



**GS** E&C

# ERC Refinery Project

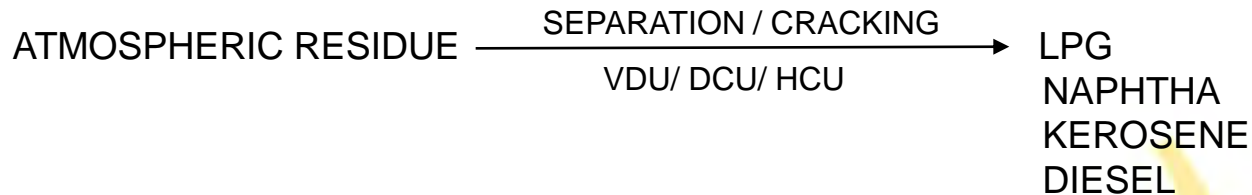
## Contents

---

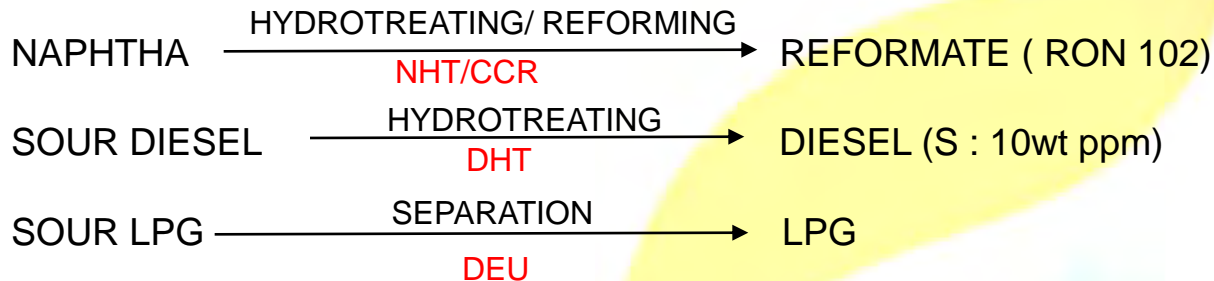
1. Process Unit Purpose
2. Unit Description & Capacity
3. Overall Block Diagram
4. Unit Schematics

# 1) PROCESS UNIT PURPOSE

- TO CONVERT HEAVY INTERMEDIATE PRODUCT OF LOW ECONOMIC VALUE INTO MIDDLE DISTILLATE OF HIGH ECONOMIC VALUE



- TO MEET SALES PRODUCTION BY HYDROTREATING, REFORMING AND BLENDING.

