S	D (CLOSE)	S	D (CLOSE)	S	S	S	D (CLOSE)	D	D	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	D (CLOSE)	E (CLOSE)	E (CLOSE)	S
2–3																				
4													Open according selected sequence (Note 9)					Open according selected sequence (Note 9)	Open according selected sequence (Note 9)	
5																				
6	**S (If XV-3031 is not closed)**		**S (If XV-3031 is not closed)**		**S (If XV-3031 is not closed)**		**S (If XV-3031 is not closed)**	**S (If XV-3031 is not closed)**	**S (If XV-3031 is not closed)**											
7	~~S (Note 3)~~		~~S (Note 3)~~		~~S (Note 3)~~		~~S (Note 3)~~	~~S (Note 3)~~	~~S (Note 3)~~											
8–10																				
11	SEE NOTE 3 PERMISSIVE TO START PUMP		SEE NOTE 3 PERMISSIVE TO START PUMP		SEE NOTE 3 PERMISSIVE TO START PUMP		SEE NOTE 3 PERMISSIVE TO START PUMP	SEE NOTE 3 PERMISSIVE TO START PUMP	SEE NOTE 3 PERMISSIVE TO START PUMP											
12–17																				
18													Open according selected sequence (Note 9)					Open according selected sequence (Note 9)	Open according selected sequence (Note 9)	
19																				
20	**S (If XV-13031 is not closed)**		**S (If XV-13031 is not closed)**		**S (If XV-13031 is not closed)**		**S (If XV-13031 is not closed)**	**S (If XV-13031 is not closed)**	**S (If XV-13031 is not closed)**											
21–24																				
25	SEE NOTE 3 PERMISSIVE TO START PUMP		SEE NOTE 3 PERMISSIVE TO START PUMP		SEE NOTE 3 PERMISSIVE TO START PUMP		SEE NOTE 3 PERMISSIVE TO START PUMP	SEE NOTE 3 PERMISSIVE TO START PUMP	SEE NOTE 3 PERMISSIVE TO START PUMP											
26–31																				
32											Close (Note 9)									
33																				STOP
34	**S (If XV-23031 is not closed)**		**S (If XV-23031 is not closed)**		**S (If XV-23031 is not closed)**		**S (If XV-23031 is not closed)**	**S (If XV-23031 is not closed)**	**S (If XV-23031 is not closed)**											S
35–37																				
38	SEE NOTE 3 PERMISSIVE TO START PUMP		SEE NOTE 3 PERMISSIVE TO START PUMP		SEE NOTE 3 PERMISSIVE TO START PUMP		SEE NOTE 3 PERMISSIVE TO START PUMP	SEE NOTE 3 PERMISSIVE TO START PUMP	SEE NOTE 3 PERMISSIVE TO START PUMP											
39–42																				
43	S																			
44	S																			
45	S																			
46		D (CLOSE)	S																	
47			S																	
48			S																	
49				D (CLOSE)	S															
50				D (CLOSE)	S															
51																				
52				D (CLOSE)	S															
53				D (CLOSE)	S															
54																				
55					S															
56					S															
57						D (CLOSE)	S													
58						D (CLOSE)	S													
59																				
60						D (CLOSE)	S													
61						D (CLOSE)	S													
62																				
63							S													
64							S													
65–67																				
68								S												
69–70																				
71									S											
72																				
73	S		S		S		S													
74	S		S		S		S													
75–92																				
93		C/O																		
94				C/O																
95						C/O														
96										C/O										
97											C/O									
98												C/O								
99													C/O							
100														C/O						
101															C/O					
102																C/O				
103																	C/O			
104																		C/O		
105																			C/O	

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)
AND PPAG-500-MC-K-106 Revision 6

NOTES

Note 1 PERMISSIVES TO START PUMPS IF TKBJ-3020 OR TKBJ-13020 NAPHTHA STORAGE TANKS ARE TO BE UNLOADED:
PROVIDE INTERLOCK SO THAT PUMP PBB-1155 CAN ONLY START **IF** XV-1158 **AND (**XV-3020 **OR** XV-13020**) AND (**XV-13024 **OR** XV-13022**)** ARE OPEN.
IF THE PUMP IS RUNNING AND NONE OF THESE SETS OF THREE VALVES IS OPEN, THEN THE PUMP MUST BE STOPPED.

PROVIDE INTERLOCK SO THAT PUMP PBB-1160 CAN ONLY STARTS **IF** XV-1163 **AND (**XV-3020 **OR** XV-13020**) AND (**XV-13024 **OR** XV-13022**)** ARE OPEN.
IF THE PUMP IS RUNNING AND NONE OF THESE SETS OF THREE VALVES IS OPEN, THEN THE PUMP MUST BE STOPPED.

PROVIDE INTERLOCK SO THAT PUMP PBB-1165 CAN ONLY STARTS **IF** XV-1168 **AND (**XV-3020 **OR** XV-13020**) AND (**XV-13024 **OR** XV-13022**)** ARE OPEN.
IF THE PUMP IS RUNNING AND NONE OF THESE SETS OF THREE VALVES IS OPEN, THEN THE PUMP MUST BE STOPPED.

Note 2 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: FIRST STOP THE PUMP, THEN CLOSE THE VALVE.
Note 3 PERMISSIVE TO START PUMPS IF TKBJ-3030 OR TKBJ-13030 OR TKBJ-23030 DIESEL STORAGE TANKS ARE TO BE UNLOADED:

PROVIDE INTERLOCK SO THAT DIESEL SHIP LOADING PUMP PBB-1410 CAN ONLY STARTS **IF** XV-1413 TOGETHER WITH AT LEAST ONE OF THE FOLLOWING SETS OF THREE VALVES IS OPENED: **((**XV-3031 **AND** XV-23040**) OR (**XV-13031 **AND** XV-23037**) OR (**XV-23031 **AND** XV-23038**))AND (**XV-13033 OR XV-13038 OR XV-23033) ARE OPEN
IF THE PUMP IS RUNNING AND NONE OF THESE SETS OF FOUR VALVES, THEN THE PUMP MUST BE STOPPED.

PROVIDE INTERLOCK SO THAT DIESEL SHIP LOADING PUMP PBB-1415 CAN ONLY STARTS **IF** XV-1419 TOGETHER WITH AT LEAST ONE OF THE FOLLOWING SETS OF THREE VALVES IS OPENED: **(**(XV-3031 **AND** XV-23040**) OR (**XV-13031 **AND** XV-23037**) OR (**XV-23031 **AND** XV-23038**)) AND (XV-13033 OR** XV-13038 **OR** XV-23033) ARE OPEN
IF THE PUMP IS RUNNING AND NONE OF THESE SETS OF FOUR VALVES, THEN THE PUMP MUST BE STOPPED.

PROVIDE INTERLOCK SO THAT DIESEL SHIP LOADING PUMP PBB-11410 CAN ONLY STARTS **IF** XV-11413 **AND ((**XV-3031 **AND** XV-13040**) OR (**XV-13031 **AND** XV-13035**) OR (XV-23031 AND 23035)) AND (**XV-13033 **OR** XV-13038 **OR** XV-23033**)** ARE OPEN.
IF THE PUMP IS RUNNING AND NONE OF THESE SETS OF FOUR VALVES, THEN THE PUMP MUST BE STOPPED.

PROVIDE INTERLOCK SO THAT DIESEL SHIP LOADING PUMP PBB-11415 CAN ONLY STARTS **IF** THE XV-11419 **AND** ((XV-3031 AND XV-13040) OR (XV-13031 AND XV-13035) **OR** (XV-23031 AND 23035)) AND (XV-13033 OR XV-13038 **OR** XV-23033) ARE OPEN.
IF THE PUMP IS RUNNING AND NONE OF THESE SETS OF FOUR VALVES, THEN THE PUMP MUST BE STOPPED.

PROVIDE INTERLOCK SO THAT DIESEL TRUCK LOADING PUMPS PBB-1175 AND PBB-1180 CAN ONLY START **IF** AT LEAST ONE OF THE FOLLOWING SETS OF THREE VALVES IS OPENED: ((XV-3031 **AND** XV-13041) **OR** (XV-13031 **AND** XV-13036) **OR** (XV-23031 **AND** XV-23036)) **AND** (XV-13039 **OR** XV-13034 **OR** XV-23034)
IF THE PUMPS ARE RUNNING AND NONE OF THESE PAIRS OF VALVES IS OPEN, THEN THE PUMPS MUST BE STOPPED.

MODIFY EXISTING INTERLOCK SO THAT PBB-1175/80, PBB-1410/15 AND PBB-11410/15 STOP UPON ACTIVATION OF LOW LOW LEVEL ALARM (LLAL) OF THE TANK THAT IS BEING UNLOADING.

Note 4 DELETED (SEE NOTE 3).
Note 5 If ZIC of the discharge valve is activated the corresponding pump cannot be started.
Note 6 ~~Alarm shall inform operator to open FV-4550B (switch product to TKBJ-3000).~~
Upon activation of LAHH-3020, FIRST OPEN XV-13021 (INLET TKBJ-13020) AND XV-13022(TKBJ-13020 PUMP RETURN), AND 15 SECONDS AFTER LAHH-3020
Upon activation of LAHH-13020, FIRST OPEN XV-13023 (INLET TKBJ-3020) AND XV-13024 (TKBJ-3020 PUMP RETURN), AND 15 SECONDS AFTER LAHH-
~~Note 7~~ ~~If the PSHH and the AT-6824 (Gas Detector, see PCAM-680-PL-Y-416-1) are in alarm condition then the pump corresponding to the PSHH must be stoped and its suction valve must be closed~~.
Note 8 Warn operator to isolate Truck Loading Pump(s) by closing Suction Manual Valve.
Note 9 ~~Alarm shall inform operator to open FV-4570B (switch product to TKBJ-3000).~~
~~Upon activation of LAHH-3030, FIRST OPEN XV-13032 (INLET TKBJ-13030), XV-13033(SHIP LOAD PUMP RETURN) AND~~
~~Upon activation of LAHH-13030, FIRST OPEN XV-13037 (INLET TKBJ-3030), XV-13038(SHIP LOAD PUMP RETURN) AND~~
PROVIDE A SELECTOR SWITCH FOR THE OPERATOR TO CHOOSE WHAT TANK IS THE NEXT TO BE LOADED. ALARM THE OPERATOR TO CHOOSE THE NEXT TANK TO BE LOADED. WHEN THE FILLING TANK IS EQUAL TO THE SELECTED NEXT TANK, AN ALARM MUST BE ACTIVATED TO ADVICE THE OPERATOR TO CHOOSE A DIFERENT NEXT TANK. IN CASE OF ACTIVATION OF THE LAHH OF THE FILLING TANK, OPEN INLET VALVES AND THE PUMPS RETURN VALVES OF THE NEXT TANK (PREVIOUSLY SELECTED BY OPERATOR) AND 15 SECONDS AFTER LAHH ACTIVATION CLOSE THE INLET VALVE AND THE PUMPS RETURNS VALVES OF THE FILLING TANK.

Note 10 All Ship Loading Pumps shall be stopped in case of an ESD at Berth.
Note 11 All Ship Loading Pumps and Cool Down Pumps shall be stopped in case of an ESD at Berth.
Note 12 Provide interlocks so that if any of the Propane, Butane or Naphtha Ship Loading Pumps are running, then none of the other two can be started.
Note 13 If XV-6200 or XV-6210 at Berth are opened (see PCAM-550-PL-Y-237), then PBB-1155/1160/1165 Naphtha Ship Loading Pump cannot be started.
Note 14 Any of PSHH or LSLL in alarm condition activates SD of pump.
Note 15 DELETED
~~NOTE 16: ERROR SIGNAL IN INTEROCK~~

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)
AND PPAG-500-MC-K-106 Rebvision 6 (BLOCK 56 - CAMISEA EXPANSION PROJECT)
BLOCK 56 - CAMISEA EXPANSION PROJECT
AUXILIARY SYSTEMS Sheet 1_Existing and New

