

HUMBERZER 

Phillips 66 Limited Humber Refinery
Post Combustion Carbon Capture Project



■ **4 Process Columns**

- ASME VIII, Carbon Steel + 316L Clad, up to 8m diameter, 40m T/T

■ **5 Compressors / Turbine**

- LP & HP CO₂ Process Compressors
- MVR Compressor
- Plant and Instrument Air Compressors
- Steam Turbine Generator

■ **19 Vessels & Tanks**

- ASME VIII
- Up to 5m diameter, 8m T/T CS +316L clad
- Filter Vessels
- Storage Tanks, up to 300 m³, CS + 316L clad

■ **25 Heat Exchangers**

- Waste Heat Exchanger & Economiser – 5psi rated
- Shell & Tube + Vertical Reboiler
- Plate & Frame

■ **40 Air Cooled Heat Exchangers**

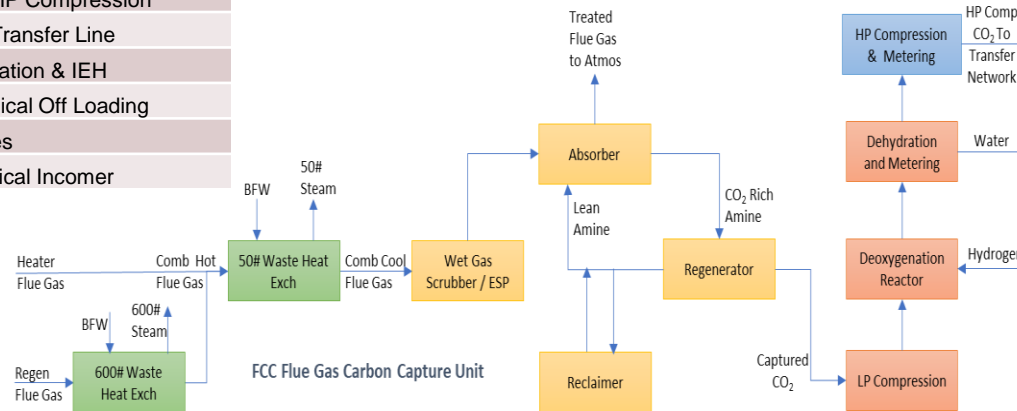
- Forced Draft
- 9.6m bundle

■ **57 Pumps**

- Centrifugal ISO 5199
- Centrifugal API 610

WBS	Description
H00	Plot Enabling
H01	Flue Gas Supply
H02	Pre-Treatment
H03	Absorption & Regeneration
H04	CO ₂ LP Compression
H05	Dehydration
H06	CO ₂ HP Compression
H07	CO ₂ Transfer Line
H08	Substation & IEH
H09/H10	Chemical Off Loading
H11	Utilities
H12	Electrical Incomer

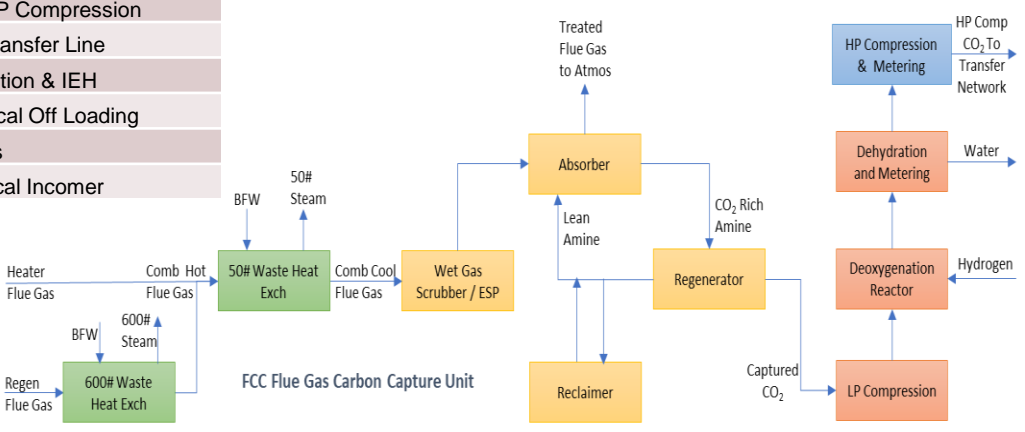
- **Post FCC Flue Gas Carbon Capture Unit at Humber Refinery.**
- **Design Capacity 0.5 MMTPA to recover & purify 95% CO₂ from Flue Gas and export to Transport and Storage (T&S) network.**





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■ **30km Piping, ASME B31.3**

- Sizes from 1/2" to 20" nominal bore, CL1 and Seamless
- 50% Carbon Steel and 50% Stainless Steel, 304L and 316L
- 60% CL150# , 40% CL300-1500#, with RTJ's => CL900#
- 60% Lagged, Electric Traced, Painted, 20% Passivated
- 90% Shop Fabrication, PARs / PAUs, Skids, Minimised site Testing

