PTT Phenol Company Limited

Plant Technical

SO-(PH-P1-TE)-1100-009

Reduce steam consumption at DIPB column (V-1103) by reduce pressure

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Reviewer list

Reviewer	Position	Unit Code

Edition records

Rev.	Effective Date	Detail	Updated by
1	29/03/2022	Create New Document	Miss Tharinee Ketsuwan

Related Units

Unit Code	Unit Name
PH-P1-TE	Plant Technical

Related KPI

KPI Measure	Description / Calculation	Target (unit)

Related Law

Law Name

Related Documents

Document ID	Document Name
SO-(PH-P1-TE)-1100-001	CONTROL PARAMETER SPECIFICATION QMAX UNIT

External Reference Documents

Document Name

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1. Purpose/Objective

1.1 ที่มาและความสำคัญ (Background)

According to the emergency shutdown due to power outage leading to high specific energy consumption (SEC) in Apr-21 and the forecast YTD SEC tends to exceed the target plan at 6,498 MJ/T Co-Product as shown in the figure below:

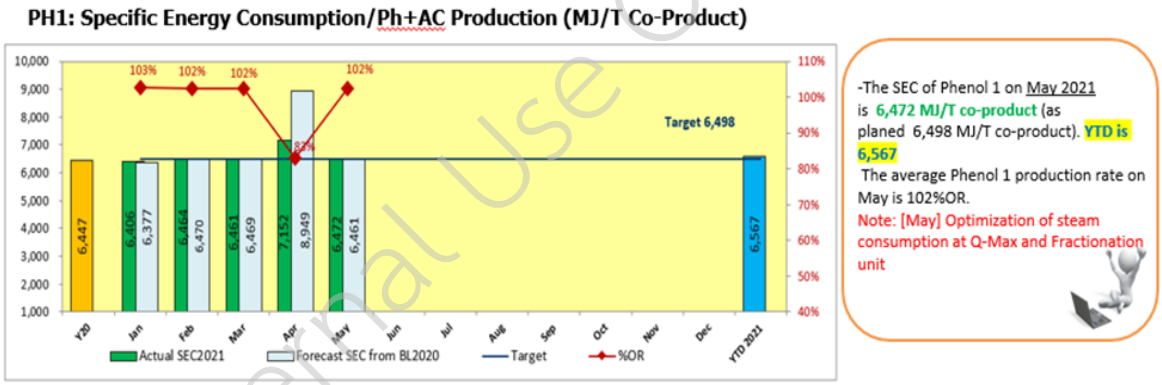

Figure 1 shows the SEC of Phenol 1 in Y2021

Therefore, in order to improve energy efficiency and reduce operating cost, PE would like to submit the operating guideline to minimize steam 40 bar consumption at DIPB Column (V-1103) and continuously control the product quality of distillation in the control specification.

1.2 วัตถุประสงค์ (Objective)

1.2.1 Minimize steam 40 bar consumption of DIPB Column (V-1103) to improve SEC as target.

1.2.2 Control the quality of distillation product at DIPB Side Draw (SN-1112) and Heavy Aromatics (SN-1113) in the control specification.

1.3 ปัญหาและสิ่งที่พบ (Observation)

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2. Scope

This operating guideline is applied with PTT Phenol Co.ltd. (PPCL)

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3. List

3.1 แผนงานการทำงาน (Schedule)

Activities	June-21			
	W1	W2	W3	W4
Review Operating Guideline				
Step 1 - Decrease pressure and S40 steam for 1st-step		Day 1		
Step 2 - Decrease pressure and S40 steam for 2nd-step		Day2		
Monitor Conditions and Sampling Results				
Collect Data and Summary				

3.2 ขั้นตอนการทำงาน (Instruction/Steps)

3.2.1 Off APC, tighten controlling conditions as follows:

Q-Component Target	Target	Current	Lag- indicator
Pressure (PIC-11-1704)	0.2000	0.2175	
Middle temperature (TIC-11-1703)	≤ 208	208	SN-1112 (Heavier <0.5wt%)
Bottom temperature (TI-11-1706)	224-228	227	Monitor RQE TIPB SN-1113 (TIPB<5wt%, DIPB<1wt%)
R/D ratio	0.178	0.178	
Steam S40 (m3/hr)	2.85	3.05	
Temp. Outlet E-1115 (TI-11-1901)	35 (<53°C)	35	

3.2.2 Start reducing sealant vacuum flow FIC-11-1901 from 1.5 m3/h to 1.35 m3/h

3.2.3 Start reducing the pressure control of PIC-11-1704.SV from 0.2175 kg/cm2A (Target 0.20 kg/cm2A) downwards in step of 0.01 kg/cm2/Day

3.2.4 Reduce S40 steam flow (FIC-11-1702.SV) by 0.05 m3/hr per step (Target total S40 steam reduction is 0.2 m3/hr)

3.2.5 Monitor the quality of distillation product as following

- DIPB Side Draw SN-1112 (Heavier < 0.5%wt)
- Heavy Aromatics SN-1113 (TIPB<5wt%, DIPB<1wt%)