No.	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
	AUXILIARY SYSTEMS Sheet 1																
1	**NITROGEN**																
2	PAL - 3275	UPON LOW PRESSURE IN INSTRUMENT AIR HEADER, CLOSE SUPPLY TO NITROGEN GENERATOR	650-412		psig					85		THIS LOGIC GOES IN THE PCS					
3	**FUEL GAS SYSTEM**																
4	LT - 3321	VAK-3320	615-403		in				18,3								
5	LT - 3326	VAK-3325	615-403		in				18,3								
6	LT - 13321	VAK-13320	615-703		in				18,3								
7	**FLARE SYSTEMS**																
8	FSL - 3273	Purge gas to LP Flare Header	630-405		SCFH					0							
9	FSL - 3274	Purge Gas to HP Flare Header	630-405		SCFH					0							
10	FSL - 3278	Purge Gas to HP Flare Line	540-230		SCFH					0							
11	FSL - 6201	Purge Gas to HP Flare Line	540-231		SCFH					0							
12	FSL - 13274	Purge Gas to HP Flare Header	630-405		SCFH					0							
13	LSH - 3280	Process Area Flare Header Boot	630-405		in				11,4								
14	LSH - 3281	Process Area Flare Header Boot	630-405		in				25								
15	LSLL - 3255	VBA-3255 Process Area Flare Scrubber	630-8045		in						15						X
16	PSHH - 1200	PBB-1200 Process Area Flare Scrubber Pump	630-8045	3, ~~13~~	psig			12						~~X~~			
17	PSHH - 1205	PBB-1205 Process Area Flare Scrubber Pump	630-8045	4, ~~13~~	psig			12						~~X~~			
18	LT - 3261	VBF-3260	630-406		in						8						X
19	FSL - 6005	Purge Gas to LP Flare Header (Back Up)	630-406		SCFH					0							
20	LSH - 6005	LP Flare Header Boot	630-406	7	in				27,5								
21	FSL - 6000	Purge Gas to HP Flare	630-407		SCFH					0							
22	FSL - 28000A	Purge Gas to HP Flare	630-800		SCFH					0							
23	FSL - 28000B	Purge Gas to Cold Close Drain	630-800		SCFH					0							
22	**DRAIN SYSTEM**																
23	LALL - 3301	VBA-3300 Closed Drain Vessel	665-410-1		in						14						X
24	LAHH - 3301	VBA-3300 Closed Drain Vessel	665-410-1		in			71									
25	PSHH - 1250	PBB-1250 Closed Drain Pump Seal Pot	665-410-1	5, ~~13~~	psig			12									
26	LSLL - 1250	PBB-1250 Closed Drain Pump Seal Pot	665-410-1	5,13							X						
27	XY - 1250	PBB-1250 Closed Drain Pump Seal Pot: PSHH-1250 + LSLL-1250	665-410-1	5								X					
43	LALL - 23301	VBA-23300 Closed Drain Vessel	665-782		in						14						X
47	LAHH - 23301	VBA-23300 Closed Drain Vessel	665-782		in			71									
48	PSHH - 21250	PBB-21250 Closed Drain Pump Seal Pot	665-782	14	psig			12									X
49	LSLL - 21250	PBB-21250 Closed Drain Pump Seal Pot	665-782	14	in						30						
	LSHH - 21250	PBB-21250 Closed Drain Pump Seal Pot	665-782	14				47									
~~50~~	~~XY - 21250~~	~~PBB-21250 Closed Drain Pump Seal Pot: PSHH-21250 + LSLL-21250~~	~~665-782~~	5,~~14~~								~~X~~					
28																	
29																	
30	LALL - 13301	VBA-13300 Closed Drain Vessel	665-710		in						14						X
31	LAL - 13300	VBA-13300 Closed Drain Vessel (In PCS)	665-710		%					29,8						X	
32	TAH - 13300	VBA-13300 Closed Drain Vessel (In PCS)	665-710		° F				120						X		
33	LAHH - 13301	VBA-13300 Closed Drain Vessel	665-710	~~13~~	in			71						~~X~~			
34	PSHH - 11250	PBB-11250 Closed Drain Pump Seal Pot	665-710	5	psig			12						~~X~~			
35	LSLL - 11250	PBB-11250 Closed Drain Pump Seal Pot	665-710	5							30						
36	XY - 11250	PBB-11250 Closed Drain Pump Seal Pot: PSHH-11250 + LSLL-11250	665-710	5, ~~13~~								X					~~X~~
37	LALL - 3311	VBA-3310 Open Drain Vessel	665-410-5		in						20						X
38	LAHH - 3311	VBA-3310 Open Drain Vessel	665-410-5	~~13~~	in			59						~~X~~			
39	LT - 3061	TKBJ-3060 Slop Oil Tank	665-411		in			161			12			X			X
44	LAL - 23300	VBA-23300 Closed Drain Vessel (In PCS)	665-782		in					28,0							
45	LAH - 23300	VBA-23300 Closed Drain Vessel (In PCS)	665-782		in				59								
46	TAH - 23300	VBA-23300 Closed Drain Vessel (In PCS)	665-782		° F				120								
40	**CONTAMINATED FIRE & RAINWATER TREATMENT**																
41	LSHH - 6120	MZZ-6145 Retention Pond	665-410-3		in			17									
42	LSLL - 6120	MZZ-6145 Retention Pond	665-410-3		in						4						X
43	LSH - 6170	MZZ-6175 Retention Pond Overflow Chamber	665-410-3	8, ~~13~~	in			~~79~~	197					~~X~~			
44	LSL - 6170	MZZ-6175 Retention Pond Overflow Chamber	665-410-3	8, ~~13~~	in					23				~~X~~			
45	LSHH - 1210	MZZ-6155 Hydrocarbon API Separator	665-410-3	9, ~~13~~	in			36						~~X~~			
46	LSLL - 1210	MZZ-6155 Hydrocarbon API Separator	665-410-3		in						8						X
59	LAHH - 26131	MZZ-6130 API SEPARATOR	665-410-3	~~13~~	in			40						~~X~~			
60	LALL - 26131	MZZ-6130 API SEPARATOR	665-410-3		in						8						X
61	LAH - 26130	MZZ-6130 API SEPARATOR	665-410-3		in				36								
62	LAL - 26130	MZZ-6130 API SEPARATOR	665-410-3		in					13							
	PAL - 3275	UPON LOW PRESSURE IN INSTRUMENT AIR HEADER, CLOSE SUPPLY TO COURSE BUBBLE DIFFUSER SYSTEM (MZZ-26147)	665-410-3		psig					85		THIS LOGIC GOES IN THE PCS					
47	**POTABLE WATER SYSTEM**																
48	LT - 3056	TKBJ-3055 Potable Water Storage Tank	680-413		in			161						X			
49	LT - 3056	TKBJ-3055 Potable Water Storage Tank	680-413		in						12						X
50	**EXISTING FIREWATER SYSTEM**																
51	LSHH - 3050	TKBJ-3050 Firewater Storage Tank	660-415-1	10	in			708						X			
52	LAHH - 13051	TKBJ-13050 Firewater Storage Tank	660-715		in			708						X			
53	LSH - 3050	TKBJ-3050 Firewater Storage Tank	660-415-1		in				705								
54	LSL - 3050	TKBJ-3050 Firewater Storage Tank	660-415-1		in					54							
55	LSLL - 3050	TKBJ-3050 Firewater Storage Tank	660-415-1	2, ~~13~~	in						50						~~X~~
56	LAL - 3050	TKBJ-3050 Firewater Storage Tank (PCS Signal)	660-415-2		in					590							
57	XA - 1280	PBB-1280 Firewater Jockey Pump	660-415-1			X											
58	UE - 1280	PBB-1280 Firewater Jockey Pump	660-415-1			X											
59	XA - 1285	PBB-1285 Firewater Jockey Pump	660-415-1			X											
60	UE - 1285	PBB-1285 Firewater Jockey Pump	660-415-1			X											
61	PSL - 1260	Firewater Ring Main	660-415-2	1	psig					85						X	
62	XA - 1260 A	Electric Firewater Pump	660-415-2			X											
63	UE - 1260 A	Electric Firewater Pump	660-415-2			X											
64	XA - 1260 B	Electric Firewater Pump	660-415-2			X											
65	UE - 1260 B	Electric Firewater Pump	660-415-2			X											
66	XA - 1270 A	Diesel Firewater Pump	660-415-2			X											
67	UE - 1270 A	Diesel Firewater Pump	660-415-2			X											
68	UAM - 1270 A	Diesel Firewater Pump (Manual)	660-415-2			X											
69	UAM - 1271 A	Diesel Firewater Pump (Auto)	660-415-2			X											
70	XA - 1270 B	Diesel Firewater Pump	660-415-2			X											
71	UE - 1270 B	Diesel Firewater Pump	660-415-2			X											
72	UAM - 1270 B	Diesel Firewater Pump (Manual)	660-415-2			X											
73	UAM - 1271 B	Diesel Firewater Pump (Auto)	660-415-2			X											
74	**EXISTING FIREWATER SYSTEM**																
75	LAH - 13051	TKBJ-13050 Firewater Storage Tank	660-715		in				705								
76	LAL - 13051	TKBJ-13050 Firewater Storage Tank	660-715		in					590							
77	LALL - 13051	TKBJ-13050 Firewater Storage Tank	660-715	2, ~~13~~	in						50						~~X~~
78	UE - 11280	PBB-11280 Firewater Jockey Pump Status	660-716-1			X											
79	XA - 11280	PBB-11280 Firewater Jockey Pump Alarm Summary	660-716-1			X											
80	UE - 11285	PBB-11285 Firewater Jockey Pump Status	660-716-1			X											
81	XA - 11285	PBB-11285 Firewater Jockey Pump Alarm Summary	660-716-1			X											
82	PIT - 11260A	Firewater Ring Main	660-716-1	11	psig					160						X	
83	PSL - 11260B	Firewater Ring Main	660-716-1	11	psig					155						X	
84	XA - 11260 A	PBB-11260A Electric Firewater Pump Alarm Summary	660-716-1			X											
85	UE - 11260 A	PBB-11260A Electric Firewater Pump Status	660-716-1			X											
86	XA - 11260 B	PBB-11260B Electric Firewater Pump Alarm Summary	660-716-1			X											
87	UE - 11260 B	PBB-11260B Electric Firewater Pump Status	660-716-1			X											
88	XA - 11270 A	PBB-11270A Diesel Firewater Pump Alarm Summary	660-716-2			X											
89	UE - 11270 A	PBB-11270A Diesel Firewater Pump Status	660-716-2			X											
90	UAM - 11270 A	PBB-11270A Diesel Firewater Pump (Manual)	660-716-2			X											
91	UAM - 11271 A	PBB-11270A Diesel Firewater Pump (Auto)	660-716-2			X											
92	XA - 11270 B	PBB-11270B Diesel Firewater Pump Alarm Summary	660-716-2			X											
93	UE - 11270 B	PBB-11270B Diesel Firewater Pump Status	660-716-2			X											
94	UAM - 11270 B	PBB-11270B Diesel Firewater Pump (Manual)	660-716-2			X											
95	UAM - 11271 B	PBB-11270B Diesel Firewater Pump (Auto)	660-716-2			X											
96	XA - 11270 C	PBB-11270C Diesel Firewater Pump Alarm Summary	660-716-2			X											
97	UE - 11270 C	PBB-11270C Diesel Firewater Pump Status	660-716-2			X											
98	UAM - 11270 C	PBB-11270C Diesel Firewater Pump (Manual)	660-716-2			X											
99	UAM - 11271 C	PBB-11270C Diesel Firewater Pump (Auto)	660-716-2			X											
100	**HAND SWITCHES IN PCS**																
101	HS - 11260A	PBB-11260A Electric Firewater Pump Remote Start	660-716-1									X					
102	HS - 11260B	PBB-11260B Electric Firewater Pump Remote Start	660-716-1									X					
103	HS - 11270A	PBB-11270A Electric Firewater Pump Remote Start	660-716-2									X					
104	HS - 11270B	PBB-11270B Electric Firewater Pump Remote Start	660-716-2									X					
105	HS - 11270C	PBB-11270C Electric Firewater Pump Remote Start	660-716-2									X					
106	HS - 23295	Inlet to MAN-23295 Nitrogen Generator	650-781														

Effects (columns 1–28):

No. / TAG	1 650-722 Inlet to MAN-13295 Nitrogen Generator XV-13295	2 630-406 LP Flare Scrubber EZZ-3250 LP Flare Scrubber Electrical Heater UCS-3250	3 630-8045 PBB-1200 Process Area Scrubber Pump Motor PBB-1200	4 630-8045 PBB-1200 Process Area Scrubber Pump Motor PBB-1205	5 665-410-1 Close Drain Pump Motor PBB-1250	6 665-710 Close Drain Pump Motor PBB-11250	7 665-410-3 PBB-6120 Retention Pond Pump SV-6120	8 665-410-3 PBB-6125 Retention Pond Pump SV-6125	9 665-410-3 PBB-1215 Skimmer Oil Pump SV-1210	10 665-410-3 PBB-1210 Skimmer Oil Pump SV-1215	11 665-410-5 Non Pressurized Drain Pump Motor PBB-1485	12 665-411 TKBJ-3060 Local Alarm LA-3061	13 680-413 Potable Water Tank Inlet SV-3056 on LV-3055	14 680-413 Potable Water System MZZ-6160 UCS-6160	15 660-415-1 Firewater Tank Inlet Note 10 SV-3051 on LV-3050	16 660-415-2 Firewater Pump (Electric) Motor PBB-1260 A Firewater Pump	17 660-415-2 Firewater Pump (Electric) Motor PBB-1260 B Firewater Pump	18 660-415-2 Firewater Pump (Diesel) Motor PBB-1270 A Firewater Pump	19 660-415-2 Firewater Pump (Diesel) Motor PBB-1270 B Firewater Pump	20 660-716-1 Firewater Pump (Electric) Note 11,12 Motor PBB-11260 A Firewater Pump	21 660-716-1 Firewater Pump (Electric) Note 11,12 Motor PBB-11260 B Firewater Pump	22 660-716-2 Firewater Pump (Diesel) Note 11,12 Motor PBB-11270A Firewater Pump	23 660-716-2 Firewater Pump (Diesel) Note 11,12 Motor PBB-11270B Firewater Pump	24 660-716-2 Firewater Pump (Diesel) Note 11,12 Motor PBB-11270C Firewater Pump	25 650-781 Inlet to MAN-23295 Nitrogen Generator XV-23295	26 665-782 Close Drain Pump Motor PBB-21250	27 665-410-3 PBB-26130 Water Pump SV-26130	28 665-410-3 Inlet to Course bubble diffuser system MZZ-26147 SV-26135
2 PAL-3275	C																								C			
15 LSLL-3255			Stop	Stop																								
18 LT-3261		Stop																										
23 LALL-3301					Stop																							
27 XY-1250					Stop																							
43 LALL-23301																										S		
48 PSHH-21250																										~~S~~		
49 LSLL-21250																										S		
LSHH-21250																										~~S~~		
30 LALL-13301						Stop																						
31 LAL-13300						Stop																						
32 TAH-13300						Stop																						
36 XY-11250						Stop																						
37 LALL-3311											Stop																	
39 LT-3061												X																
42 LSLL-6120							D	D																				
46 LSLL-1210									D	D																		
60 LALL-26131																											D	D
PAL-3275																												C
48 LT-3056													D															
49 LT-3056														Stop														
51 LSHH-3050															D													
61 PSL-1260																Start	Start	Start	Start									
82 PIT-11260A																				Start (according Firewater pump logic)								
83 PSL-11260B																				Start (according Firewater pump logic)								
101 HS-11260A																				Start								
102 HS-11260B																					Start							
103 HS-11270A																						Start						
104 HS-11270B																							Start					
105 HS-11270C																								Start				
106 HS-23295																									C/0			

All other rows have no entries in effect columns 1–28.

NOTES

Note 1 The Electric Firewater Pumps PBE-1260A/B shall start first. Should these pumps fail the Diesel Firewater Pumps must be started. See Page 2 for Start Logic
Note 2 Warn Operator to shutdown Firewater Pumps manually when LSLL activated.
Note 3 Warn Operator to check and shutdown Pump PBB-1200 manually and switchover to Standby Pump PBB-1205.
Note 4 Warn Operator to check and shutdown Pump PBB-1205 manually and switchover to Standby Pump PBB-1200.
Note 5 PSHH, LSLL must be in alarm condition to activate SD of pump. Warn operator to isolate Truck Loading Pump(s) by closing Suction Manual Valve.
Note 6 DELETED.
Note 7 Warn Operator to manually drain the Low Pressure Flare Drain Leg.
Note 8 The Interlocks of PBB-6170/6175/6180 are performed by PBB-1170/75/80 Local Control Panel and not by the SSS.
Note 9 Operator shall start PBB-1210/15 from Control Room.
Note 10 Close the valve LV-3050 (solenoid SV-3051) only if both TK-3050 and TK-13050 Firewater Storages Tanks ARE FULL.
Note 11 The Electric Firewater Pumps PBB-11260A/B shall start first. If these pumps fail the Diesel Firewater Pumps must be started. See sheets Firewater pump logic_new_1 and Firewater pump logic_new_2 for Start Logic Diagram

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)
AND PPAG-500-MC-K-106 Rebvision 6 (B

Effects (columns)