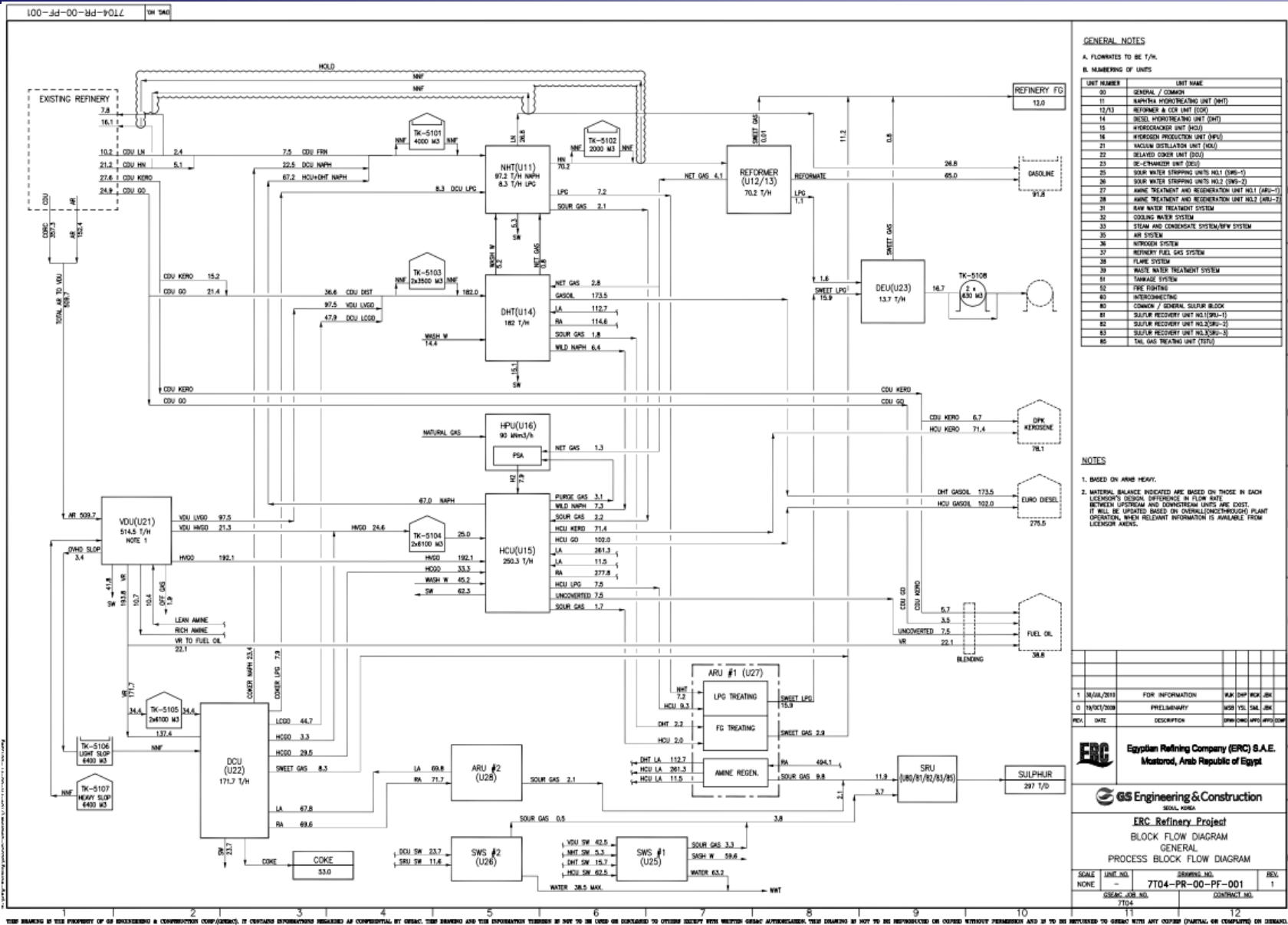


- TO SUPPORT PROCESS UNIT

- HYDROGEN PRODUCTION UNIT
- AMINE REGENERATION UNIT
- SOUR WATER STRIPPING UNIT
- SULPHUR RECOVERY UNIT
- UTILITY SYSTEMS
- TANKAGE

Unit No.	Unit Name	Capacity		Remarks
		TON/HR	BPSD	
11	Naphtha Hydrotreating Unit	105.5	22600	Axens
12 / 13	Reformer & CCR Unit	71.2	14100	Axens
14	Diesel Hydrotreating Unit	182.0	32100	Axens
15	Hydrocracker Unit	250.3	40800	Axens
16	Hydrogen Production Unit	100 kNm <sup>3</sup> /h		KTI
21	Vacuum Distillation Unit	514.5	81500	GS
22	Delayed Coker Unit	171.7	25000	Conocophillips
23	De-ethanizer Unit	16.7		GS
25	Sour Water Stripping Unit No.1	126.0		GS
26	Sour Water Stripping Unit No.2	39.0		GS
27	Amine Treatment and Regeneration Unit No.1	495.0 m <sup>3</sup> /h (Amine Circ.)		GS
28	Amine Treatment and Regeneration Unit No.2	71.9 m <sup>3</sup> /h (Amine Circ.)		GS
80, 81, 82, 83	Sulfur Recovery Unit (COMMON, No.1, No.2, No.3)	162.5 Ton/D X 50% X 3 Train		TKT (KTI)
85	Tail Gas Treating Unit	325 Ton/D		TKT (KTI)

# 3) OVERALL BLOCK DIAGRAM



**GENERAL NOTES**

A. FLOWRATES TO BE T/H

B. NUMBERING OF UNITS

UNIT NUMBER	UNIT NAME
00	GENERAL / COMMON
11	NAPHTHA HYDROTREATING UNIT (NHT)
12/13	REFORMER & COX UNIT (COX)
14	DIESEL HYDROTREATING UNIT (DHT)
15	HYDROCRACKER UNIT (HCU)
16	HYDROGEN PRODUCTION UNIT (HPU)
21	TOLUENE DISTILLATION UNIT (TDU)
22	DELAYED COKER UNIT (DCU)
23	BE-EXCHANGE UNIT (BEU)
25	SOUR WATER STRIPPING UNITS SWU (SWU-1)
26	SOUR WATER STRIPPING UNITS SWU (SWU-2)
27	AMINE TREATMENT AND REGENERATION UNIT NOL (ARU-1)
28	AMINE TREATMENT AND REGENERATION UNIT NOL (ARU-2)
31	RAW WATER TREATMENT SYSTEM
32	COOLING WATER SYSTEM
33	STEAM AND CONDENSATE SYSTEM/NEW SYSTEM
35	AIR SYSTEM
36	NITROGEN SYSTEM
37	REFINERY FUEL GAS SYSTEM
38	FLAME SYSTEM
39	RAVINE WATER TREATMENT SYSTEM
41	TARVAZE SYSTEM
52	FIRE FIGHTING
60	HYDROMETRIC
80	COMMON / GENERAL SULPHUR BLOCK
81	SULPHUR RECOVERY UNIT NOL(SRU-1)
82	SULPHUR RECOVERY UNIT NOL(SRU-2)
83	SULPHUR RECOVERY UNIT NOL(SRU-3)
85	SUL GAS TREATING UNIT (STGU)

**NOTES**

1. BASED ON AMINE HEAVY.

2. MATERIAL BALANCE INDICATED ARE BASED ON THOSE IN EACH LICENSOR'S DESIGN. DIFFERENCE IN FLOW RATE BETWEEN LICENSOR'S DESIGN AND CONTRACTOR UNITS ARE DUE TO IT WILL BE UPDATED BASED ON OPERATIONAL/PLANT OPERATIONAL. WHEN RELEVANT INFORMATION IS AVAILABLE FROM LICENSOR AMEND.