■ **Valves & Fittings ANSI / API**

- Metal Seated Butterfly & Ball API 6D
- Gate, Globe and Non Return Valves API 600 / 601 / 602
- 5D induction Bends / Maximise Forged fittings Red Tees B16.9
- Low Fugitive Emission Controls, Valve Packing & Testing
- Inline Filters / Y Strainers / Hoses / Couplings / Traps / PSV

■ **700m Large Fabricated Ducting 42" to 66"**

- Hot Walled Carbon steel and Stainless / Cold Walled (Refractory Lined)
- Bellows, Expansion Joints / Tight shut off Dampers / Slide Valves
- Large Variable & Constant effort supports

■ **CE Marked / Positive Material Identification**

- Dual certified material 304H / 316H,
- Hardness controls / Normalised / 3.1B Certs
- NoBo Inspections / PED DoC



■ **1100 tonnes Structural Steel**

- **950m new Pipe Racks; Preassembled where possible**
 - Pipe Rack Sections 6m wide x 15m high 24m long
 - Duct Rack Sections 6m wide x 15m high 18m long
- **Main Modules**
 - Wet Gas Scrubber Module
 - Absorber Module
 - Regenerator Module
 - Thermal Reclaimer Unit
 - Plus Preassembled Stair Towers

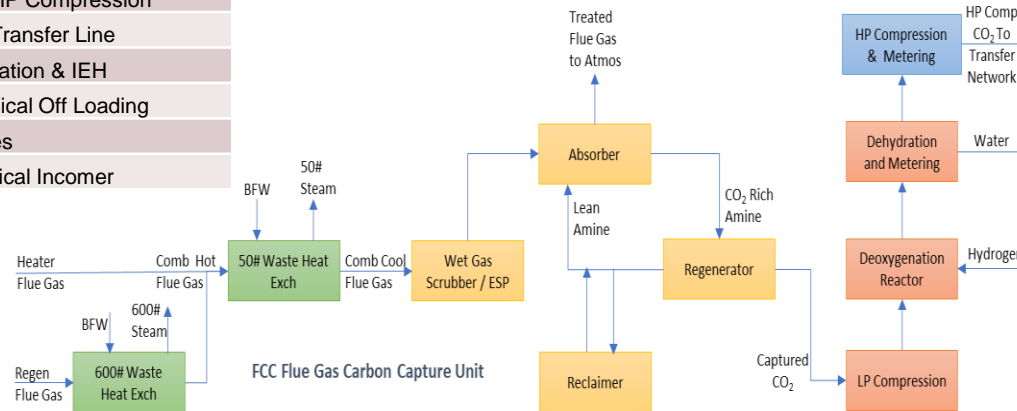
- **Compressor Shed**
- **Blast Rated Modular Building**

■ **Civils**

- **Site Clearance and Plot Enabling**
- **OWS, SWS, Amine and Caustic Drainage Systems**
- **300 Piles**
- **7500 tonnes Concrete**

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Electrical

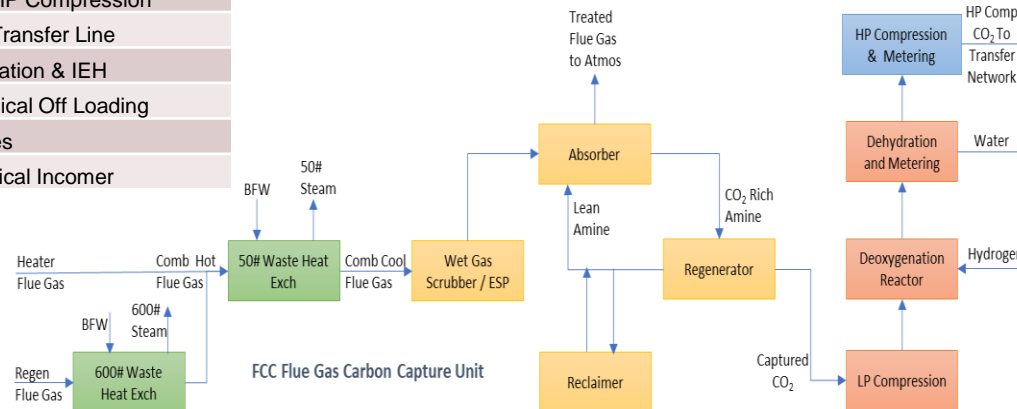
- Super Grid Transformer
- HV / LV Transformers
- MCCs / Switchgear
- Packaged Main Incomer Substation
- Modular CCU Substation
- Distribution Boards
- 35km Cabling (EHV, HV and LV)