Col	P&ID	Description	Note	Tag
1	533-208	TKBJ-3005 Propane Storage Tank Outlet	Note 6	XY-3005 on XV-3005
2	533-608	TKBJ-13005 Propane Storage Tank Outlet	Note 6	XY-13005 on XV-13005
3	533-609	TKBJ-23005 Propane Storage Tank Outlet	Note 6	XY-23005 on XV-23005
4	533-208	Propane Cool Down Pump		PBB-1325
5	533-208	Propane Cool Down Pump		PBB-1365
6	545-210	PBB-1120 Butane Ship Loading Pump Suction	Note 6	XY-1123 on XV-1123
7	545-211	Butane Ship Loading Pump		PBB-1120
8	545-210	PBB-1125 Butane Ship Loading Pump Suction	Note 6	XY-1125 on XV-1125
9	545-211	Butane Ship Loading Pump		PBB-1125
10	545-209	PBB-1090 Suction	Note 6	XY-1093 on XV-1093
11	545-209	Propane Ship Loading Pump		PBB-1090
12	545-209	PBB-1095 Suction	Note 6	XY-1098 on XV-1098
13	545-209	Propane Ship Loading Pump		PBB-1095
14	545-209	PBB-1100 Suction	Note 6	XY-1103 on XV-1103
15	545-209	Propane Ship Loading Pump		PBB-1100
16	520-8011	PBB-1010/1015 Depropanizer Reflux Pumps Suction	Note 6	SDY-1015 on SDV-1015
17	520-8011	PBB-1010 Depropanizer Reflux Pump		PBB-1010
18	520-8011	PBB-1015 Depropanizer Reflux Pump		PBB-1015
19	520-8013	PBB-1020/1025 Debutanizer Reflux Pumps Suction	Note 6	SDY-1025 on SDV-1025
20	520-8013	PBB-1020 Debutanizer Reflux Pump		PBB-1020
21	520-8013	PBB-1025 Debutanizer Reflux Pump		PBB-1025
22	545-217	PBB-1155 Naphtha Ship Loading Pump Suction	Note 6	XY-1158 on XV-1158
23	545-217	PBB-1155 Naphtha Ship Loading Pump Suction		PBB-1155
24	545-217	PBB-1160 Naphtha Ship Loading Pump Suction	Note 6	XY-1163 on XV-1163
25	545-217	PBB-1160 Naphtha Ship Loading Pump Suction		PBB-1160
26	545-217	PBB-1165 Naphtha Ship Loading Pump Suction	Note 6	XY-1168 on XV-1168
27	545-217	PBB-1165 Naphtha Ship Loading Pump Suction		PBB-1165
28	520-206	TKBJ-3000 Outlet	Note 6	XY-3000 on XV-3000
29	520-206	Naphtha Tower Feed Pump		PBB-1030
30	520-206	Naphtha Tower Feed Pump		PBB-1035
31	0520-503	PBB-11010/11015 Depropanizer Reflux Pumps Suction	Note 6	SDY-11015 on SDV-11015
32	0520-503	PBB-11010 Depropanizer Reflux Pump		PBB-11010
33	0520-503	PBB-11015 Depropanizer Reflux Pump		PBB-11015
34	0520-505	PBB-11020/11025 Debutanizer Reflux Pumps Suction	Note 6	SDY-11025 on SDV-11025
35	0520-505	PBB-11020 Debutanizer Reflux Pump		PBB-11020
36	0520-505	PBB-11025 Debutanizer Reflux Pump		PBB-11025
37	510-203	VBA-3105 Outlet	Note 6	XY-3105 on XV-3105
38	510-603	VBA-13105 Outlet	Note 6	XY-13105 on XV-13105
39	510-203	PBB-1000 Depropanizer Feed Pump		PBB-1000
40	510-203	PBB-1005 Depropanizer Feed Pump		PBB-1005
41	510-603	PBB-11000 Depropanizer Feed Pump		PBB-11000
42	520-606	TKBJ-13000 Outlet	Note 6	XY-13000 on XV-13000
43	520-606	Naphtha Tower Feed Pump		PBB-11030
44	520-606	Naphtha Tower Feed Pump		PBB-11035
45	680-719/21	XV-16801 Deluge Valve		SV-16801
46	680-719/21	XV-16802 Deluge Valve		SV-16802
47	680-719/21	XV-16803 Deluge Valve		SV-16803
48	680-719/21	XV-16804 Deluge Valve		SV-16804
49	680-719/21	XV-16805 Deluge Valve		SV-16805
50	680-719/21	XV-16806 Deluge Valve		SV-16806
51	680-719/21	XV-16807 Deluge Valve		SV-16807
52	680-719/21	XV-16808 Deluge Valve		SV-16808
53	680-719/21	XV-16809 Deluge Valve		SV-16809
54	680-719/21	XV-16810 Deluge Valve		SV-16810
55	680-719/21	XV-16811 Deluge Valve		SV-16811
56	680-719/21	XV-16812 Deluge Valve		SV-16812
57	680-719/21	XV-16813 Deluge Valve		SV-16813
58	680-719/21	XV-16814 Deluge Valve		SV-16814
59	680-719/21	XV-16815 Deluge Valve		SV-16815
60	680-719/21	XV-16816 Deluge Valve		SV-16816
61	680-719/21	XV-16817 Deluge Valve		SV-16817
62	680-719/21	XV-16818 Deluge Valve		SV-16818
63	680-719/21	XV-16819 Deluge Valve		SV-16819
64	680-719/21	XV-16820 Deluge Valve		SV-16820
65	680-719/21	XV-16821 Deluge Valve		SV-16821
66	680-719/21	XV-16822 Deluge Valve		SV-16822
67	680-719/21	XV-16823 Deluge Valve		SV-16823
68	680-719/21	XV-16824 Deluge Valve		SV-16824
69	680-719/21	XV-16834 Deluge Valve		SV-16834
70	680-719/21	XV-16835 Deluge Valve		SV-16835
71	680-719/21	XV-16836 Deluge Valve		SV-16836
72	680-719/21	XV-16837 Deluge Valve		SV-16837
73	680-719/21	XV-16838 Deluge Valve		SV-16838
74	680-719/21	XV-16839 Deluge Valve		SV-16839
75	680-719/21	XV-16840 Deluge Valve		SV-16840
76	680-719/21	XV-16841 Deluge Valve		SV-16841
77	680-719/21	XV-16842 Deluge Valve		SV-16842
78	680-719/21	XV-16843 Deluge Valve		SV-16843
79	680-719/21	XV-16844 Deluge Valve		SV-16844
80	680-719/21	XV-16845 Deluge Valve		SV-16845
81	680-719/21	XV-16846 Deluge Valve		SV-16846
82	680-719/21	XV-166047 Deluge Valve		SV-166047
83	680-719/21	XV-166048 Deluge Valve		SV-166048
84	680-797	XV-26825 Deluge Valve		SV-26825
85	680-797	XV-26826 Deluge Valve		SV-26826
86	680-797	XV-26827 Deluge Valve		SV-26827
87	680-797	XV-26828 Deluge Valve		SV-26828
88	680-797	XV-26829 Deluge Valve		SV-26829
89	680-797	XV-26834 Deluge Valve		SV-26834
90	680-797	XV-26835 Deluge Valve		SV-26835
91	680-797	XV-26836 Deluge Valve		SV-26836
92	680-797	XV-26837 Deluge Valve		SV-26837
93	680-797	XV-26838 Deluge Valve		SV-26838
94	680-797	XV-26839 Deluge Valve		SV-26839
95	680-797	XV-26841 Deluge Valve		SV-26841
96	680-797	XV-26842 Deluge Valve		SV-26842
97	680-797	XV-26821 Deluge Valve		SV-26821
98	680-797	XV-26822 Deluge Valve		SV-26822
99	680-797	XV-26843 Deluge Valve		SV-26843
100	680-797	XV-26844 Deluge Valve		SV-26844
101	680-797	XV-26845 Deluge Valve		SV-26845
102	680-797	XV-26823 Deluge Valve		SV-26823
103	680-797	XV-26824 Deluge Valve		SV-26824
104	680-797	XV-26846 Deluge Valve		SV-26846
105	680-797	XV-26847 Deluge Valve		SV-26847
106	680-797	XV-26848 Deluge Valve		SV-26848
107	680-797	XV-26849 Deluge Valve		SV-26849
108	680-797	XV-26850 Deluge Valve		SV-26850
109	680-797	XV-26851 Deluge Valve		SV-26851
110	680-797	XV-26852 Deluge Valve		SV-26852