REV.	DATE	DESCRIPTION	BY	CHK	APP	DATE
1	18/04/2019	FOR INFORMATION	M.K.	D.H.	M.K.	J.B.
2	19/01/2020	PRELIMINARY	M.S.	Y.S.	S.M.	J.B.

**ERC** Egyptian Refining Company (ERC) S.A.E. Matruh, Arab Republic of Egypt

**GS Engineering & Construction** SOUL, KOREA

**ERC Refinery Project**  
BLOCK FLOW DIAGRAM  
PROCESS GENERAL FLOW DIAGRAM

SCALE	LINE NO.	SHEETING NO.	REV.
NONE	-	7104-PR-00-PF-001	1
DESIGN JOB NO.	CONTRACT NO.	7104	

### **VACUUM DISTILLATION UNIT (VDU)**

TO SEPARATE ATMOSPHERIC RESIDUE INTO,

- ✓ LVGO (FEED FOR DHT UNIT)
- ✓ MVGO/ HVGO (FEED FOR HCU UNIT)
- ✓ VR (FEED FOR DCU UNIT)



**VDU**

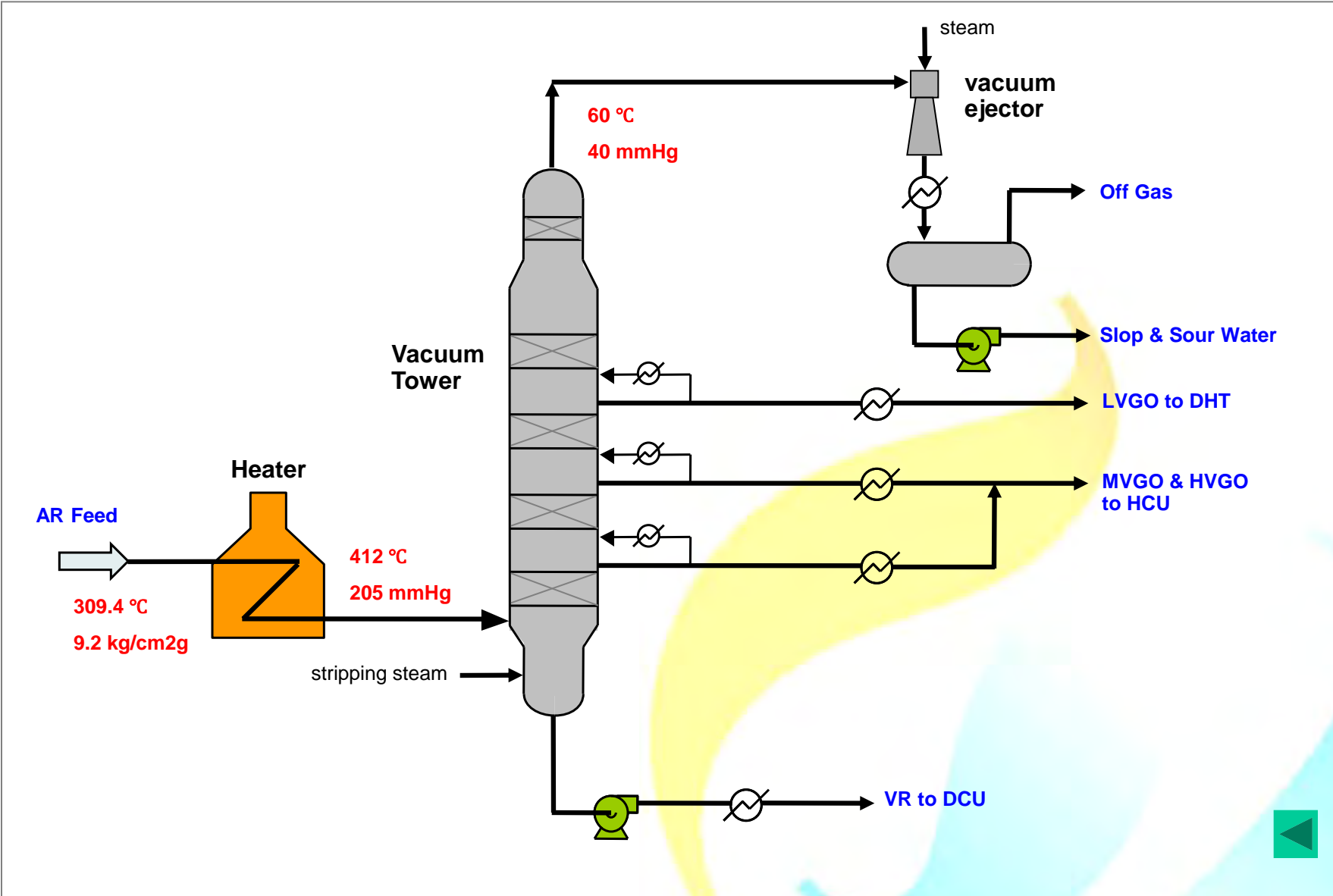
### **DELAYED COKER UNIT (DCU)**

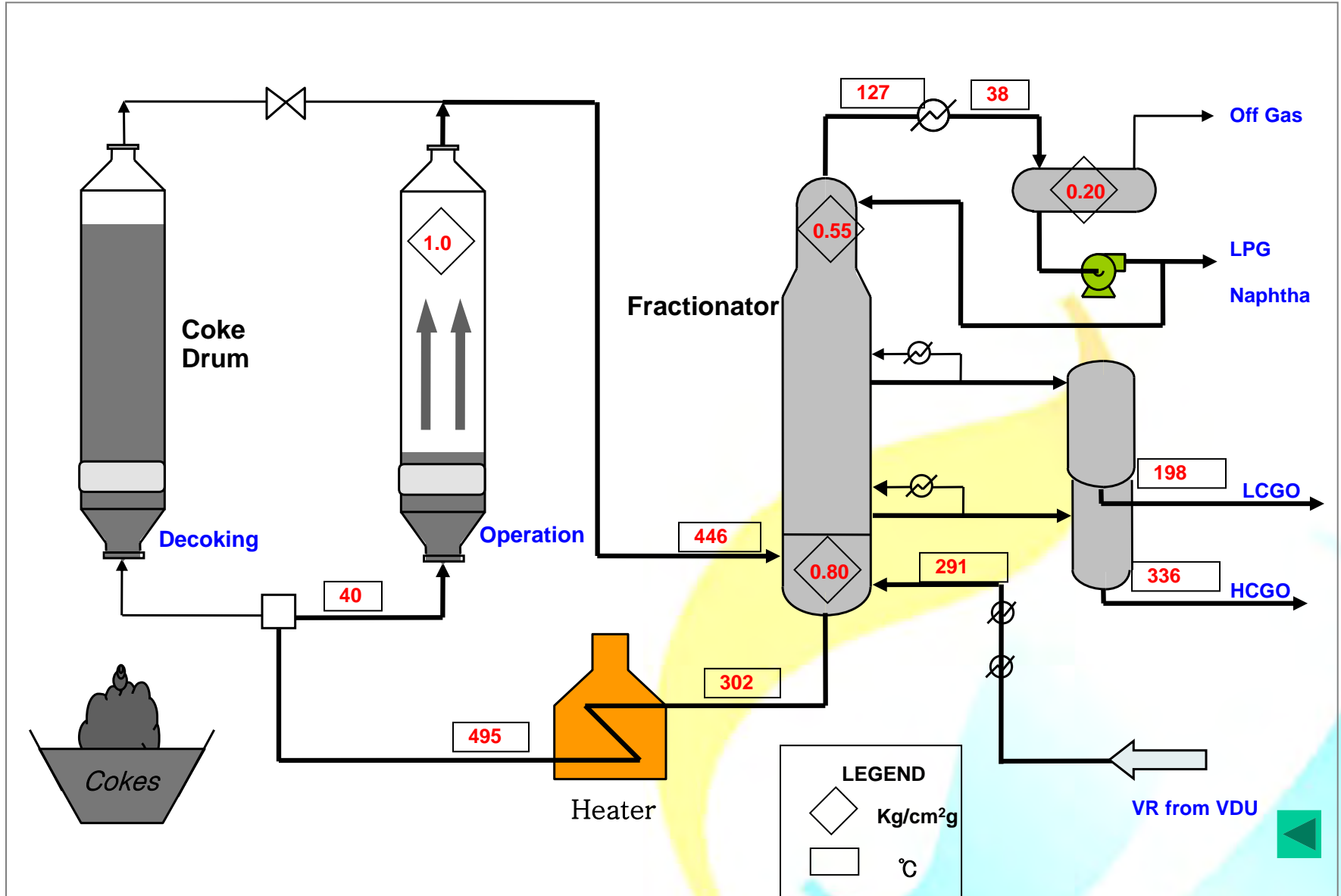
TO CONVERT VACUUM RESIDUE (VR) BY THERMAL CRACKING INTO,

- ✓ SOUR NAPHTHA (FEED FOR NHT UNIT)
- ✓ SOUR LPG (FEED FOR NHT UNIT)
- ✓ LCGO (FEED FOR DHT UNIT)
- ✓ HCGO (FEED FOR HCU UNIT)
- ✓ COKE AS SIDE PRODUCT



**DCU**





## **NAPHTHA HYDROTREATING (NHT) & REFORMER /CCR UNIT**

- TO REMOVE SULPHUR AND NITROGEN IN NAPHTHA TO MEET REFORMER UNIT REQUIREMENT
- TO INCREASE OCTANE NUMBER (RON :102) BY REFORMING
- CONTINUOUS CATALYST REGENERATION IN ORDER TO MAINTAIN CATALYST ACTIVITY