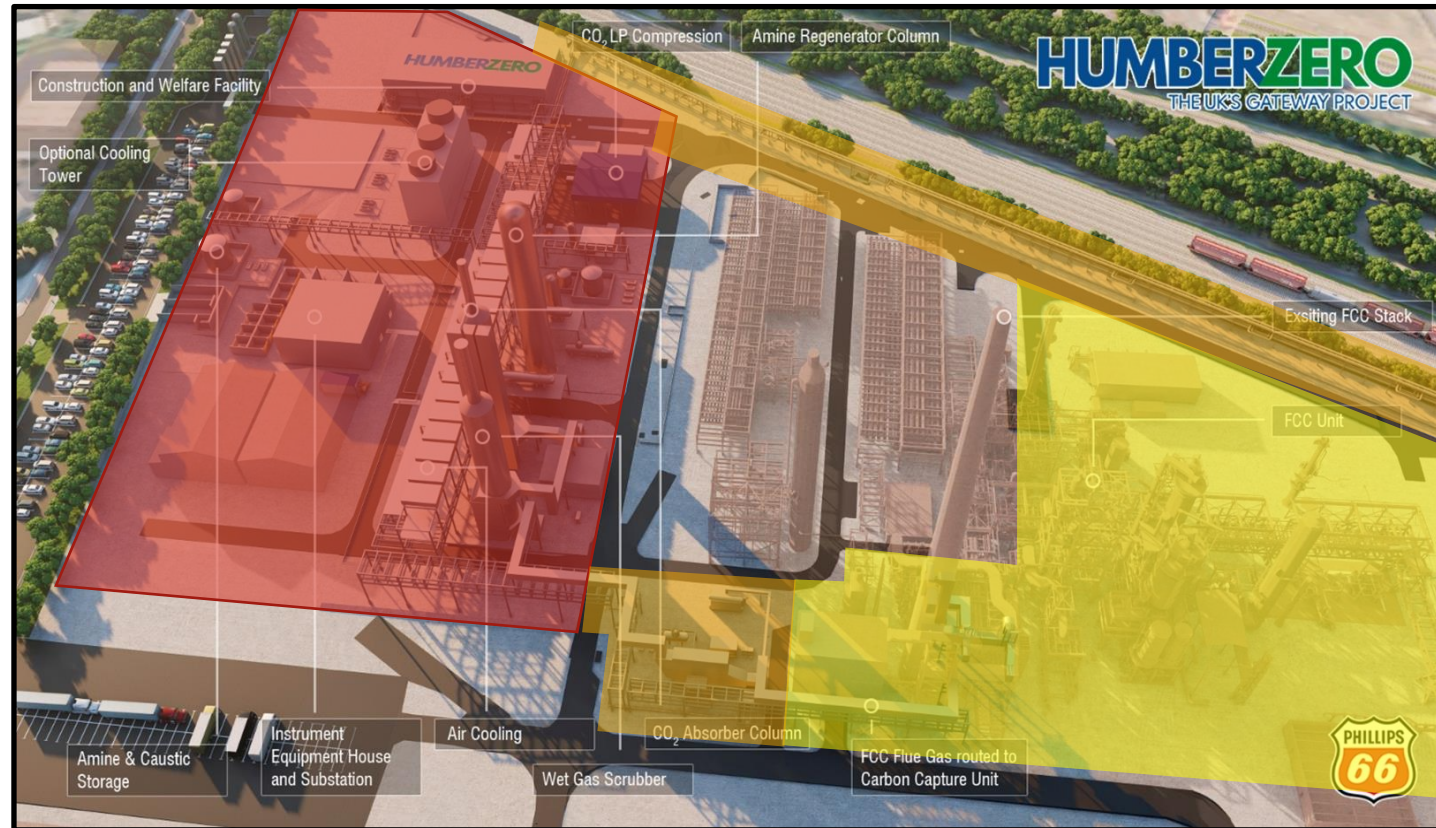
C&I

- Analysers / CEMS / Fiscal Metering / Vibration Monitoring
- >350 Instruments
 - Control Valves
 - Actuated On/Off Valves
 - ESD Valves
 - Pressure Transmitters / Gauges
 - Temperature Transmitters / Gauges
 - Level Transmitters / Gauges
 - Flow Transmitters & Flow Elements
 - Fire & Gas Sensors
- Safety Instrumented Systems
- 10km Cabling / Fibre

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Construction Strategy



- Maximise off site assembly, with 4 Main Modules
 - Wet Gas Scrubber
 - Absorber
 - Regenerator
 - Thermal Reclaimer Unit
- Pre-Assembled Racks
 - Pipe Rack Sections 6m wide x 15m high 24m long
 - Duct Rack Sections 6m wide x 15m high 18m long
- Packaged Sub Stations and IEH
- Opportunities for new Contractors without previous Humber refinery experience
- Indicative Schedule
 - Plot Enabling commences Q4 2024
 - Blast Rated Modular Construction Facility for Offices and Contractor Welfare Facilities erected
 - Large Equipment Install Q2 2026
 - Complete Construction 6 months prior to 27TA to allow Refinery TA preparation
 - Pre Commissioning prior to 27TA

Project Island Dedicated Project "CDM" Area Separate Access from Eastfield Rd Project Specific PTW & CMT Systems	Hybrid Areas Area controlled by Refinery operations but with temporary "possessions" approach covered by P66 ePTW	Existing Refinery Areas "Mainland" Area controlled by Refinery Operations "Tie Ins" approach covered by P66 ePTW & ATC systems
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