Causes

#	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS High High	ALARMS High	INTERLOCKS ON	INTERLOCKS High High	Effects (col: action)
	AUXILIARY SYSTEMS Sheet 2										
1	**FIRE & GAS DETECTION SYSTEM**										
2	**GAS DETECTORS**										
3	AH - 6801	Gas Detector in KBA-2015/2025 Area	680-416-1		%			20			
4	AHH - 6801	Gas Detector in KBA-2015/2025 Area	680-416-1		%		40				
5	AH - 6802	Gas Detector in Cool Down Pumps Area	680-416-1	~~1~~	%			20			
6	AHH - 6802	Gas Detector in Cool Down Pumps Area	680-416-1	1	%		40			X	1: D (CLOSE); 2: D (CLOSE); 3: D (CLOSE); 4: S; 5: S; 11: S; 13: S; 15: S
7	AH - 6803	Gas Detector in Butane Ship Loading Pumps Area	680-416-1	~~3~~	%			20			
8	AHH - 6803	Gas Detector in Butane Ship Loading Pumps Area	680-416-1	3	%		40			X	6: D (CLOSE); 7: S; 8: D (CLOSE); 9: S
9	AH - 6804	Gas Detector in Pressurized Butane Vessels	680-416-1		%			20			
10	AHH - 6804	Gas Detector in Pressurized Butane Vessels	680-416-1		%		40				
11	AH - 6805	Gas Detector in Pressurized Propane Vessels	680-416-1		%			20			
12	AHH - 6805	Gas Detector in Pressurized Propane Vessels	680-416-1		%		40				
13	AH - 6806	Gas Detector in PBB-1000/1005 Area	680-416-1		%			20			
14	AHH - 6806	Gas Detector in PBB-1000/1005 Area	680-416-1	10	%		40			X	37: D (CLOSE); 38: D (CLOSE); 39: S; 40: S; 41: S
15	AH - 6807	Gas Detector in Control Room Air Conditioning Inlet	680-416-1		%			20			
16	AHH - 6807	Gas Detector in Control Room Air Conditioning Inlet	680-416-1		%		40				
17	AH - 6808	Gas Detector in Generators Area	680-416-1		%			20			
18	AHH - 6808	Gas Detector in Generators Area	680-416-1		%		40				
19	AH - 6809	Gas Detector in Generators Area	680-416-1		%			20			
20	AHH - 6809	Gas Detector in Generators Area	680-416-1		%		40				
21	AH - 6810	Gas Detector in KBA-2000 Area	680-416-1		%			20			
22	AHH - 6810	Gas Detector in KBA-2000 Area	680-416-1		%		40				
23	AH - 6811	Gas Detector in KBA-2005 Area	680-416-1		%			20			
24	AHH - 6811	Gas Detector in KBA-2005 Area	680-416-1		%		40				
25	AH - 6812	Gas Detector in Butane Truck Loading Area	680-416-1		%			20			
26	AHH - 6812	Gas Detector in Butane Truck Loading Area	680-416-1		%		40				
27	AH - 6813	Gas Detector in Propane Truck Loading Area	680-416-1		%			20			
28	AHH - 6813	Gas Detector in Propane Truck Loading Area	680-416-1		%		40				
29	AH - 6814	Gas Detector in Propane Ship Loading Area	680-416-1	~~2~~	%			20			
30	AHH - 6814	Gas Detector in Propane Ship Loading Area	680-416-1	2	%		40			X	10: D (CLOSE); 11: S; 12: D (CLOSE); 13: S; 14: D (CLOSE); 15: S
31	AH - 6815	Gas Detector in Butane Ship Loading Pumps Area	680-416-1		%			20			
32	AHH - 6815	Gas Detector in Butane Ship Loading Pumps Area	680-416-1	2	%		40			X	10: D; 11: S; 12: D; 13: S; 14: D; 15: S
33	AH - 6816	Gas Detector in KBA-2010 Area	680-416-1		%			20			
34	AHH - 6816	Gas Detector in KBA-2010 Area	680-416-1		%		40				
35	AH - 6817	Gas Detector in KBA-2020/2030 Area	680-416-1		%			20			
36	AHH - 6817	Gas Detector in KBA-2020/2030 Area	680-416-1		%		40				
37	AH - 6818	Gas Detector in VBA-3105 Area	680-416-1		%			20			
38	AHH - 6818	Gas Detector in VBA-3105 Area	680-416-1		%		40				
39	AH - 6819	Gas Detector in TKBJ-3005 Area	680-416-1		%			20			
40	AHH - 6819	Gas Detector in TKBJ-3005 Area	680-416-1		%		40				
41	AH - 6820	Gas Detector in TKBJ-3010 Area	680-416-1		%			20			
42	AHH - 6820	Gas Detector in TKBJ-3010 Area	680-416-1		%		40				
43	AH - 6821	Gas Detector in PBB-1010/1015 Area (propane reflux pumps_fractionation unit 1)	680-416-1		%			20			
44	AHH - 6821	Gas Detector in PBB-1010/1015 Area (propane reflux pumps_fractionation unit 1)	680-416-1	11	%		40			X	16: D; 17: S; 18: S
45	AH - 6822	Gas Detector in PBB-1020/1025 Area (butane reflux pumps_fractionation unit 1)	680-416-1		%			20			
46	AHH - 6822	Gas Detector in PBB-1020/1025 Area (butane reflux pumps_fractionation unit 1)	680-416-1	12	%		40			X	19: D; 20: S; 21: S
47	AH - 6823	Gas Detector in PBB-1030/1035 Area	680-416-1		%			20			
48	AHH - 6823	Gas Detector in PBB-1030/1035 Area	680-416-1		%		40				
49	AH - 6824	Gas Detector in PBB-1155/1160/1165 Area (Naphtha ship loading pumps)	680-416-1	4	%			20			
50	AHH - 6824	Gas Detector in PBB-1155/1160/1165 Area (Naphtha ship loading pumps)	680-416-1	4	%		40				
51	AH - 6040	Gas Detector in LPG Truck Loading Station MZZ-6040	680-416-1		%			20			
52	AHH - 6040	Gas Detector in LPG Truck Loading Station MZZ-6040	680-416-1		%		40				
53	AH - 6140	Gas Detector in LPG Truck Loading Station MZZ-6140	680-416-1		%			20			
54	AHH - 6140	Gas Detector in LPG Truck Loading Station MZZ-6140	680-416-1		%		40				
55	AH - 6240	Gas Detector in LPG Truck Loading Station MZZ-6240	680-416-1		%			20			
56	AHH - 6240	Gas Detector in LPG Truck Loading Station MZZ-6240	680-416-1		%		40				
57	AH - 6340	Gas Detector in LPG Truck Loading Station MZZ-6340	680-416-1	5	%			20			
58	AHH - 6340	Gas Detector in LPG Truck Loading Station MZZ-6340	680-416-1	5	%		40				
59	AH - 6260	Gas Detector in Diesel Truck Loading Station MZZ-6260	680-416-1		%			20			
60	AHH - 6260	Gas Detector in Diesel Truck Loading Station MZZ-6260	680-416-1		%		40				
61	AH - 6270	Gas Detector in Diesel Truck Loading Station MZZ-6270	680-416-1		%			20			
62	AHH - 6270	Gas Detector in Diesel Truck Loading Station MZZ-6270	680-416-1		%		40				
63	AH - 6280	Gas Detector in Diesel Truck Loading Station MZZ-6280	680-416-1	5	%			20			
64	AHH - 6280	Gas Detector in Diesel Truck Loading Station MZZ-6280	680-416-1	5	%		40				
65	AH - 6290	Gas Detector in Diesel Truck Loading Station MZZ-6290	680-416-1	5	%			20			
66	AHH - 6290	Gas Detector in Diesel Truck Loading Station MZZ-6290	680-416-1	5	%		40				
67	AH - 16801	VBA-13105 FEED SURGE VESSEL	680-719		%			20			
68	AHH - 16801	VBA-13105 FEED SURGE VESSEL	680-719	7	%		40			X	45: O; 46: O; 76: O; 77: O
69	AH - 16802	TKBJ-13005 PROPANE STORAGE TANK	680-719		%			20			
70	AHH - 16802	TKBJ-13005 PROPANE STORAGE TANK	680-719	7	%		40			X	49: O; 50: O; 51: O; 52: O; 53: O
71	AH - 16803	TKBJ-23005 PROPANE STORAGE TANK	680-719		%			20			
72	AHH - 16803	TKBJ-23005 PROPANE STORAGE TANK	680-719	7	%		40			X	54: O; 55: O; 56: O; 57: O; 58: O
73	AH - 16804	TKBJ-13010 BUTANE STORAGE TANK	680-719		%			20			
74	AHH - 16804	TKBJ-13010 BUTANE STORAGE TANK	680-719	7	%		40			X	59: O; 60: O; 61: O; 62: O; 63: O
75	AH - 16805	TKBJ-23010 BUTANE STORAGE TANK	680-719		%			20			
76	AHH - 16805	TKBJ-23010 BUTANE STORAGE TANK	680-719	7	%		40			X	64: O; 65: O; 66: O; 67: O; 68: O
77	AH - 16806	PBB-11010/15 DEPROPANIZER REFLUX PUMPS	680-719		%			20			
78	AHH - 16806	PBB-11010/15 DEPROPANIZER REFLUX PUMPS	680-719	7, 13	%		40			X	31: D; 32: S; 33: S; 71: O; 73: O
79	AH - 16807	PBB-11020/25 DEBUTANIZER REFLUX PUMPS	680-719		%			20			
80	AHH - 16807	PBB-11020/25 DEBUTANIZER REFLUX PUMPS	680-719	7, 14	%		40			X	34: D; 35: S; 36: S; 72: O; 74: O
81	AH - 16808	CBA-13065 DEPROPANIZER	680-719		%			20			
82	AHH - 16808	CBA-13065 DEPROPANIZER	680-719	7	%		40			X	69: O
83	AH - 16809	CBA-13070 DEBUTANIZER	680-719		%			20			
84	AHH - 16809	CBA-13070 DEBUTANIZER	680-719	7	%		40			X	70: O
85	AH - 16810	REMOTE IMPOUNDING STORAGE TANKS AREA	680-719		%			20			
86	AHH - 16810	REMOTE IMPOUNDING STORAGE TANKS AREA	680-719	7	%		40			X	75: O; 83: O
87	AH - 16811	REMOTE IMPOUNDING STORAGE TANKS AREA	680-719		%			20			
88	AHH - 16811	REMOTE IMPOUNDING STORAGE TANKS AREA	680-719	7	%		40			X	75: O; 83: O
89	AH - 16812	REMOTE IMPOUNDING STORAGE TANKS AREA	680-719		%			20			
90	AHH - 16812	REMOTE IMPOUNDING STORAGE TANKS AREA	680-719	7	%		40			X	75: O; 83: O
91	AH - 16813	KBA-12000 PROPANE COMPRESSOR (VRU UNIT)	680-719		%			20			
92	AHH - 16813	KBA-12000 PROPANE COMPRESSOR (VRU UNIT)	680-719		%		40				
93	AH - 16814	KBA-12010 BUTANE COMPRESSOR (VRU UNIT)	680-719		%			20			
94	AHH - 16814	KBA-12010 BUTANE COMPRESSOR (VRU UNIT)	680-719		%		40				
95	AH - 16815	KBA-12015/25 REFRIGERANT COMPRESSOR (REFRIGERATION UNIT)	680-719		%			20			
96	AHH - 16815	KBA-12015/25 REFRIGERANT COMPRESSOR (REFRIGERATION UNIT)	680-719	7	%		40			X	79: O
97	AH - 16816	KBA-19000 PRECOOLING COMPRESSOR (REFRIGERATION UNIT)	680-719		%			20			
98	AHH - 16816	KBA-19000 PRECOOLING COMPRESSOR (REFRIGERATION UNIT)	680-719	7	%		40			X	80: O
99	AH - 16817	KBA-19001 PRECOOLING COMPRESSOR (REFRIGERATION UNIT)	680-719		%			20			
100	AHH - 16817	KBA-19001 PRECOOLING COMPRESSOR (REFRIGERATION UNIT)	680-719		%		40				
101	AH - 16818	PBB-11105/06 PROPANE CONDENSATE RETURN PUMPS (VRU UNIT)	680-719		%			20			
102	AHH - 16818	PBB-11105/06 PROPANE CONDENSATE RETURN PUMPS (VRU UNIT)	680-719		%		40				
103	AH - 16819	PBB-11115/16 BUTANE CONDENSATE RETURN PUMPS (VRU UNIT)	680-719		%			20			
104	AHH - 16819	PBB-11115/16 BUTANE CONDENSATE RETURN PUMPS (VRU UNIT)	680-719		%		40				
105	AH - 16820	PBB-11565 REFRIGERANT LIQUID ACCUMULATOR PUMP (REFRIGERATION UNIT)	680-719		%			20			
106	AHH - 16820	PBB-11565 REFRIGERANT LIQUID ACCUMULATOR PUMP (REFRIGERATION UNIT)	680-719	7	%		40			X	79: O; 80: O
107	AH - 16821	PBB-11000 DEPROPANIZER FEED PUMP	680-719		%			20			
108	AHH - 16821	PBB-11000 DEPROPANIZER FEED PUMP	680-719	7, 10	%		40			X	37: D (CLOSE); 38: D (CLOSE); 39: S; 40: S; 41: S
109	AH - 16822	PBB-11030/35 NAPHTHA TOWER FEED PUMPS	680-719		%			20			
110	AHH - 16822	PBB-11030/35 NAPHTHA TOWER FEED PUMPS	680-719	7	%		40			X	47: O; 48: O
111	AH - 16823	REMOTE IMPOUNDING SPHERE AREA	680-719		%			20			
112	AHH - 16823	REMOTE IMPOUNDING SPHERE AREA	680-719	7	%		40			X	81: O; 82: O
113	AH - 16824	REMOTE IMPOUNDING SPHERE AREA	680-719		%			20			
114	AHH - 16824	REMOTE IMPOUNDING SPHERE AREA	680-719	7	%		40			X	81: O; 82: O
115	AH - 16825	REMOTE IMPOUNDING SPHERE AREA	680-719		%			20			
116	AHH - 16825	REMOTE IMPOUNDING SPHERE AREA	680-719	7	%		40			X	81: O; 82: O
117	AH - 16826	VBA-13170 PROPANE CONDENSATE ACCUMULATOR (VRU UNIT)	680-719		%			20			
118	AHH - 16826	VBA-13170 PROPANE CONDENSATE ACCUMULATOR (VRU UNIT)	680-719		%		40				
119	AH - 16827	VBA-13180 BUTANE CONDENSATE ACCUMULATOR (VRU UNIT)	680-719		%			20			
120	AHH - 16827	VBA-13180 BUTANE CONDENSATE ACCUMULATOR (VRU UNIT)	680-719		%		40				
121	AH - 16828	MZZ-6175 RETENTION POND OVERFLOW CHAMBER	680-719		%			20			
122	AHH - 16828	MZZ-6175 RETENTION POND OVERFLOW CHAMBER	680-719		%		40				
123	AH - 16829	MZZ-6145 RETENTION POND	680-719		%			20			
124	AHH - 16829	MZZ-6145 RETENTION POND	680-719		%		40				
125	AH - 26801	VBA-23105 FEED SURGE VESSEL	680-797		%	X		20			
	AHH - 26801	VBA-23105 FEED SURGE VESSEL	680-797	7	%	X	40			X	95: O; 96: O; 97: O; 98: O
126	AH - 26806	PBB-21010/15 DEPROPANIZER REFLUX PUMPS	680-797		%	X		20			
	AHH - 26806	PBB-21010/15 DEPROPANIZER REFLUX PUMPS	680-797	7, 15	%	X	40			X	92: O
127	AH - 26807	PBB-21020/25 DEBUTANIZER REFLUX PUMPS	680-797		%	X		20			
	AHH - 26807	PBB-21020/25 DEBUTANIZER REFLUX PUMPS	680-797	7, 16	%	X	40			X	93: O
128	AH - 26808	CBA-23065 DEPROPANIZER	680-797		%	X		20			
	AHH - 26808	CBA-23065 DEPROPANIZER	680-797	7	%	X	40			X	90: O
129	AH - 26809	CBA-23070 DEBUTANIZER	680-797		%	X		20			
	AHH - 26809	CBA-23070 DEBUTANIZER	680-797	7	%	X	40			X	91: O
	AH - 26810	PBB-21140/45 PROPANE TRUCK LOADONG PUMPS	680-797		%	X		20			
130	AHH - 26810	PBB-21140/45 PROPANE TRUCK LOADONG PUMPS	680-797		%	X	40				
131	AH - 26811	PBB-21175/80 BUTANE TRUCK LOADONG PUMPS	680-797		%	X		20			
	AHH - 26811	PBB-21175/80 BUTANE TRUCK LOADONG PUMPS	680-797		%	X	40				
132	AH - 26812	PBB-21165/70 PROPANE TRUCK LOADONG PUMPS	680-797		%	X		20			
	AHH - 26812	PBB-21165/70 PROPANE TRUCK LOADONG PUMPS	680-797		%	X	40				
133	AH - 26813	KBA-22000 PROPANE VRU COMPRESSOR	680-797		%	X		20			
	AHH - 26813	KBA-22000 PROPANE VRU COMPRESSOR	680-797		%	X	40				
134	AH - 26814	PBB-21130/35 PROPANE TRUCK LOADONG PUMPS	680-797		%	X		20			
	AHH - 26814	PBB-21130/35 PROPANE TRUCK LOADONG PUMPS	680-797		%	X	40				
135	AH - 26815	KBA-22015/25 REFRIGERANT COMPRESSOR	680-797		%	X		20			
	AHH - 26815	KBA-22015/25 REFRIGERANT COMPRESSOR	680-797	7, 17	%	X	40			X	100: O; 101: O; 104: O
136	AH - 26816	KBA-29000 PRECOOLING COMPRESSOR	680-797		%	X		20			
	AHH - 26816	KBA-29000 PRECOOLING COMPRESSOR	680-797	7, 17	%	X	40			X	104: O
137	AH - 26817	EBG-2998/EGB-24010 REFRIGERATION UNIT	680-797		%	X		20			
	AHH - 26817	EBG-2998/EGB-24010 REFRIGERATION UNIT	680-797	7, 17	%	X	40			X	100: O; 101: O; 104: O
138	AH - 26818	PBB-21105/06 PROPANE CONDENSATE RETURN PUMPS (VRU UNIT)	680-797		%	X		20			
	AHH - 26818	PBB-21105/06 PROPANE CONDENSATE RETURN PUMPS (VRU UNIT)	680-797		%	X	40				
139	AH - 26820	PBB-21565 REFRIGERANT LIQUID ACCUM.PUMP (REFRIGERATION UNIT)	680-797		%	X		20			
	AHH - 26820	PBB-21565 REFRIGERANT LIQUID ACCUM.PUMP (REFRIGERATION UNIT)	680-797		%	X	40				
140	AH - 26822	PBB-21030/35 NAPHTHA TOWER FEED PUMPS	680-797		%	X		20			
	AHH - 26822	PBB-21030/35 NAPHTHA TOWER FEED PUMPS	680-797	7	%	X	40			X	102: O; 103: O
141	AH - 26826	VBA-23170 PROPANE CONDENSOR ACCUMULATOR (VRU UNIT)	680-797		%	X		20			
142	AHH - 26826	VBA-23170 PROPANE CONDENSOR ACCUMULATOR (VRU UNIT)	680-797		%	X	40				
125	**ULTRAVIOLET/INFRARED FLAME DETECTORS**										
126	UV/IR - 6801	Flame Detector in KBA-2015/2025 & KBA-2020/2030	680-416-1			X					
127	UV/IR - 6802	Flame Detector in Propane Ship Loading Area	680-416-1			X					
128	UV/IR - 6803	Flame Detector in Butane Ship Loading Area	680-416-1			X					
129	UV/IR - 6807	Flame Detector in Heaters Area	680-416-1			X					
130	UV/IR - 6808	Flame Detector in Generators Area	680-416-1			X					
131	UV/IR - 6809	Flame Detector in Generators Area	680-416-1			X					
132	UV/IR - 6810	Flame Detector in KBA-2000	680-416-1			X					
133	UV/IR - 6811	Flame Detector in KBA-2005	680-416-1			X					
134	UV/IR - 6812	Flame Detector in KBA-2010	680-416-1			X					
135	UV/IR - 6040	Flame Detector in LPG Truck Loading Station MZZ-6040	680-416-1			X					
136	UV/IR - 6140	Flame Detector in LPG Truck Loading Station MZZ-6140	680-416-1			X					
137	UV/IR - 6240	Flame Detector in LPG Truck Loading Station MZZ-6240	680-416-1			X					
138	UV/IR - 6340	Flame Detector in LPG Truck Loading Station MZZ-6340	680-416-1	5		X					
139	UV/IR - 6260	Flame Detector in Diesel Truck Loading Station MZZ-6260	680-416-1			X					
140	UV/IR - 6270	Flame Detector in Diesel Truck Loading Station MZZ-6270	680-416-1			X					
141	UV/IR - 6280	Flame Detector in Diesel Truck Loading Station MZZ-6280	680-416-1	5		X					
142	UV/IR - 6290	Flame Detector in Diesel Truck Loading Station MZZ-6290	680-416-1	5		X					
143	UV/IR - 16801	Flame Detector in Naphtha Tower Area	680-719	8		X			X		78: O
144	UV/IR - 16802	Flame Detector in Heaters Area	680-719			X					
145	UV/IR - 16803	Flame Detector in Propane Compressor (VRU UNIT)	680-719			X					
146	UV/IR - 16804	Flame Detector in Butane Compressor (VRU UNIT)	680-719			X					
147	UV/IR - 16805	Flame Detector in Refrigerant Compressors (Refrigeration unit)	680-719	8		X			X		79: O
148	UV/IR - 16806	Flame Detector in Precooling Compressors (Refrigeration unit)	680-719	8		X			X		80: O
149	UV/IR - 16807	Flame Detector in Precooling Compressors (Refrigeration unit)	680-719			X					
150	UV/IR - 26801	NAPHTHA TOWER AREA	680-797	8		X			X		99: O
~~151~~	~~UV/IR - 26801~~	~~NAPHTHA TOWER AREA~~	~~680-797~~			~~X~~					
~~152~~	~~UV/IR - 26801~~	~~NAPHTHA TOWER AREA~~	~~680-797~~			~~X~~					
~~153~~	~~UV/IR - 26801~~	~~NAPHTHA TOWER AREA~~	~~680-797~~			~~X~~					
154	UV/IR - 26802	HEATERS AREA	680-797			X					
~~155~~	~~UV/IR - 26802~~	~~HEATERS AREA~~	~~680-797~~			~~X~~					
~~156~~	~~UV/IR - 26802~~	~~HEATERS AREA~~	~~680-797~~			~~X~~					
~~157~~	~~UV/IR - 26802~~	~~HEATERS AREA~~	~~680-797~~			~~X~~					
158	UV/IR - 26803	PROPANE COMPRESSOR (VRU UNIT)	680-797			X					
~~159~~	~~UV/IR - 26803~~	~~PROPANE COMPRESSOR (VRU UNIT)~~	~~680-797~~			~~X~~					
~~160~~	~~UV/IR - 26803~~	~~PROPANE COMPRESSOR (VRU UNIT)~~	~~680-797~~			~~X~~					
~~161~~	~~UV/IR - 26803~~	~~PROPANE COMPRESSOR (VRU UNIT)~~	~~680-797~~			~~X~~					
162	UV/IR - 26805	REFRIGERANT COMPRESSORS (REFRIGERATION UNIT)	680-797	8,17		X			X		100: O; 101: O; 104: O
~~163~~	~~UV/IR - 26805~~	~~REFRIGERANT COMPRESSORS (REFRIGERATION UNIT)~~	~~680-797~~			~~X~~					
~~164~~	~~UV/IR - 26805~~	~~REFRIGERANT COMPRESSORS (REFRIGERATION UNIT)~~	~~680-797~~			~~X~~					
~~165~~	~~UV/IR - 26805~~	~~REFRIGERANT COMPRESSORS (REFRIGERATION UNIT)~~	~~680-797~~			~~X~~					
166	UV/IR - 26806	PRECOOLING COMPRESSORS (REFRIGERATION UNIT)	680-797	8,17		X			X		104: O
~~167~~	~~UV/IR - 26806~~	~~PRECOOLING COMPRESSORS (REFRIGERATION UNIT)~~	~~680-797~~			~~X~~					
~~168~~	~~UV/IR - 26806~~	~~PRECOOLING COMPRESSORS (REFRIGERATION UNIT)~~	~~680-797~~			~~X~~					
~~169~~	~~UV/IR - 26806~~	~~PRECOOLING COMPRESSORS (REFRIGERATION UNIT)~~	~~680-797~~			~~X~~					
170	UV/IR - 26807	PRECOOLING COMPRESSORS (REFRIGERATION UNIT)	680-797			X					
~~171~~	~~UV/IR - 26807~~	~~PRECOOLING COMPRESSORS (REFRIGERATION UNIT)~~	~~680-797~~			~~X~~					
~~172~~	~~UV/IR - 26807~~	~~PRECOOLING COMPRESSORS (REFRIGERATION UNIT)~~	~~680-797~~			~~X~~					
~~173~~	~~UV/IR - 26807~~	~~PRECOOLING COMPRESSORS (REFRIGERATION UNIT)~~	~~680-797~~			~~X~~					
174											
175											
176											
177											

NOTES

Note 1 If PSHH-1325 and AT-6802 (Gas Detector, see PCAM-680-PL-Y-416-1) are in alarm condition, then PBB-1325/1365/1090/1095/1100 must be stopped and XV-3
If PSHH-1365 and AT-6802 (Gas Detector, see PCAM-680-PL-Y-416-1) are in alarm condition then PBB-1325/1365/1090/1095/1100 must be stopped and XV-3

Note 2 If the PSHH AND (AT-6814 OR AT-6815) are in alarm condition then the pump corresponding to the PSHH must be stoped and its suction valve must be closed.

Note 3 If the PSHH and the AT-6803 are in alarm condition then the pump corresponding to the PSHH must be stoped and its suction valve must be closed.

~~Note 4 If the PSHH and the AT-6824 are in alarm condition then the pump corresponding to the PSHH must be stoped and its suction valve must be closed.~~

Note 5 FUTURE.

Note 6 THE LOGIC SHOULD BE IN THE FOLLOWING ORDER: FIRST STOP THE PUMP, THEN CLOSE THE VALVE.

Note 7 Provide 1 min time delay to allow the operator to bypass the interlock in case of spurious alarm.

Note 8 Provide 1 min time delay to allow the operator to bypass the interlock in case of spurious alarm.

~~Note 9 PSHH (seal pot) and AHH (gas detector) must be in alarm condition to activate Shutdown of the pumps and suction SDV.~~

Note 10 IF (PSHH-1000 OR PSHH-1005 OR PSHH-11000) AND (AHH-6806 OR AHH-16821) ARE ACTIVE THEN STOP PBB-1000, PBB-1005 AND PBB-11000, AND

NOTE 11 If PSHH-1010 or PSHH-1015 is in alarm condition and also AT-6821(Gas Detector) is in alarm condition, both pump must be stopped (PBB-1010 & PBB-1015) and the suction valve must be closed (SDY-1015 deenergize).

NOTE 12 If PSHH-1020 or PSHH-1025 is in alarm condition and also AT-6822(Gas Detector) is in alarm condition, both pump must be stopped (PBB-1020 & PBB-1025) and the suction valve must be closed (SDY-1025 deenergize).