**NHT**

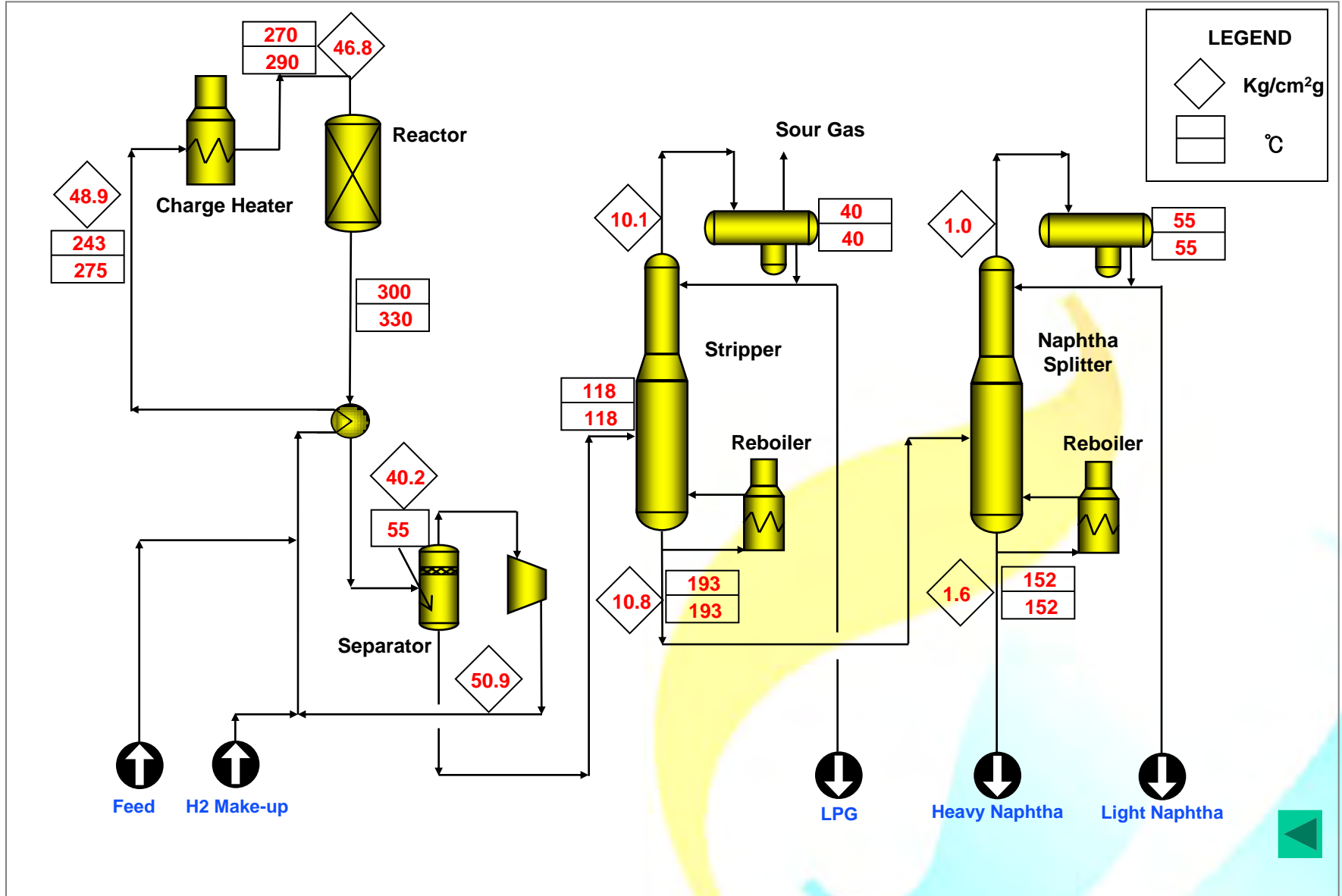


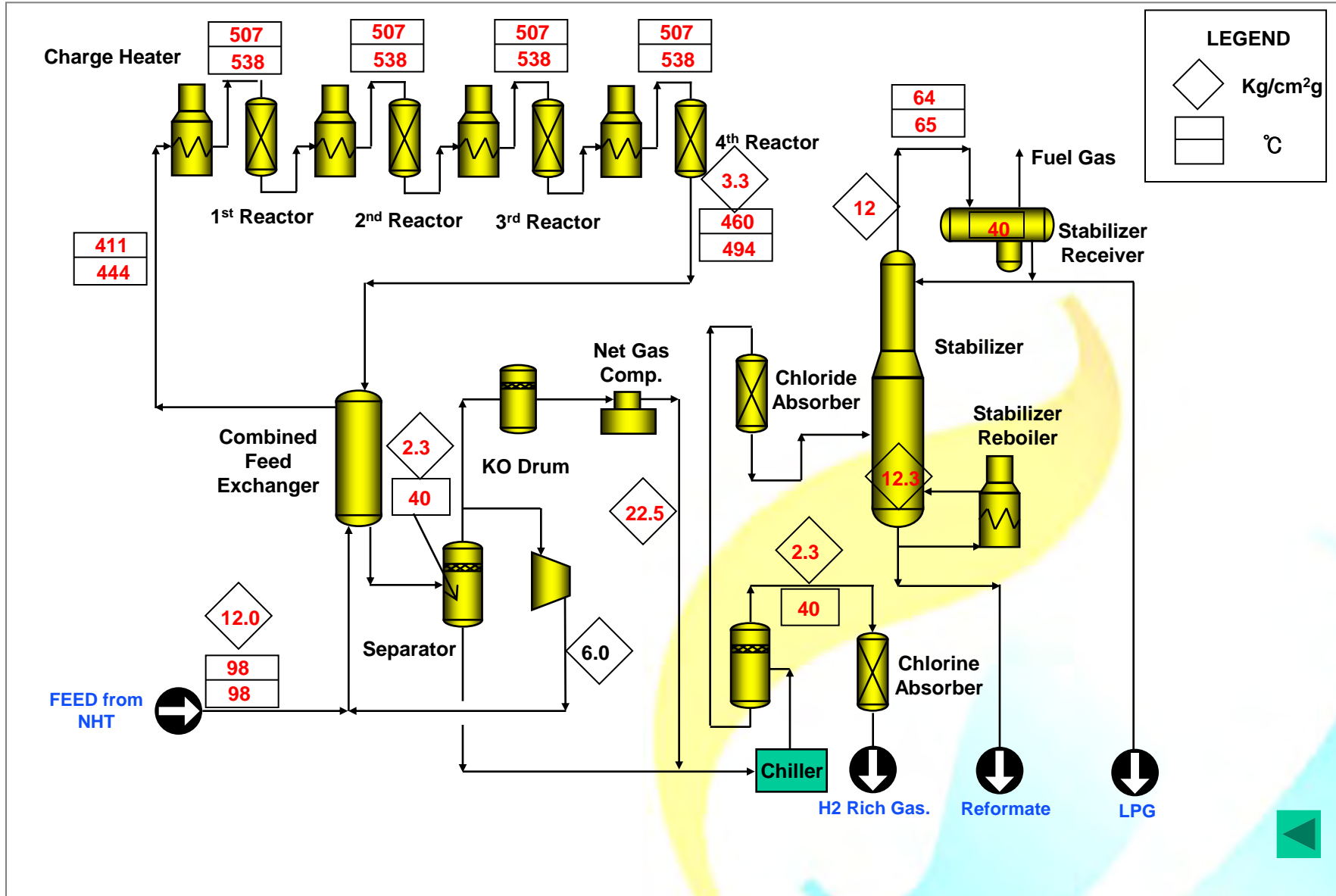
**CCR**

## **DIESEL HYDROTREATING UNIT (DHT)**

- TO REMOVE SULPHUR(10wt ppm)
- TO MEET FLASH POINT REQUIREMENT ( $\geq 55^{\circ}\text{C}$ )







### HYDROCRACKER UNIT (HCU)

- PRODUCING MAXIMUM AMOUNT OF KEROSENE AND DIESEL, COMPLYING WITH KEROSENE AND DIESEL SPECIFICATION