3.2.6 Monitor conditions of DIPB Column (V-1103) as following:

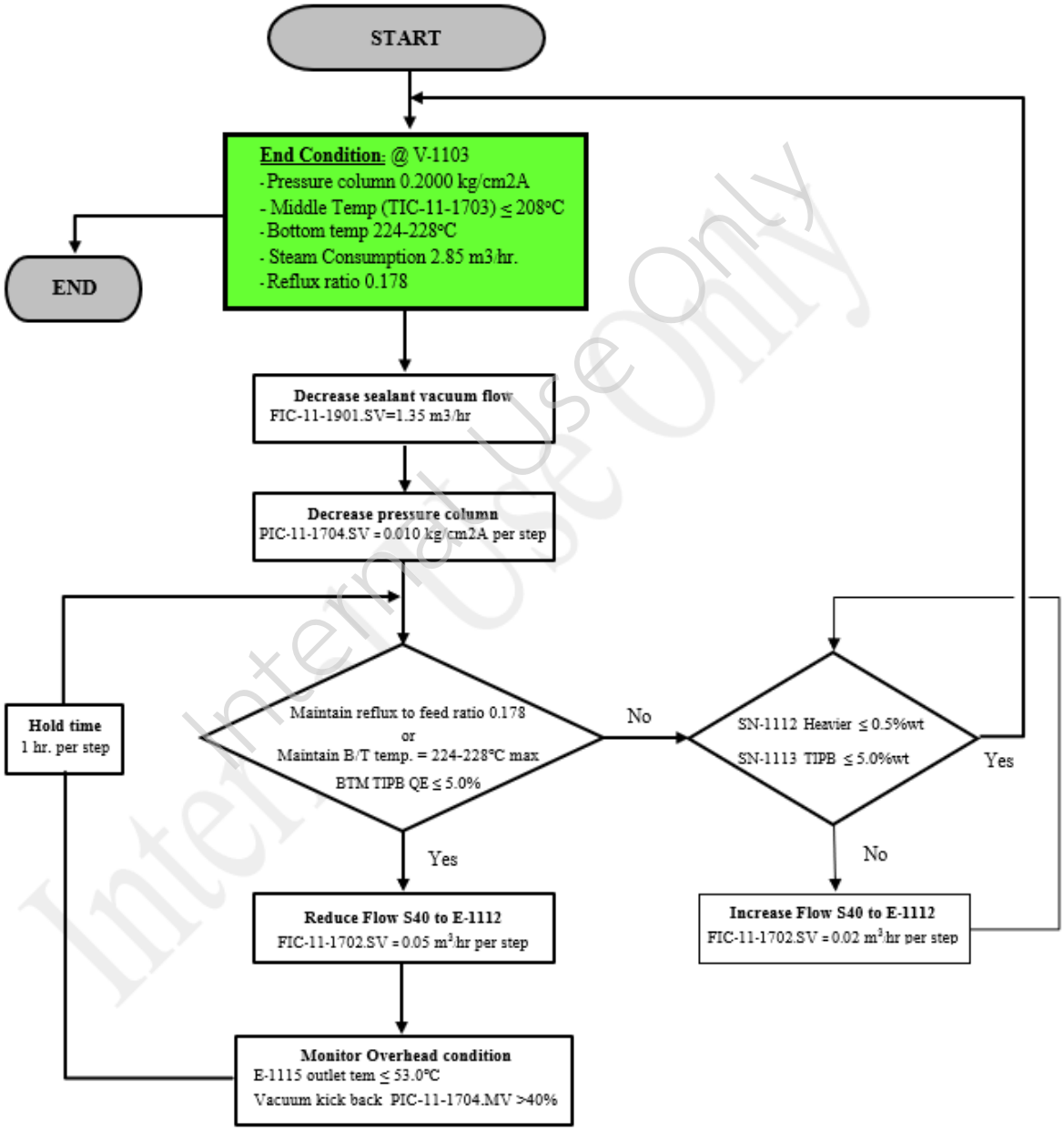
- Overhead condenser TI-11-1901.PV < 53oC (Alarm high at 55°C, Interlock trip at 65°C)
- vacuum system monitor kick back valve PIC-11-1704.MV >40% (Actual 75%)

3.2.7 Back to do step 3.2.3 again until meet the target or criteria. Otherwise, hold operating condition of DIPB Column (V-1103) and collect data for summarizing the results

3.2.8 Concern the conditions of DIPB Column (V-1103) as following:

- Overhead condenser TI-11-1901.PV < 53°C (Alarm high at 55°C, Interlock trip at 65°C) >> UC-1103 Vacuum system.
- Performance of vacuum system >> Kick back valve PIC-11-1704.MV >40%
- Column deep vacuum and effect to level bottom & side drew >> Balance the level by 1st decreasing the flow S40 or 2nd increasing the reflux flow.

Trial workflow for steam optimization



DIPB Side Draw	SN-1112	Sampling time
Heavier	0.5%wt max.	Routine 1/wk (Sun), Additional request 1/after adjust
Heavy Aromatics	**SN-1113**	**Sampling time**
DIPB	1 wt% max.	Routine 1/wk (Sat), Additional request 1/after adjust
TIPB	5 wt% max.	Routine 1/wk (Sat), Additional request 1/after adjust

Daily Target Plan

Q-Component Target	Target	Current	Jun 15, 21		Jun 16, 21	
			D	N	D	N
Sealant vacuum flow (FIC-11-1901), m3/h	1.35	1.5	1.35	1.35	1.35	1.35
Pressure (PIC-11-1704), kg/cm2A	0.2000	0.2175	0.2075	0.2075	0.2000	0.2000
Middle temperature (TIC-11-1703), °C	≤ 208	208	≤ 208	≤ 208	≤ 208	≤ 208
Bottom temperature (TI-11-1706), °C	224-228	227	224-228	224-228	224-228	224-228
R/D ratio	0.178	0.178	0.178	0.178	0.178	0.178
Steam S40, m3/hr	2.85	3.05	2.95	2.95	2.85	2.85
Temp. Outlet E-1115 (TI-11-1901), °C	35 (<53°C)	35 (<53°C)	35 (<53°C)	35 (<53°C)	35 (<53°C)	35 (<53°C)