NOTE 13 If PSHH-11010 or PSHH-11015 is in alarm condition and also AT-16806 (Gas Detector) is in alarm condition, both pump must be stopped (PBB-11010 & PBB-11015) and the suction valve must be closed (SDY-11015 deenergize).

NOTE 14 If PSHH-11020 or PSHH-11025 is in alarm condition and also AT-16807(Gas Detector) is in alarm condition, both pump must be stopped (PBB-11020 & PBB-11025) and the suction valve must be closed (SDY-11025 deenergize).

NOTE 15 If PSHH-21010 or PSHH-21015 is in alarm condition and also AT-26806 (Gas Detector) is in alarm condition, both pumps must be stopped (PBB-21010 & PBB-21015) and the suction valve must be closed (SDY-21015 deenergize).

NOTE 16 If PSHH-21020 or PSHH-21025 is in alarm condition and also AT-26807 (Gas Detector) is in alarm condition, both pumps must be stopped (PBB-21020 & PBB-21025) and the suction valve must be closed (SDY-21025 deenergize).

NOTE 17 Upon opening of XV-26846, fans of air coolers EAL-29000 and EAL-24590 must be shut down. This interlock must must have an override for testing purposes.

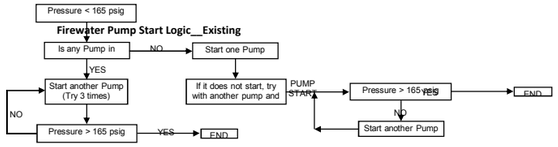
CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
PROYECTO EPC2-PGCD PLANT
PGCD PLANT
Reference: PCAM-320-CTT-006 Revision 6 (EPC2-PGCD PLANT)
MMI: PFAS-030-MR-X-006 Revision 0 (

	TAG	Loop service	P&ID	Notes	ALARMS: CCR	ALARMS: LOT	ALARMS: Field	ALARMS: Sirens	ALARMS: Strobes	INTERLOCKS: CCR	INTERLOCKS: SS-TK-PC	INTERLOCKS: Other Interlocks
1		AUXILIARY SYSTEMS Sheet 3										
2		FIRE & GAS DETECTION SYSTEM (CONTINUATION)										
3		MANUAL CALL POINTS										
4	HS - 6821	Manual Call Alarm in Heaters Area	680-416-1		X							
5	HS - 6822	Manual Call Alarm in Propane Ship Loading Pumps	680-416-1		X							
6	HS - 6823	Manual Call Alarm in Butane Ship Loading Pumps	680-416-1		X							
7	HS - 6824	Manual Call Alarm in Pressurized Propane / Butane Vessels	680-416-1		X							
8	HS - 6825	Manual Call Alarm in HP Flare Scrubber Area	680-416-1		X							
9	HS - 6826	Manual Call Alarm in MAU-8010 Area	680-416-1		X							
10	HS - 6827	Manual Call Alarm in Control Room	680-416-1		X							
11	HS - 6828	Manual Call Alarm in Generators Area	680-416-1		X							
12	HS - 6829	Manual Call Alarm in Maintenance Shop Area	680-416-1		X							
13	HS - 6830	Manual Call Alarm in PBB- 1030/1055 Area	680-416-1		X							
14	HS - 6831	Manual Call Alarm in VBA-3010 Area	680-416-1		X							
15	HS - 6832	Manual Call Alarm in Sewage Treatment 3060 Disc Area	680-416-1		X							
16	HS - 6833	Manual Call Alarm in EAL-4000 Shell Side	680-416-1		X							
17	HS - 6834	Manual Call Alarm in EAL-4000 Wset Area	680-416-1		X							
18	HS - 6835	Manual Call Alarm in EAL-4200 West Area	680-416-1		X							
19	HS - 6836	Manual Call Alarm in Future Diesel Pumps Area	680-416-1		X							
20	HS - 6837	Manual Call Alarm in Naphtha Ship Loading Pumps Area	680-416-1		X							
21	HS - 6838	Manual Call Alarm in TKBJ-3000 Area	680-416-1		X							
22	HS - 6839	Manual Call Alarm in LPG Truck Loading Station MZZ-6040	680-416-1		X							
23	HS - 6147	Manual Call Alarm in LPG Truck Loading Station MZZ-6140	680-416-1		X							
24	HS - 6247	Manual Call Alarm in LPG Truck Loading Station MZZ-6240	680-416-1		X							
25	HS - 6347	Manual Call Alarm in LPG Truck Loading Station MZZ-6340 (FUTURE)	680-416-1	1	X							
26	HS - 6267	Manual Call Alarm in Diesel Truck Loading Station MZZ-6280	680-416-1		X							
27	HS - 6277	Manual Call Alarm in Diesel Truck Loading Station MZZ-6270	680-416-1		X							
28	HS - 6287	Manual Call Alarm in Diesel Truck Loading Station MZZ-6380 (FUTURE)	680-416-1	1	X							
29	HS - 6297	Manual Call Alarm in Diesel Truck Loading Station MZZ-6290 (FUTURE)	680-416-1	1	X							
30	HS - 16801	Manual Call Alarm in Propane Storage Area	680-719		X							
31	HS - 16802	Manual Call Alarm in Diesel Storage Area	680-719		X							
32	HS - 16803	Manual Call Alarm in Naphtha Storage Area	680-719		X							
33	HS - 16804	Manual Call Alarm in Fractionation Unit 2 North Side	680-719		X							
34	HS - 16805	Manual Call Alarm in Coolers Area	680-719		X							
35	HS - 16806	Manual Call Alarm in Heaters Area	680-719		X							
36	HS - 29802	Manual Call Point FRACTIONATION UNIT 2 STORAGE TANK AREA	680-797		X							
37	HS - 29804	Manual Call Point FRACTIONATION UNIT 2 WEST SIDE	680-797		X							
38	HS - 29805	Manual Call Point FRACTIONATION UNIT 2 COOLERS AREA	680-797		X							
39	HS - 29806	Manual Call Point FRACTIONATION UNIT 2 HEATERS AREA	680-797		X							
40	HS - 29807	Manual Call Point VRU AREA	680-797		X							
41	HS - 29808	Manual Call Point FUEL GAS METERING AREA	680-797		X							
42		REMOTE ANNUNCIATOR TO OPEN EACH DELUGE VALVE										
43	HS - 6851	Deluge valve for VBA-3100 PRESSURIZED BUTANE STORAGE VESSEL	680-416-1							X	X	
44	HS - 6852	Deluge valve for VBA-3210 PRESSURIZED BUTANE STORAGE VESSEL	680-416-1							X		
45	HS - 6853	Deluge valve for VBA-3100 FEED SURGE VESSEL	680-416-1							X		
46	HS - 6854	Deluge valve for TKBJ-3040 Utility Diesel Storage Tank	680-416-1							X		
47	HS - 6855	Deluge valve in LPG Truck Loading Station MZZ-6040	680-416-1							X		
48	HS - 6856	Deluge valve in LPG Truck Loading Station MZZ-6140	680-416-1							X		
49	HS - 6857	Deluge valve in LPG Truck Loading Station MZZ-6240	680-416-1							X		
50	HS - 6858	Deluge valve in LPG Truck Loading Station MZZ-6340 (FUTURE)	680-416-1	1						X		
51	HS - 6859	Deluge valve in Diesel Truck Loading Station MZZ-6280	680-416-1							X		
52	HS - 6860	Deluge valve in Diesel Truck Loading Station MZZ-6270	680-416-1							X		
53	HS - 6861	Deluge valve in Diesel Truck Loading Station MZZ-6380 (FUTURE)	680-416-1	1						X		
54	HS - 6862	Deluge valve in Diesel Truck Loading Station MZZ-6290 (FUTURE)	680-416-1	1						X		
55	HS - 16821	Deluge valve for VBA-13100 FEED SURGE VESSEL	680-719/727							X		
56	HS - 16822	Deluge valve for TKBJ-13000 PROPANE SURGE TANK	680-719/727							X		
57	HS - 16823	Deluge valve for TKBJ-13000 CONDENSATE SURGE TANK	680-719/727							X		
58	HS - 16824	Deluge valve for TKBJ-13000 CONDENSATE SURGE TANK	680-719/727							X		
59	HS - 16825	Deluge valve for TKBJ-13005 PROPANE STORAGE TANK	680-719/727							X		
60	HS - 16826	Deluge valve for TKBJ-13005 PROPANE STORAGE TANK	680-719/727							X		
61	HS - 16827	Deluge valve for TKBJ-13005 PROPANE STORAGE TANK	680-719/727							X		
62	HS - 16828	Deluge valve for TKBJ-13005 PROPANE STORAGE TANK	680-719/727							X		
63	HS - 16829	Deluge valve for TKBJ-13005 PROPANE STORAGE TANK	680-719/727							X		
64	HS - 16810	Deluge valve for TKBJ-23005 PROPANE STORAGE TANK	680-719/727							X		
65	HS - 16811	Deluge valve for TKBJ-23005 PROPANE STORAGE TANK	680-719/727							X		
66	HS - 16812	Deluge valve for TKBJ-23005 PROPANE STORAGE TANK	680-719/727							X		
67	HS - 16813	Deluge valve for TKBJ-23005 PROPANE STORAGE TANK	680-719/727							X		
68	HS - 16814	Deluge valve for TKBJ-23005 PROPANE STORAGE TANK	680-719/727							X		
69	HS - 16815	Deluge valve for TKBJ-13010 BUTANE STORAGE TANK	680-719/727							X		
70	HS - 16816	Deluge valve for TKBJ-13010 BUTANE STORAGE TANK	680-719/727							X		
71	HS - 16817	Deluge valve for TKBJ-13010 BUTANE STORAGE TANK	680-719/727							X		
72	HS - 16818	Deluge valve for TKBJ-13010 BUTANE STORAGE TANK	680-719/727							X		
73	HS - 16819	Deluge valve for TKBJ-13010 BUTANE STORAGE TANK	680-719/727							X		
74	HS - 16820	Deluge valve for TKBJ-23010 BUTANE STORAGE TANK	680-719/727							X		
75	HS - 16821	Deluge valve for TKBJ-23010 BUTANE STORAGE TANK	680-719/727							X		
76	HS - 16822	Deluge valve for TKBJ-23010 BUTANE STORAGE TANK	680-719/727							X		
77	HS - 16823	Deluge valve for TKBJ-23010 BUTANE STORAGE TANK	680-719/727							X		
78	HS - 16824	Deluge valve for TKBJ-23010 BUTANE STORAGE TANK	680-719/727							X		
79	HS - 16825	Deluge valve for TKBJ-13030 DIESEL STORAGE TANK	680-719/727							X		
80	HS - 16826	Deluge valve for TKBJ-13030 DIESEL STORAGE TANK	680-719/727							X		
81	HS - 16827	Deluge valve for TKBJ-13030 DIESEL STORAGE TANK	680-719/727							X		
82	HS - 16828	Deluge valve for TKBJ-13030 DIESEL STORAGE TANK	680-719/727							X		
83	HS - 16829	Deluge valve for TKBJ-13030 DIESEL STORAGE TANK	680-719/727							X		
84	HS - 16830	Deluge valve for TKBJ-13020 NAPHTHA STORAGE TANK	680-719/727							X		
85	HS - 16831	Deluge valve for TKBJ-13020 NAPHTHA STORAGE TANK	680-719/727							X		
86	HS - 16832	Deluge valve for TKBJ-13020 NAPHTHA STORAGE TANK	680-719/727							X		
87	HS - 16833	Deluge valve for TKBJ-13020 NAPHTHA STORAGE TANK	680-719/727							X		
88	HS - 16834	Deluge valve for CBA-13000 DEPROPANIZER	680-719/727							X		
89	HS - 16835	Deluge valve for CBA-13070 DEBUTANIZER	680-719/727							X		
90	HS - 16836	Deluge valve for PBB-11010/15 DEPROPANIZER REFLUX PUMPS	680-719/727							X		
91	HS - 16837	Deluge valve for PBB-11020/25 DEBUTANIZER REFLUX PUMPS	680-719/727							X		
92	HS - 16838	Deluge valve for VBA-13100 DEPROPANIZER REFLUX ACCUMULATOR	680-719/727							X		
93	HS - 16839	Deluge valve for VBA-13120 DEBUTANIZER REFLUX ACCUMULATOR	680-719/727							X		
94	HS - 16840	Deluge valve for REMOTE IMPOUNDING STORAGE TANKS AREA	680-719/727							X		
95	HS - 16841	Deluge valve for VBA-13100 FEED SURGE VESSEL	680-719/727							X		
96	HS - 16842	Deluge valve for VBA-13100 FEED SURGE VESSEL	680-719/727							X		
97	HS - 16843	Deluge valve for VBA-13200 REFRIGERANT ACCUMULATOR	680-719/727							X		
98	HS - 16844	Deluge valve for VBA-13200 REFRIGERANT ACCUMULATOR	680-719/727							X		
99	HS - 16845	Deluge valve for VBA-13002 REFRIGERANT ACCUMULATOR (PRECOOLING)	680-719/727							X		
100	HS - 16846	Deluge valve for REMOTE IMPOUNDING SPHERE AREA	680-719/727							X		
101	HS - 16847	Deluge valve for REMOTE IMPOUNDING SPHERE AREA	680-719/727							X		
102	HS - 16848	Deluge valve for REMOTE IMPOUNDING STORAGE TANKS AREA	680-719/727							X		
103	HS - 29802	Deluge valve for TKBJ-23030 DIESEL STORAGE TANK	680-797							X		
104	HS - 29803	Deluge valve for TKBJ-23030 DIESEL STORAGE TANK	680-797							X		
105	HS - 29807	Deluge valve for TKBJ-23030 DIESEL STORAGE TANK	680-797							X		
106	HS - 29808	Deluge valve for TKBJ-23030 DIESEL STORAGE TANK	680-797							X		
107	HS - 29809	Deluge valve for TKBJ-23030 DIESEL STORAGE TANK	680-797							X		
108	HS - 29814	Deluge valve for CBA-23000 DEPROPANIZER	680-797							X		
109	HS - 29815	Deluge valve for CBA-23070 DEBUTANIZER	680-797							X		
110	HS - 29816	Deluge valve for PBB-21010/15 DEPROPANIZER REFLUX PUMPS	680-797							X		
111	HS - 29817	Deluge valve for PBB-21020/25 DEBUTANIZER REFLUX PUMPS	680-797							X		
112	HS - 29818	Deluge valve for VBA-23100 DEPROPANIZER REFLUX ACCUMULATOR	680-797							X		
113	HS - 29819	Deluge valve for VBA-23120 DEBUTANIZER REFLUX ACCUMULATOR	680-797							X		
114	HS - 29841	Deluge valve for VBA-23100 FEED SURGE VESSEL	680-797							X		
115	HS - 29842	Deluge valve for VBA-23100 FEED SURGE VESSEL	680-797							X		
116	HS - 29821	Deluge valve for VBA-23100 FEED SURGE VESSEL	680-797							X		
117	HS - 29822	Deluge valve for VBA-23100 FEED SURGE VESSEL	680-797							X		
118	HS - 29843	Deluge valve for VBA-23140 NAPHTA REFLUX ACCUMULATOR	680-797							X		
119	HS - 29844	Deluge valve for EBG-29881 / EBG-29701 / EBG-29702/03	680-797							X		
120	HS - 29845	Deluge valve for VBA-23030 / VBA-29525	680-797							X		
121	HS - 29823	Deluge valve for TKBJ-23000 CONDENSATE SURGE TANK	680-797							X		
122	HS - 29824	Deluge valve for TKBJ-23000 CONDENSATE SURGE TANK	680-797							X		
123	HS - 29846	Deluge valve for EAL-29302 / 29306 REFRIGERANT CONDENSER	680-797	4						X		
124	HS - 29847	Deluge valve for VBA-3100 PRESSURIZED PROPANE STORAGE VESSEL	680-797							X		
125	HS - 29848	Deluge valve for VBA-3100 PRESSURIZED PROPANE STORAGE VESSEL	680-797							X		
126	HS - 29849	Deluge valve for VBA-23200 PRESSURIZED PROPANE STORAGE VESSEL	680-797							X		
127	HS - 29850	Deluge valve for VBA-23200 PRESSURIZED PROPANE STORAGE VESSEL	680-797							X		
128	HS - 29851	Deluge valve for PBB-23040/45 NAPHTA TOWER REFLUX PUMPS	680-797							X		
129	HS - 29852	Deluge valve for PBB-21030/35 DIESEL MEMS DRAW PUMPS	680-797							X		
130		FIRE DETECTION BY PVC TUBE THAT IS DESTROYED BY FIRE										
131	BSHYSL - 6804	Fire Detection on VBA-3105 PRESSURIZED PROPANE STORAGE VESSEL	680-416-3	(446)		9				F		
132	BSHYSL - 6805	Fire Detection on VBA-3205 PRESSURIZED BUTANE STORAGE VESSEL	680-416-3	(446)		9				F		
133	BSHYSL - 6806	Fire Detection on VBA-3105 FEED SURGE VESSEL	680-416-3	(446)		9				F		
134	BSHYSL - 6812	Fire Detection on VBA-3180 PRESSURIZED PROPANE STORAGE VESSEL	680-416-3	(446)		9				F		
135	BSHYSL - 6813	Fire Detection on VBA-3215 PRESSURIZED BUTANE STORAGE VESSEL	680-416-3	(446)		9				F		
136		FIRE DETECTION BY SMOKE										
137	BSH - 13105	Fire Detection on VBA-13100 FEED SURGE VESSEL	680-719/727	3						X		
138	BSH - 13106	Fire Detection on TKBJ-13020 NAPHTHA STORAGE TANK	680-719	3						X		
139	BSH - 23105A	Fire Detection on VBA-23100 FEED SURGE VESSEL (TOP)	680-797	3						X		
140	BSH - 23105B	Fire Detection on VBA-23100 FEED SURGE VESSEL (BOTTOM)	680-797	3						X		
141	BSH - 23205A	Fire Detection on VBA-23200 PRESSURIZED PROPANE STORAGE VESSEL (TOP)	680-797	3						X		
142	BSH - 23205B	Fire Detection on VBA-23200 PRESSURIZED PROPANE STORAGE VESSEL (BOTTOM)	680-797	3						X		
143	BSH - 23205A	Fire Detection on VBA-23005 PRESSURIZED PROPANE STORAGE VESSEL (TOP)	680-797	3						X		
144	BSH - 23205B	Fire Detection on VBA-23005 PRESSURIZED PROPANE STORAGE VESSEL (BOTTOM)	680-797	3						X		
145	BSH - 23215	Fire Detection on VBA-23125 REFRIGERANT ACCUMULATOR	680-797	3 + 4						X		
146	BSH - 24020	Fire Detection on VBA-24020 A/S BUTANE PRODUCT CHILLER	680-797	3						X		
147	BSH - 29805	Fire Detection on VBA-29020 REFRIGERANT ACCUMULATOR	680-797	3 + 4						X		
148		GENERATORS										
149	AH - 6105	Gas detected alarm summary	620-417-1			X						
150	AHH - 6105	Gas detected alarm shutdown	620-417-1			X						
151	BAH - 6105	Fire detected	620-417-1		X							
152	AA - 6105	Alarm summary Shutdown Summary	620-417-1		X							
153	AH - 6110	Gas detected alarm summary	620-417-2			X						
154	AHH - 6110	Gas detected alarm shutdown	620-417-2			X						
155	BAH - 6110	Fire detected	620-417-2		X							
156	AA - 6110	Alarm summary Shutdown Summary	620-417-2		X							
157	AH - 6115	Gas detected alarm summary	620-417-3			X						
158	AHH - 6115	Gas detected alarm shutdown	620-417-3			X						
159	BAH - 6115	Fire detected	620-417-3		X							
160	AA - 6115	Alarm summary	620-417-3		X							
161	AH - 16105	Gas detected alarm summary	620-717			X						
162	AHH - 16105	Gas detected alarm shutdown	620-717			X						
163	BAH - 16105	Fire detected	620-717		X							
164	AA - 16105	Alarm summary	620-717		X							
165	AH - 16110	Gas detected alarm summary	620-718			X						
166	AHH - 16110	Gas detected alarm shutdown	620-718			X						
167	BAH - 16110	Fire detected	620-718		X							
168	AA - 16110	Alarm summary	620-718		X							
169	AH - 29105	Gas detected alarm summary	620-777			X						
170	AHH - 29105	Gas detected alarm shutdown	620-777			X						
171	BAH - 29105	Fire detected	620-777		X							
172	AA - 29105	Alarm summary	620-777		X							
173	AH - 29115	Gas detected alarm summary	620-778			X						
174	AHH - 29115	Gas detected alarm shutdown	620-778			X						
175	BAH - 29115	Fire detected	620-778		X							
176	AA - 29115	Alarm summary	620-778		X							
177		UTILITY DIESEL										
178	AHH - 3040	TKBJ-3040 Utility Diesel Storage Tank	620-419		X		(1)(2)			X		
179	BLL - 3040	TKBJ-3040 Utility Diesel Storage Tank	620-419		X							X