- CONVERSION: 96.5 WT% MIN.
- KEROSENE SULPHUR CONTENT: 10 WT PPM MAX. DIESEL SULPHUR CONTENT: 10 WT PPM MAX.

### HYDROGEN PRODUCTION UNIT(HPU)

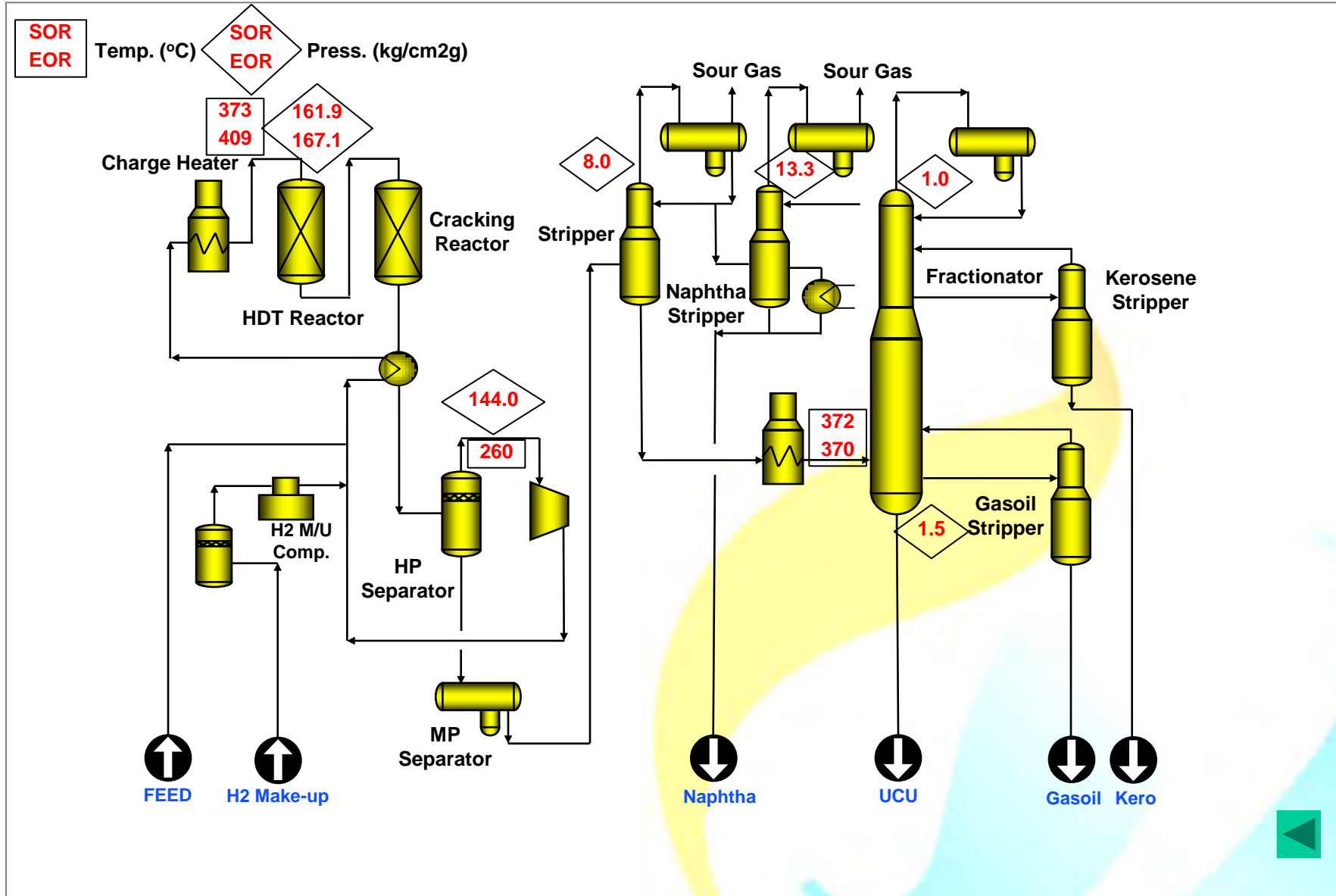
- TO CONVERT NATURAL GAS INTO HYDROGEN IN ORDER TO SUPPLY REACTION SOURCE TO HYDROTREATING AND HYDROCRACKING UNITS
- TO RECOVER HYDROGEN RICH GAS FROM CCR AND PURGE GAS FROM HCU TO HYDROGEN