NOTES:
Note 1: FUTURE
Note 2: Cierre motorizado de agua: Válvulas de diluvio para rociado de agua solo Modo de Falla: Fail Open (FO): La solenoide está siempre energizada y la válvula de diluvio cerrada.
(For water spray systems with deluge valve, the solenoide valve is energized and the deluge valve is closed. When the solenoide valve is deenergized, the deluge valve opens and water flows through the spray nozzles. Cierre motorizado de espuma: Modo de Falla: Fail Open (FO): La solenoide está siempre energizada y la válvula de diluvio cerrada.
(For the case of foam systems with deluge valve, the solenoide valve is deenergized and the deluge valve is closed. When the fire solenoide valve is energized, the deluge va
Note 3: Provide 1 min time delay to allow operator override in case of spurious alarm.
Note 4: Alarm opening of AO-29845, Tens of AO-Isolers EAL-29302 and EAL-29306 must be shut down. This interlock must must have an override for testing purposes.

Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)



The Start sequence shall be:

1°) PBB-1260A
2°) PBB-1260B
3°) PBB-1270A
3°) PBB-1270B

FPR&MS KM 40 Shutdown Matrix

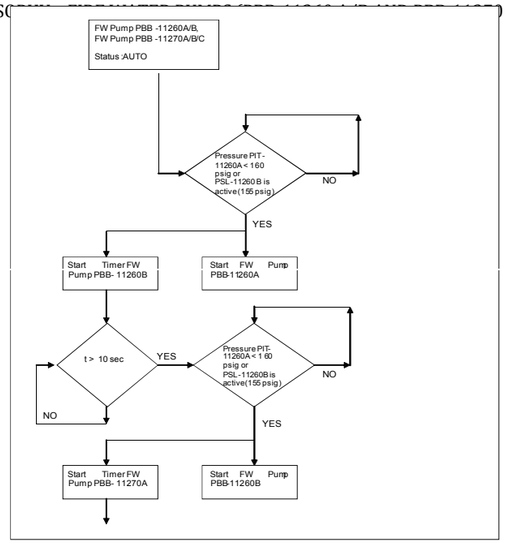
The Station KM 40 of FPR&MS is controlled by the EPC2 PCS and SSS. For the Cause and Effect Matrix for this Station, please refer to the document:

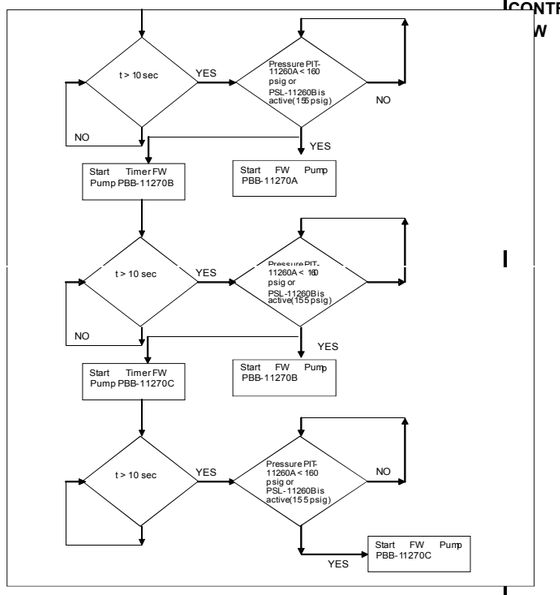
PCAM-950-ET-Y-014

Reference: PPAG-500-MC-Y-417 Revision B. PISCO PLANT. FIRE WATER SYSTEM DESIGN.

CONTROL PHILOSO A/B/C)

NEW





Reference: PPAG-500-MC-Y-417 Revision B. PISCO PLANT. FIRE WATER SYSTEM DESIGN.

CONTROL PHILOSOPHY – FIRE WATER PUMPS (PBB-11260 A/B AND PBB-11270 A/B/C)

W

| PROTECTED EPCC-PSCO PLANT | | |

CAUSE AND EFFECT MATRIX (EXISTING AND NEW)

PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)
LPG TRUCK LOADING-LCS (Truck Loading Control System)_Existing

Future EPC- Truck Loading Expansion is in BLUE (Blue marks are out of EPC-22 Scope)

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
1																	
2																	
3																	
4				~~5~~													
5																	
6	ESD - 6807	Truck Loading Stations Shutdown Manual HARD Push Button in Loading Control Room	680-416-1									X					
7	ESD - 6811	Truck Loading Stations Shutdown Manual SOFT Push Button in Loading Control Room										X					
8	ESD - 6815	Shutdown Signal from Safety Shutdown System (SSS)										X					
9																	
10	ESD - 6040	Truck Loading Station MZZ-6040 Shutdown Manual HARD Push Button in MZZ-6040	540-501									X					
11	ESD - 6140	Truck Loading Station MZZ-6140 Shutdown Manual HARD Push Button in MZZ-6140	540-502									X					
12	ESD - 6240	Truck Loading Station MZZ-6240 Shutdown Manual HARD Push Button in MZZ-6240	540-503									X					
13	ESD - 6340	Truck Loading Station MZZ-6340 Shutdown Manual HARD Push Button in MZZ-6340	540-504	~~5~~								X					
	ESD - 6440	Truck Loading Station MZZ-6440 Shutdown Manual HARD Push Button in MZZ-6440	540-505									X					
14																	
15	PDT - 6049	Odorizant Filter	540-501	5	psi				5								
16																	
17	LSH - 6046	Truck Loading Vapour Return Line Boot	540-501		in				9						X		
18	LSH - 6146	Truck Loading Vapour Return Line Boot	540-502		in				9						X		
19	LSH - 6246	Truck Loading Vapour Return Line Boot	540-503		in				9						X		
20	LSH - 6346	Truck Loading Vapour Return Line Boot	540-504	~~5~~	in				9						X		
	LSH - 6446	Truck Loading Vapour Return Line Boot	540-505		in				9						X		
21																	
22	HS - 6049	MZZ-6040 First Permissive	540-501	6								X					
23	HS - 6050	MZZ-6040 Second Permissive	540-501	7								X					
24	ZIO - 6041	MZZ-6040 Vent to Flare	540-501	8								X					
25	ZIO - 6042	MZZ-6040 Return to Pressurized Butane Storage Vessels	540-501	8								X					
26	ZIO - 6043	MZZ-6040 Propane Loading Control Valve	540-501	9								X					
27	ZIO - 6044	MZZ-6040 Butane Loading Control Valve	540-501	9								X					
28																	
29	HS - 6149	MZZ-6140 First Permissive	540-502	6								X					
30	HS - 6150	MZZ-6140 Second Permissive	540-502	7								X					
31	ZIO - 6141	MZZ-6140 Vent to Flare	540-502	8								X					
32	ZIO - 6142	MZZ-6140 Return to Pressurized Butane Storage Vessels	540-502	8								X					
33	ZIO - 6143	MZZ-6140 Propane Loading Control Valve	540-502	9								X					
34	ZIO - 6144	MZZ-6140 Butane Loading Control Valve	540-502	9								X					
35																	
36	HS - 6249	MZZ-6240 First Permissive	540-503	6								X					
37	HS - 6250	MZZ-6240 Second Permissive	540-503	7								X					
38	ZIO - 6241	MZZ-6240 Vent to Flare	540-503	8								X					
39	ZIO - 6242	MZZ-6240 Return to Pressurized Butane Storage Vessels	540-503	8								X					
40	ZIO - 6243	MZZ-6240 Propane Loading Control Valve	540-503	9								X					
41	ZIO - 6244	MZZ-6240 Butane Loading Control Valve	540-503	9								X					
42																	
43	HS - 6349	MZZ-6340 First Permissive	540-504	~~5~~, 6								X					
44	HS - 6350	MZZ-6340 Second Permissive	540-504	~~5~~, 7								X					
45	ZIO - 6341	MZZ-6340 Vent to Flare	540-504	~~5~~, 8								X					
46	ZIO - 6342	MZZ-6340 Return to Pressurized Butane Storage Vessels	540-504	~~5~~, 8								X					
47	ZIO - 6343	MZZ-6340 Propane Loading Control Valve	540-504	~~5~~, 9								X					
48	ZIO - 6344	MZZ-6340 Butane Loading Control Valve	540-504	~~5~~, 9								X					
49																	
	HS - 6449	MZZ-6440 First Permissive	540-505	6								X					
	HS - 6450	MZZ-6440 Second Permissive	540-505	7								X					
	ZIO - 6441	MZZ-6440 Vent to Flare	540-505	8								X					
	ZIO - 6442	MZZ-6440 Return to Pressurized Butane Storage Vessels	540-505	8								X					
	ZIO - 6443	MZZ-6440 Propane Loading Control Valve	540-505	9								X					
	ZIO - 6444	MZZ-6440 Butane Loading Control Valve	540-505	9								X					
50	XA - 6047	MZZ-6040 (signal from SSS)	540-501	1		X						X					
51	AAH - 6040	MZZ-6040 Gas Detector Alarm (signal from SSS)	540-501	1		X						X					
52	BAH - 6040	MZZ-6040 Fire Detector Alarm (signal from SSS)	540-501	1		X						X					
53																	
54	XA - 6147	MZZ-6140 (signal from SSS)	540-502	1		X						X					
55	AAH - 6140	MZZ-6140 Gas Detector Alarm (signal from SSS)	540-502	1		X						X					
56	BAH - 6140	MZZ-6140 Fire Detector Alarm (signal from SSS)	540-502	1		X						X					
57																	
58	XA - 6247	MZZ-6240 (signal from SSS)	540-503	1		X						X					
59	AAH - 6240	MZZ-6240 Gas Detector Alarm (signal from SSS)	540-503	1		X						X					
60	BAH - 6240	MZZ-6240 Fire Detector Alarm (signal from SSS)	540-503	1		X						X					
61																	
62	XA - 6347	MZZ-6340 (signal from SSS)	540-504	1, ~~5~~		X						X					
63	AAH - 6340	MZZ-6340 Gas Detector Alarm (signal from SSS)	540-504	1, ~~5~~		X						X					
64	BAH - 6340	MZZ-6340 Fire Detector Alarm (signal from SSS)	540-504	1, ~~5~~		X						X					
	XA - 6447	MZZ-6440 (signal from SSS)	540-505	1		X						X					
	AAH - 6440	MZZ-6440 Gas Detector Alarm (signal from SSS)	540-505	1		X						X					
	BAH - 6440	MZZ-6440 Fire Detector Alarm (signal from SSS)	540-505	1		X						X					
65																	
66	XA - 6510	SKZZ-6510 Alarm Summary	540-230			X											
67																	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
								540-230	540-230	540-230	540-230	540-501	540-501	540-501	540-501	540-501	540-501	540-501	540-502	540-502	540-502	540-502	540-502	540-502	540-502	540-503	540-503	540-503	540-503	540-503	540-503	540-503	540-504	540-504	540-504	540-504	540-504	540-504	540-504	540-504	540-504	540-504	540-504	540-504	540-504	540-504
							Alarm to Pisco CCR	Propane to Truck Loading Stations MZZ-6040/6140/6240/6340/6440	Butane to Truck Loading Stations MZZ-6040/6140/6240/6340/6440	Propane to Truck Loading Stations MZZ-6040/6140/6240/6340/6440	Butane to Truck Loading Stations MZZ-6040/6140/6240/6340/6440	Truck Loading Butane Line MZZ-6040 (Safety Valve)	Truck Loading Butane Line MZZ-6040 (Control Valve)	Truck Loading Propane Line MZZ-6040 (Safety Valve)	Truck Loading Propane Line MZZ-6040 (Control Valve)	Odorant Injection MZZ-6040	Propane/Butane return Line MZZ-6040	Propane/Butane to Flare Line MZZ-6040	Truck Loading Butane Line MZZ-6140 (Safety Valve)	Truck Loading Butane Line MZZ-6140 (Control Valve)	Truck Loading Propane Line MZZ-6140 (Safety Valve)	Truck Loading Propane Line MZZ-6140 (Control Valve)	Odorant Injection MZZ-6140	Propane/Butane return Line MZZ-6140	Propane/Butane to Flare Line MZZ-6140	Truck Loading Butane Line MZZ-6240 (Safety Valve)	Truck Loading Butane Line MZZ-6240 (Control Valve)	Truck Loading Propane Line MZZ-6240 (Safety Valve)	Truck Loading Propane Line MZZ-6240 (Control Valve)	Odorant Injection MZZ-6240	Propane/Butane return Line MZZ-6240	Propane/Butane to Flare Line MZZ-6240	Truck Loading Butane Line MZZ-6340 (Safety Valve)	Truck Loading Butane Line MZZ-6340 (Control Valve)	Truck Loading Propane Line MZZ-6340 (Safety Valve)	Truck Loading Propane Line MZZ-6340 (Control Valve)	Odorant Injection MZZ-6340	Propane/Butane return Line MZZ-6340	Propane/Butane to Flare Line MZZ-6340	Truck Loading Butane Line MZZ-6440 (Safety Valve)	Truck Loading Butane Line MZZ-6440 (Control Valve)	Truck Loading Propane Line MZZ-6440 (Safety Valve)	Truck Loading Propane Line MZZ-6440 (Control Valve)	Odorant Injection MZZ-6440	Propane/Butane return Line MZZ-6440	Propane/Butane to Flare Line MZZ-6440
					~~Note 6~~							~~Note 2~~	~~Note 2~~	~~Note 3~~	~~Note 3~~				~~Note 2~~	~~Note 2~~	~~Note 3~~	~~Note 3~~				~~Note 2~~	~~Note 2~~	~~Note 3~~	~~Note 3~~				~~Note 2, 5~~	~~Note 2, 5~~	~~Note 3, 5~~	~~Note 3, 5~~	~~Note 5~~	~~Note 5~~	~~Note 5~~								
TAG	LPG TRUCK LOADING SHUTDOWN LEVEL 2	MZZ-6040 LPG Truck Loading Station	MZZ-6140 LPG Truck Loading Station	MZZ-6240 LPG Truck Loading Station	MZZ-6340 LPG Truck Loading Station	MZZ-6440 LPG Truck Loading Station	SDA-6817	XV-1136 on XV-1136	XV-1141 on XV-1141	XV-21160 on XV-21160	XV-21165 on XV-21165	SDV-6040	XV-6044	SDV-6045	XV-6043	SV-6046	XV-6042	XV-6041	SDV-6140	XV-6144	SDV-6145	XV-6143	SV-6146	XV-6142	XV-6141	SDV-6240	XV-6244	SDV-6245	XV-6243	SV-6246	XV-6242	XV-6241	SDV-6340	XV-6344	SDV-6345	XV-6343	SV-6346	XV-6342	XV-6341	SDV-6440	XV-6444	SDV-6445	XV-6443	SV-6446	XV-6442	XV-6441
LPG TRUCK LOADING																																														
1												D	D	D	D	D	D	D																												
2																			D	D	D	D	D	D	D																						
3																										D	D	D	D	D	D	D															
4																																	D	D	D	D	D	D	D								
5		X	X	X	X	X	X	D	D	D	D																													D	D	D	D	D	D	D
6	X																																													
7	X																																													
8	X																																													
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10		X																																												
11			X																																											
12				X																																										
13					X																																									
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62	X																																													
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64	X																																													
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						X																																								
	X																																													
65																																														
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67																																														

Note 2 and 3 shall be eliminated from Future EPC- Truck Loading Cause and Effect Matrix

NOTES

Note 1 This signal is coming form the Plant Safety Shutdown System (SSS).
~~Note 2 If one of the two series valves and the three butane loading lines are close for a period of time longer than 15 minutes, then stop pumps PBB-1140 / 1145.~~
~~Note 3 If one of the two series valves and the three propane loading lines are close for a period of time longer than 15 minutes, then stop pumps PBB-1130 / 1135.~~
Note 4 For additional configuration requirements see documents: PCAM-540-ET-Y-001 "Functional Specification for Tank Truck Loading Facility" and PCAM-540-ET-K-001 "Truck Loading Control System Technical Specification"
Note 5 FUTURE.
Note 6 The First Permissive gives the information that the Electrical Plug for Grounding / High Level Truck Shutoff and all the Loading Arms are well connected.
Note 7 The Second Permissive released the operation over the following valves: SDV-6X40, SDV-6X45, XV-6X43, XV-6X44, XV-6X41 and XV-6X42. Repleace X with the corresponding Truck loading Station Number (MZZ-604**0**; MZZ-6140: **1**, MZZ-6240: **2**, **MZZ-6340: 3 and MZZ-6440: 4)**
Note 8 Provide interlock so that when XV-6X41 is open, then XV-6X42 shall be close and viceversa.
Note 9 Provide interlock so that when XV-6X43 is open, then XV-6X44 shall be close and viceversa.

CAUSE AND EFFECT MATRIX (EXISTING)

PROYECTO EPC2-PISCO PLANT
PISCO PLANT
Reference: PCAM-500-ET-Y-606 Revision 4 (EPC2-PISCO PLANT)
DIESEL TRUCK LOADING-LCS [Truck Loading Control System]_Existing

	TAG	Loop Service	P&ID	Notes	Unit	ALARMS ON	ALARMS OFF	ALARMS High-High	ALARMS High	ALARMS Low	ALARMS Low Low	INTERLOCKS ON	INTERLOCKS OFF	INTERLOCKS High-High	INTERLOCKS High	INTERLOCKS Low	INTERLOCKS Low Low
3																	
2																	
3																	
4																	
5																	
6																	
7	540-231																
8	540-231																
9	540-231																
10	540-231																
11	540-231																
12	540-231																
13	540-511																
14	540-511																
15	540-511																
16	540-512																
17	540-512																
18	540-512																
19	540-513																
20	540-513																
21	540-513																
22	540-514																
23	540-514																
24	540-514																
		DIESEL TRUCK LOADING (FUTURE)															
1	MZZ-6260	Diesel Truck Loanding Station Shutdown															
2	MZZ-6270	Diesel Truck Loanding Station Shutdown															
3	MZZ-6280	Diesel Truck Loanding Station Shutdown		3													
4	MZZ-6290	Diesel Truck Loanding Station Shutdown		3													
5	TRUCK LOADING SHUTDOWN LEVEL 2																
6	ESD - 6808	Truck Loading Stations Shutdown Manual HARD Push Button in Loading Control Room	680-416-1									X					
7	ESD - 6812	Truck Loading Stations Shutdown Manual SOFT Push Button in Loading Control Room										X					
8	ESD - 6815	Shutdown Signal from Safety Shutdown System (SSS)										X					
9																	
10	ESD - 6260	Truck Loading Station MZZ-6260 Shutdown Manual HARD Push Button in MZZ-6260	540-511									X					
11	ESD - 6270	Truck Loading Station MZZ-6270 Shutdown Manual HARD Push Button in MZZ-6270	540-512									X					
12	ESD - 6280	Truck Loading Station MZZ-6280 Shutdown Manual HARD Push Button in MZZ-6280	540-513	3								X					
13	ESD - 6290	Truck Loading Station MZZ-6290 Shutdown Manual HARD Push Button in MZZ-6290	540-514	3								X					
14																	
15	PDT - 6266	FAJ-6260 Diesel Loading Filter	540-511		psi			5									
16	PDT - 6276	FAJ-6270 Diesel Loading Filter	540-512		psi			5									
17	PDT - 6286	FAJ-6280 Diesel Loading Filter	540-513	3	psi			5									
18	PDT - 6296	FAJ-6290 Diesel Loading Filter	540-514	3	psi			5									
19																	
20	LSH - 6265	Truck Loading Vapour Return Line Boot	540-511		in			9							X		
21	LSH - 6275	Truck Loading Vapour Return Line Boot	540-512		in			9							X		
22	LSH - 6285	Truck Loading Vapour Return Line Boot	540-513	3	in			9							X		
23	LSH - 6295	Truck Loading Vapour Return Line Boot	540-514	3	in			9							X		
24																	
25	HS - 6268	MZZ-6260 First Permissive	540-									X					
26	HS - 6269	MZZ-6260 Second Permissive	540-														
27																	
28	HS - 6278	MZZ-6270 First Permissive	540-														
29	HS - 6279	MZZ-6270 Second Permissive	540-														
30																	
31	HS - 6288	MZZ-6280 First Permissive	540-513	3, 4								X					
32	HS - 6289	MZZ-6280 Second Permissive	540-513	3, 5								X					
33																	
34	HS - 6298	MZZ-6290 First Permissive	540-514	3, 4								X					
35	HS - 6299	MZZ-6290 Second Permissive	540-514	3, 5								X					
36																	
37	XA - 6267	MZZ-6260 (signal from SSS)	540-511	1		X						X					
38	AAH - 6260	MZZ-6260 Gas Detector Alarm (signal from SSS)	540-511	1		X						X					
39	BAH - 6260	MZZ-6260 Fire Detector Alarm (signal from SSS)	540-511	1		X						X					
40																	
41	XA - 6276	MZZ-6270 (signal from SSS)	540-512	1		X						X					
42	AAH - 6270	MZZ-6270 Gas Detector Alarm (signal from SSS)	540-512	1		X						X					
43	BAH - 6270	MZZ-6270 Fire Detector Alarm (signal from SSS)	540-512	1		X						X					
44																	
45	XA - 6287	MZZ-6280 (signal from SSS)	540-513	1, 3		X						X					
46	AAH - 6280	MZZ-6280 Gas Detector Alarm (signal from SSS)	540-513	1, 3		X						X					
47	BAH - 6280	MZZ-6280 Fire Detector Alarm (signal from SSS)	540-513	1, 3		X						X					
48																	
49	XA - 6297	MZZ-6290 (signal from SSS)	540-514	1, 3		X						X					
50	AAH - 6290	MZZ-6290 Gas Detector Alarm (signal from SSS)	540-514	1, 3		X						X					
51	BAH - 6290	MZZ-6290 Fire Detector Alarm (signal from SSS)	540-514	1, 3		X						X					
52																	
53	XA - 6275	SKZZ-6275 Alarm Summary	540-231			X											
54	XA - 6280	SKZZ-6280 Alarm Summary	540-231			X											
55	XA - 6285	SKZZ-6285 Alarm Summary	540-231			X											
56	XA - 6290	SKZZ-6290 Alarm Summary	540-231			X											
57	XA - 6295	SKZZ-6295 Alarm Summary	540-231			X											
58																	

	TAG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3								540-231	540-231	540-231	540-231	540-231	540-231	540-511	540-511	540-511	540-512	540-512	540-512	540-513	540-513	540-513	540-514	540-514	540-514
2							Alarm to Pisco CCR	Inlet to Diesel to Truck Loading Stations MZZ-6260/6270/6280/6290	SZZ-6275 Airline Injection Shed	SZZ-6280 Airline Injection Shed	SZZ-6285 Airline Injection Shed	SZZ-6290 Airline Injection Shed	SZZ-6295 Airline Injection Shed	Truck Loading Diesel Line MZZ-6260 (Safety Valve)	Truck Loading Diesel Line MZZ-6260 (Control Valve)	Diesel Vapor Line MZZ-6260	Truck Loading Diesel Line MZZ-6270 (Safety Valve)	Truck Loading Diesel Line MZZ-6270 (Control Valve)	Diesel Vapor Line MZZ-6270	Truck Loading Diesel Line MZZ-6280 (Safety Valve)	Truck Loading Diesel Line MZZ-6280 (Control Valve)	Diesel Vapor Line MZZ-6280	Truck Loading Diesel Line MZZ-6290 (Safety Valve)	Truck Loading Diesel Line MZZ-6290 (Control Valve)	Diesel Vapor Line MZZ-6290
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	DIESEL TRUCK LOADING (FUTURE)	**DIESEL TRUCK LOADING SHUTDOWN LEVEL 2**	**MZZ-6260 Diesel Truck Loanding Station**	**MZZ-6270 Diesel Truck Loanding Station**	**MZZ-6280 Diesel Truck Loanding Station**	**MZZ-6290 Diesel Truck Loanding Station**	SDV-6839	XV-6310 on XV-6310	LCS-6275 SKZZ-6275 Shutdown	LCS-6285 SKZZ-6285 Shutdown	LCS-6295 SKZZ-6295 Shutdown	LCS-6290 SKZZ-6290 Shutdown	LCS-6295 SKZZ-6295 Shutdown	SDV-6268 on SDV-6268	XV-6260 on FV-6260	SDV-6262 on SDV-6262	SDV-6273 on SDV-6273	XV-6270 on FV-6270	SDV-6272 on SDV-6272	SDV-6288 on SDV-6288	XV-6280 on FV-6280	SDV-6282 on SDV-6282	SDV-6289 on SDV-6289	XV-6290 on FV-6290	SDV-6292 on SDV-6292
1			X											D	D	D									
2				X													D	D	D						
3					X															D	D	D			
4						X																	D	D	D
5			X	X	X	X	X	D	X	X	X	X	X												
6		X																							
7		X																							
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DELETED

NOTES

Note 1 This signal is coming form the Plant Safety Shutdown System (SSS).
Note 2 For additional configuration requirements see documents: PCAM-540-ET-Y-001 "Functional Specification for Tank Truck Loading Facility" and PCAM-540-ET-K-001 "Truck Loading Control System Technical Specification"
Note 3 FUTURE
Note 4 The First Permissive gives the information that the Electrical Plug for Grounding / High Level Truck Shutoff and all the Loading Arms are well connected.
Note 5 The Second Permissive released the operation over the following valves: SDV-62X3 and FV-62X0. Repleace X with the corresponding Truck loading Station Number (MZZ-6260: **6**, MZZ-6270: **7**, MZZ-6280: **8** and MZZ-6290: **9**).