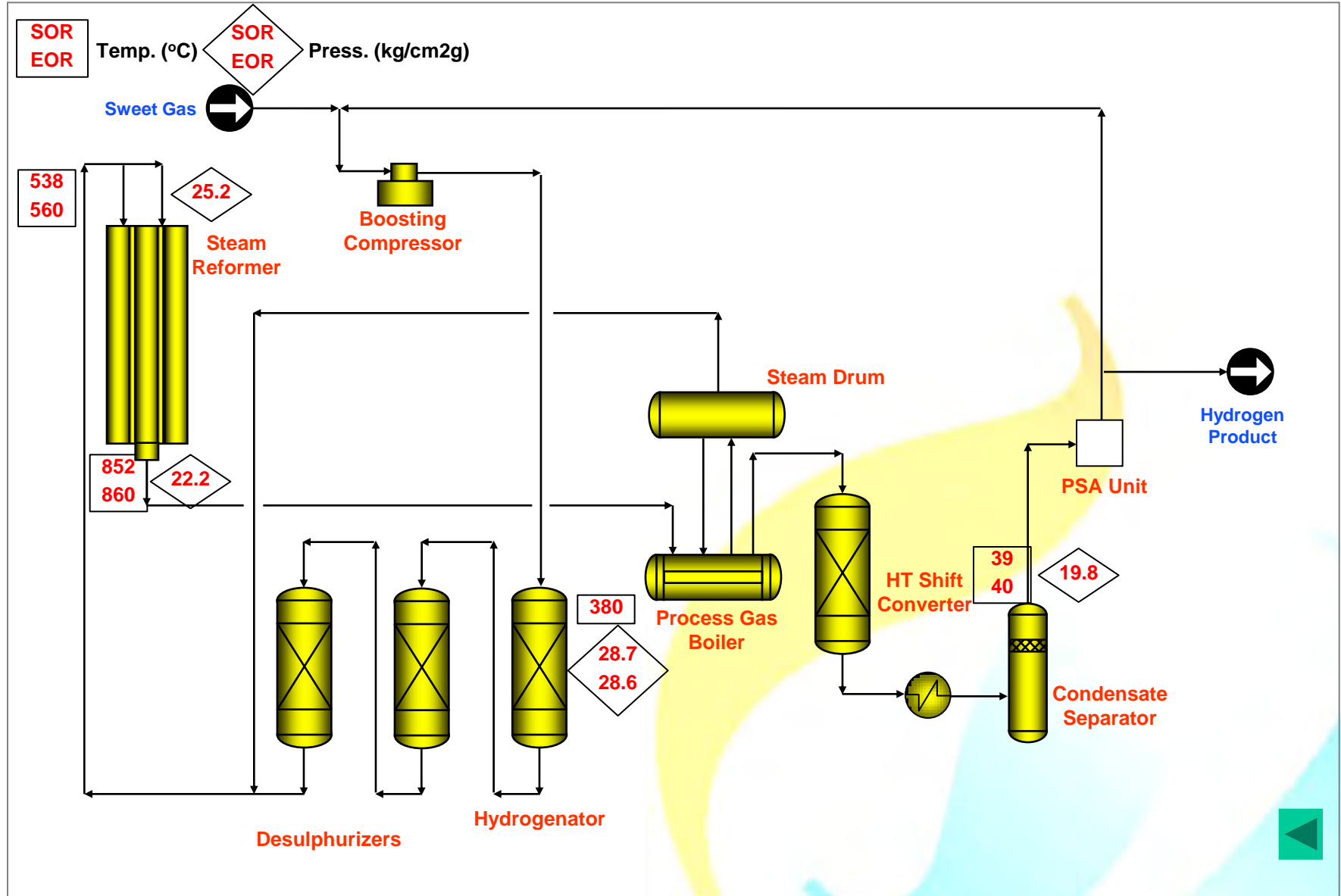


**HCU**



**HPU**





## SWS, ARU, SRU

### ➤ SWS

- ✓ TO TREAT SOUR WATER BY STEAM STRIPPING COMPLYING WITH WASH WATER FOR HYDROTREATING AND WWT FEED REQUIREMENT
- ✓ PHENOLIC SOUR WATER AND NON-PHENOLIC SOUR WATER