PLUSPETROL PERU
PISCO FRACT. PLANT (EXISTING)
ALARM AND SHUTDOWN
HOT OIL SYSTEM (EXISTING)
REFRIGERATION (EXISTING)
VAPOR RECOVERY UNIT (EXISTING)
HOWE-BAKER JOB #1915
ISSUE FOR CONSTRUCTION
REFERENCE: PCAM-520-PL-Y-8206 Revision 5. JUNE 2, 2003

												ITEM NUMBER	1	2	3	4	5	6	7	8	9	10	11	12
													MAP-5000 NAPHTHA TOWER FEED HEATER	PBB-1565 REFRIGERANT LIQUID ACCUMULATOR PUMP	KBA-2015/2025 REFRIGERATION COMPRESSOR	PBB-1570 REFRIGERANT LIQUID ACCUMULATOR PUMP	KBA-2020/2030 REFRIGERATION COMPRESSOR	KBA-2000 PROPANE VAPOR RECOVERY COMPRESSOR	KBA-2005 C3/C4 VAPOR RECOVERY COMPRESSOR	KBA-2010 BUTANE VAPOR RECOVERY COMPRESSOR	MAP-5010 HOT OIL HEATER	PBB-1150 HOT OIL SUMP PUMP	PBB-1200 PROCESS AREA SCRUBBER PUMP	PBB-1205 PROCESS AREA SCRUBBER PUMP
												RESULTING ACTION	S.D.	S.D.	S.D.	S.D.	S.D.	S.D.	S.D.	S.D.	S.D.	S.D.	S.D.	S.D.
												EQUIP. NUMBER	MAP-5000	PBB-1565	KBA-2015/2025	PBB-1570	KBA-2020/2030	KBA-2000	KBA-2005	KBA-2010	MAP-5010	PBB-1150	PBB-1200	PBB-1205
												DCS ADDRESS												
ITEM	SERVICE	MALFUNCTION	NOTES	FIELD DEVICE		ANNUNCIATOR TAG		INPUT DCS	INPUT SSS	Annun Alarm	Annun Shutdown	FLOW SHEET	525-PL-Y-8017	523-PL-Y-8023	523-PL-Y-8025	523-PL-Y-8026	523-PL-Y-8028	523-PL-Y-8032	523-PL-Y-8034	523-PL-Y-8036	610-PL-Y-8040	610-PL-Y-8042	610-PL-Y-8045	610-PL-Y-8045
1	MAP-5000 NAPHTHA TOWER FEED HEATER	LO FLOW S.D.		FT	29A	FALL	29A	X	X		X	525-PL-Y-8017	X											
2	VBA-3240 REFRIGERANT SUCTION SCRUBBER	HI DIFF PRESS AL	5	PDT	3240	PDAH	3240	X		X		523-PL-Y-8023			6									
3	VBA-3240 REFRIGERANT SUCTION SCRUBBER	HI LEVEL AL	1	LT	3240	LAH	3240	X		X		523-PL-Y-8023		START PUMP										
4	VBA-3240 REFRIGERANT SUCTION SCRUBBER	LO LEVEL AL	1	LT	3240	LAL	3240	X		X		523-PL-Y-8023		STOP PUMP										
5	VBA-3245 REFRIGERANT INTERSTAGE SCRUBBER	HI DIFF PRESS AL	5	PDT	3245	PDAH	3245	X		X		523-PL-Y-8024			6									
6	KBA-2015/2025 REFRIGERANT COMPRESSOR	UNIT SHUTDOWN				UALL	2015	X	X		X	523-PL-Y-8025			X									
7	VBA-3241 REFRIGERANT SUCTION SCRUBBER	HI DIFF PRESS AL	5	PDT	3241	PDAH	3241	X		X		523-PL-Y-8026					6							
8	VBA-3241 REFRIGERANT SUCTION SCRUBBER	HI LEVEL AL	2	LT	3241	LAH	3241	X		X		523-PL-Y-8026				START PUMP								
9	VBA-3241 REFRIGERANT SUCTION SCRUBBER	LO LEVEL AL	2	LT	3241	LAL	3241	X		X		523-PL-Y-8026				STOP PUMP								
10	VBA-3246 REFRIGERANT INTERSTAGE SCRUBBER	HI DIFF PRESS AL	5	PDT	3246	PDAH	3246	X		X		523-PL-Y-8027					6							
11	KBA-2020/2030 REFRIGERANT COMPRESSOR	UNIT SHUTDOWN				UALL	2020	X	X		X	523-PL-Y-8028					X							
12	KBA-2000 PROPANE VAPOR RECOVERY COMPRESSOR	UNIT SHUTDOWN	6			UALL	2000	X	X		X	534-PL-Y-8032						X						
13	KBA-2000 PROPANE/BUTANE VAPOR RECOVERY COMPRESSOR	UNIT SHUTDOWN	6			UALL	2005	X	X		X	534-PL-Y-8034							X					
14	KBA-2010 BUTANE VAPOR RECOVERY COMPRESSOR	UNIT SHUTDOWN	6			UALL	2010	X	X		X	534-PL-Y-8036								X				
15	KBA-2010 BUTANE VAPOR RECOVERY COMPRESSOR	UNIT ALARM				UAL	2010	X		X		534-PL-Y-8036												
16	MAP-5010 HOT OIL HEATER	LO FLOW S.D.		FT	29B	FALL	29B	X	X		X	610-PL-Y-8040									X			
17	VBA-3251 HOT OIL SUMP	LO LEVEL AL	3	LSL/H	3252	LAL	3252	X		X		610-PL-Y-8042										STOP PUMP		
18	VBA-3251 HOT OIL SUMP	HI LEVEL AL	3	LSL/H	3252	LAH	3252	X		X		610-PL-Y-8042										START PUMP		
19	VBA-3251 HOT OIL SUMP	HI TEMP S.D.		TSHH	3252	TAHH	3252	X	X		X	610-PL-Y-8042										X		
20	VBA-3255 PROCESS AREA FLARE SCRUBBER	HI LEVEL AL	4	LT	3255	LAH	3255	X		X		630-PL-Y-8045											X	X
21	VBA-3255 PROCESS AREA FLARE SCRUBBER	LO LEVEL AL	4	LT	3255	LAL	3255	X		X		630-PL-Y-8045											X	X
22	VBA-3255 PROCESS AREA FLARE SCRUBBER	LO LEVEL S.D.	4	LSHH	3255	LAHH	3255	X	X		X	630-PL-Y-8045											X	X
23	VBA-3255 PROCESS AREA FLARE SCRUBBER	HI LEVEL S.D.	4	LSLL	3255	LASS	3255	X	X		X	630-PL-Y-8045											X	X

PLUSPETROL PERU
PISCO FRACT. PLANT (EXISTING)
ALARM AND SHUTDOWN
HOT OIL SYSTEM (EXISTING)
REFRIGERATION (EXISTING)
VAPOR RECOVERY UNIT (EXISTING)

NEW: PERU CAMISEA SECOND EXPANSION PROJECT (Changes to be done by PERU CAMISEA SECOND EXPANSION PROJECT are shown in red)
HOWE-BAKER JOB #1915
ISSUE FOR CONSTRUCTION
REFERENCE: PCAM-520-PL-Y-8206 Revision 5. JUNE 2, 2003

NOTES:

1, LAH-3240 TO START PUMP PBB-1565, LAL-3240 TO STOP PUMP PBB-1565
2, LAH-3241 TO START PUMP PBB-1570, LAL-3240 TO STOP PUMP PBB-1570
3, LSL/H TO START/STOP PUMP PBB-1150
4, FLARE K.O. PUMPS
1 LAH-3255 TO START PBB-1200 OR PBB-1205
2 LAHH-3255 TO START PBB-1200 OR PBB-1205 IF THE LEVEL CONTINUES TO RISE.
3 LAL-3255 TO SHUT DOWN BOTH PUMPS PBB-1200 AND PBB-1205
4 LALL-3255 TO SHUT DOWN BOTH PUMP PBB-1200 AND PBB-1205 IF LAL-3255 FAILS.
5 THE OPERATOR SHOULD BE ABLE TO SELECT/SWITCH THE PUMP THAT IS TIED TO LAH-3255 AND LAHH-3255
6 SEE CONTROL NARRATIVE FOR A MORE DETIALED DISCIPTION OF THE SELECTION CONTROL
5, PERMISSIVE FOR REFRIGERATION COMPRESSOR TO START
AT REFRIGERATION COMPRESSOR START THE FOLLOWING STEPS SHOULD OCCUR TO GET THE PERMISSIVE TO START THE UNIT.
FOR REFRIGERATION COMPRESSOR KBA-2015/2025
SDV-3240B (SDY-3240B) SHOULD BE OPENED TO CLEAR PDAH-3240 AND THEN OPEN SDV-3240A (SDY-3240A)
SDV-3245B (SDY-3245B) SHOULD BE OPENED TO CLEAR PDAH-3245 AND THEN OPEN SDV-3245A (SDY-3245A)
ONCE BOTH THE PDAH ARE CLEARED SDV-2025 (SDY-2025) CAN BE OPENED AND THE UNIT CAN BE GIVEN THE PERMISSIVE TO START.
REFRIGERATION COMPRESSOR KBA-2020/2030 IS SPARE OF KBA-2015/2025 OR KBA-12015/12025
IF KBA-2020/2030 IS SPARE OF KBA-2015/2025 (SEE PROCESS FLOW DIAGRAM PCAM-523-PL-Y-8006):
CLOSE SDV-3240 A/B, SDV-2016, SDV-3245 A/B AND SDV-2025
VBA-3235 WILL BE THE ACCUMULATOR FOR KBA-2020/2030: KEEP SDV-3235 OPEN.
SDV-13241 A/B, SDV-13246 A/B, SDV-12030, SDV-12021, SDV-22570 AND SDV-23241 A/B, SDV-23246 A/B, SDV-22030, SDV-22021 AND SDV-21570 TO BE CLOSE.
SDV-3241B (SDY-3241B) SHOULD BE OPENED TO CLEAR PDAH-3241 AND THEN OPEN SDV-3241A (SDY-3241A)
SDV-3246B (SDY-3246B) SHOULD BE OPENED TO CLEAR PDAH-3246 AND THEN OPEN SDV-3246A (SDY-3246A)
ONCE BOTH THE PDAH ARE CLEARED SDV-2030 (SDY-2030) CAN BE OPENED AND THE UNIT CAN BE GIVEN THE PERMISSIVE TO START.
SDV-2021 AND SDV-11570 TO BE OPEN.
IF KBA-2020/2030 IS SPARE OF KBA-12015/12025 (SEE PROCESS FLOW DIAGRAM PCAM-523-PL-Y-8006 AND PPAG-523-PL-Y-8806):
CLOSE SDV-13240 A/B, SDV-12016, SDV-13245 A/B AND SDV-12027
VBA-13235 WILL BE THE ACCUMULATOR FOR KBA-2020/2030: KEEP SDV-13235 OPEN.
SDV-3241 A/B, SDV-3246 A/B, SDV-2030, SDV-2021, SDV-11570 AND SDV-23241 A/B, SDV-23246 A/B, SDV-22030, SDV-22021 AND SDV-21570 TO BE CLOSE.
SDV-13241B (SDY-13241B) SHOULD BE OPENED TO CLEAR PDAH-13241 AND THEN OPEN SDV-13241A (SDY-13241A)
SDV-13246B (SDY-13246B) SHOULD BE OPENED TO CLEAR PDAH-13246 AND THEN OPEN SDV-13246A (SDY-13246A)
ONCE BOTH THE PDAH ARE CLEARED SDV-12030 (SDY-12030) CAN BE OPENED AND THE UNIT CAN BE GIVEN THE PERMISSIVE TO START
SDV-12021 AND SDV-22570 TO BE OPEN.
IF KBA-2020/2030 IS SPARE OF KBA-22015/22025 (SEE PROCESS FLOW DIAGRAM PCAM-523-PL-Y-8006 AND PPAG-523-PL-Y-970):
CLOSE SDV-23240 A/B, SDV-22016, SDV-23245 A/B AND SDV-22027
VBA-23235 WILL BE THE ACCUMULATOR FOR KBA-2020/2030: KEEP SDV-23235 OPEN.
SDV-3241 A/B, SDV-3246 A/B, SDV-2030, SDV-2021, SDV-11570, SDV-13241 A/B, SDV-13246 A/B, SDV-12030, SDV-12021 AND SDV-22570 TO BE CLOSE.
SDV-23241B (SDY-23241B) SHOULD BE OPENED TO CLEAR PDAH-23241 AND THEN OPEN SDV-23241A (SDY-23241A)
SDV-23246B (SDY-23246B) SHOULD BE OPENED TO CLEAR PDAH-23246 AND THEN OPEN SDV-23246A (SDY-23246A)
ONCE BOTH THE PDAH ARE CLEARED SDV-22030 (SDY-22030) CAN BE OPENED AND THE UNIT CAN BE GIVEN THE PERMISSIVE TO START
SDV-22021 AND SDV-21570 TO BE OPEN.
6, VRU SYSTEM INTERLOCK FROM COMMON MACHINE.
1 VRU PROPANE COMPRESSOR KBA-2000 - RUNS PROPANE ONLY
SHUTDOWN VALVES ASSOCIATED WITH KBA-2000 ARE SDV-3150 (SDY-3150), SDV-4060A (SDY-4060A), SDV-4060B (SDY-4060B)
2 VRU PROPANE/BUTANE COMPRESSOR KBA-2005 - RUNS EITHER PROPANE OR BUTANE
SHUTDOWN VALVES ASSOCIATED WITH THE KBA-2005 ARE SDV-3155A (SDY-3155A), SDV-3155B (SDY-3155B),
SDV-4070A (SDY-4070A), SDV-4070B (SDY-4070B), SDV-4070C (SDY-4070C), SDV-4070D (SDY-4070D),
SDV-14070A (SDY-14070A), SDV-14070B (SDY-14070B), SDV-14070C (SDY-14070C), SDV-14070D (SDY-14070D) (SEE PCAM-534-PL-Y-214).
SDV-24070B (SDY-24070B), SDV-24070D (SDY-24070D) (SEE PCAM-534-PL-Y-214).
3 VRU BUTANE COMPRESSOR KBA-2010 - RUNS BUTANE ONLY
SHUTDOWN VALVES ASSOCIATED WITH KBA-2010 ARE SDV-3160 (SDY-3160), SDV-4080A (SDY-4080A), SDV-4080B (SDY-4080B)

RUNNING PROPANE/BUTANE COMPRESSOR KBA-2005 IN PROPANE MODE
1 CONFIRM THAT SDV-3155B (SDY-3155B) IS IN THE CLOSED POSITION
2 CONFIRM THAT SDV-4070A (SDY-4070A) AND SDV-14070A (SDY-14070A) ARE IN THE CLOSED POSITION
3 CONFIRM THAT SDV-4070B (SDY-4070B) AND SDV-14070B (SDY-14070B) ARE IN THE CLOSED POSITION
4 ENERGIZE SDY-3155A TO OPEN SDV-3155A
5 OPERATOR SHALL CHOOSE IF PROPANE WILL GO TO VBA-3170 OR VBA-13170 OR VBA-23170
6 IF PROPANE GOES TO VBA-3170 THEN:
7 ENERGIZE SDY-4070C TO OPEN SDV-4070C
8 ENERGIZE SDY-4070D TO OPEN SDV-4070D
9 CONFIRM THAT SDV-3155A (SDY-3155A) IS IN THE OPEN POSITION
10 CONFIRM THAT SDV-4070C (SDY-4070C) IS IN THE OPEN POSITION
11 CONFIRM THAT SDV-4070D (SDY-4070D) IS IN THE OPEN POSITION
12 IF PROPANE GOES TO VBA-13170 THEN:
13 ENERGIZE SDY-14070C TO OPEN SDV-14070C
14 ENERGIZE SDY-14070D TO OPEN SDV-14070D
15 CONFIRM THAT SDV-3155A (SDY-3155A) IS IN THE OPEN POSITION
16 CONFIRM THAT SDV-14070C (SDY-14070C) IS IN THE OPEN POSITION
17 CONFIRM THAT SDV-14070D (SDY-14070D) IS IN THE OPEN POSITION
18 IF PROPANE GOES TO VBA-23170 THEN:
19 ENERGIZE SDY-24070C TO OPEN SDV-24070C
20 ENERGIZE SDY-24070D TO OPEN SDV-24070D
21 CONFIRM THAT SDV-3155A (SDY-3155A) IS IN THE OPEN POSITION
22 CONFIRM THAT SDV-24070C (SDY-24070C) IS IN THE OPEN POSITION
23 CONFIRM THAT SDV-24070D (SDY-24070D) IS IN THE OPEN POSITION
24 THIS SHOULD PROVIDE THE PERMISSIVE TO START KBA-2005 IN THE PROPANE MODE

RUNNING PROPANE/BUTANE COMPRESSOR KBA-2005 IN BUTANE MODE
1 CONFIRM THAT SDV-3155A (SDY-3155A) IS IN THE CLOSED POSITION
2 CONFIRM THAT SDV-4070C (SDY-4070C) AND SDV-14070C (SDY-14070C) ARE IN THE CLOSED POSITION
3 CONFIRM THAT SDV-4070D (SDY-4070D) AND SDV-14070D (SDY-14070D) ARE IN THE CLOSED POSITION
4 ENERGIZE SDY-3155B TO OPEN SDV-3155B
5 OPERATOR SHALL CHOOSE IF BUTANE WILL GO TO VBA-3180 OR VBA-13180 OR BOTH
6 IF BUTANES GOES TO VBA-3180 THEN:
7 ENERGIZE SDY-4070A TO OPEN SDV-4070A
8 ENERGIZE SDY-4070B TO OPEN SDV-4070B
9 CONFIRM THAT SDV-3155B (SDY-3155B) IS IN THE OPEN POSITION
10 CONFIRM THAT SDV-4070A (SDY-4070A) IS IN THE OPEN POSITION
11 CONFIRM THAT SDV-4070B (SDY-4070B) IS IN THE OPEN POSITION
12 IF BUTANES GOES TO VBA-13180 THEN:
13 ENERGIZE SDY-14070A TO OPEN SDV-14070A
14 ENERGIZE SDY-14070B TO OPEN SDV-14070B
15 CONFIRM THAT SDV-3155B (SDY-3155B) IS IN THE OPEN POSITION
16 CONFIRM THAT SDV-14070A (SDY-14070A) IS IN THE OPEN POSITION
17 CONFIRM THAT SDV-14070B (SDY-14070B) IS IN THE OPEN POSITION
18 THIS SHOULD PROVIDE THE PERMISSIVE TO START KBA-2005 IN THE BUTANE MODE