### ➤ ARU

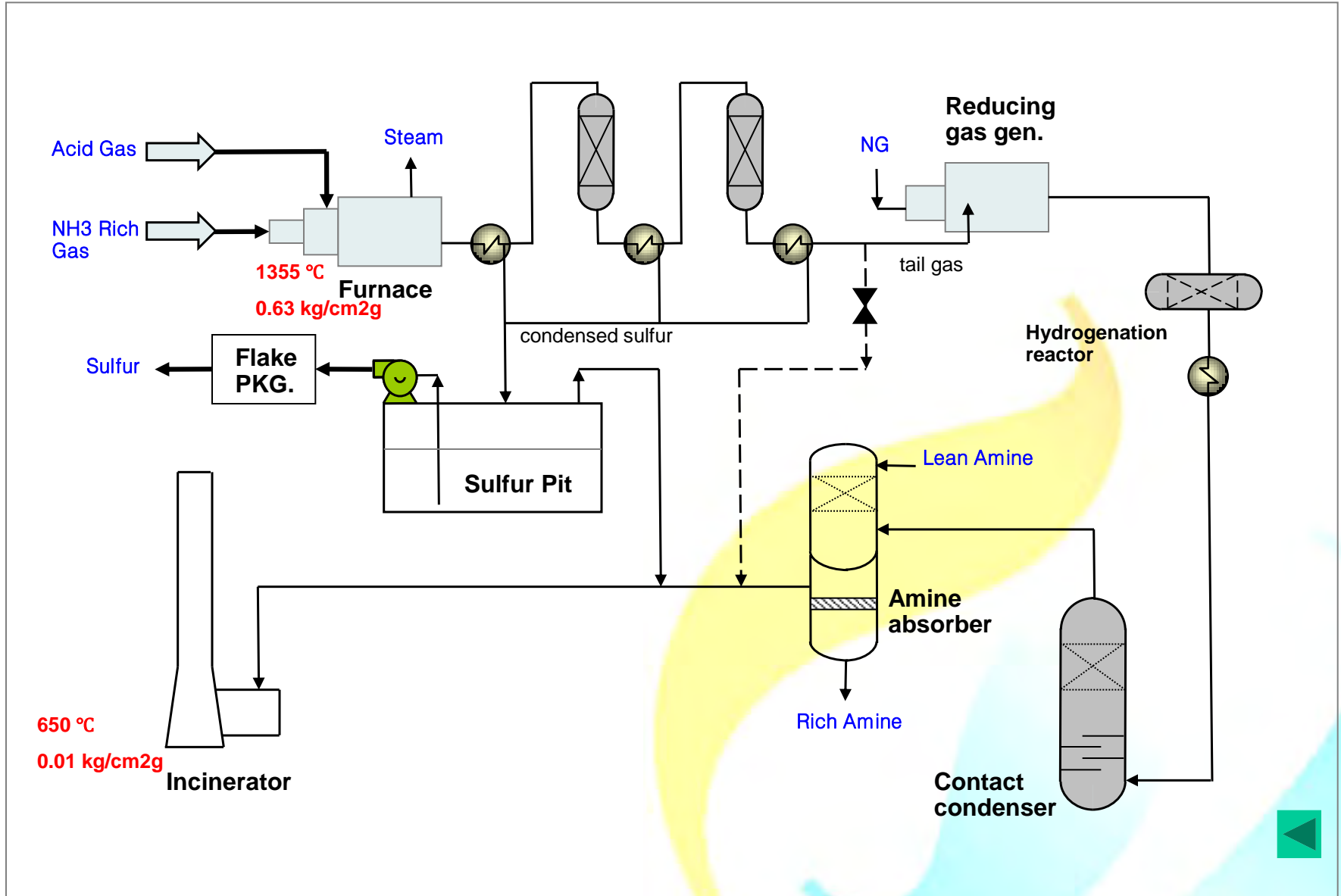
- ✓ TO REGENERATE RICH AMINE TO LEAN AMINE, IN ORDER TO MEET SPECIFICATION REQUIRED FOR UPSTREAM ABSORBER
- ✓ SATURATED GAS AND UNSATURATED GAS ARU

### ➤ SRU & TGTU

- ✓ TO CONVERT H<sub>2</sub>S INTO SULPHUR IN ORDER TO MINIMIZE ENVIRONMENTAL POLLUTION



**SRU**



### UTILITY AND OFFSITE

- ✓ RAW WATER TREATMENT SYSTEM
- ✓ COOLING WATER SYSTEM
- ✓ STEAM AND CONDENSATE SYSTEM / BOILER FEED WATER SYSTEM
- ✓ AIR SYSTEM
- ✓ NITROGEN SYSTEM
- ✓ REFINERY FUEL GAS SYSTEM
- ✓ FLARE SYSTEM
- ✓ WASTE WATER SYSTEM
- ✓ TANKAGE
- ✓ FIREFIGHTING SYSTEM
- ✓ INTERCONNECTION