

## A.05

# Gas Sweetening

## Introduction

Carbon dioxide (CO<sub>2</sub>) and hydrogen sulphide (H<sub>2</sub>S) are common impurities in natural gas. These impurities need to be removed to different levels to meet each client's specific process requirements.

The most common methods for removal of CO<sub>2</sub> and/or H<sub>2</sub>S from the gas is via amines, physical solvents, membranes or adsorbents. The choice of which technology to use depends on the levels of impurities to be removed.

SUEZ has extensive experience gained through designing, fabricating and commissioning CO<sub>2</sub> and H<sub>2</sub>S removal systems over many years.

SUEZ pioneered the use of membranes for CO<sub>2</sub> removal from natural gas in Australia. When considering a CO<sub>2</sub> removal project, SUEZ determines the best technology to meet our client's needs. This may include considering the use of solvents and membranes for a given application or a combination of both to provide our client with the best possible process solution.

## Amines & Physical Solvents

### Design Basis

Each package is typically designed and built as a complete turn-key ready package with particular emphasis on specific client requirements.

SUEZ is able to combine our expertise with proprietary sour gas process simulation software to tailor process designs to suit each application.

As a result of our significant design and installation experience, SUEZ offers a complete range of process solutions to remove CO<sub>2</sub> and H<sub>2</sub>S impurities by selecting from a range of solvents including generic amines, proprietary amine blends and physical solvents.

The design of each gas sweetening plant is unique for each application. Where amines or physical solvents are selected SUEZ is able to choose from a range of commercial and generic solvents, the solvent that is best suited to meet the needs of each specific application in terms of CAPEX, OPEX and environmental issues is selected.



BHP Zamzama CO<sub>2</sub> removal plant  
Location: Pakistan

**SUEZ – Oil & gas systems**  
(incorporating Process Group)  
Australia - Korea - Middle East - Singapore - USA

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## Gas Sweetening



In many cases, plant operating flexibility is a major factor and SUEZ is able to provide a plant that is compatible with a number of different solvents.

SUEZ ensures each plant is optimised for the following considerations:

- To meet sales gas H<sub>2</sub>S & CO<sub>2</sub> specifications,
- Impurity removal to minimise foaming,
- Operating efficiency,
- Materials compatibility.

### Reference Clients

- BP
- RAK Gas
- BOC
- AGL
- BHP Billiton
- Black & Veatch
- CB&I

### Membranes

#### Design Basis

Each package is typically designed and built as a complete turn-key ready package with particular emphasis on specific client requirements.

The design of CO<sub>2</sub> removal systems is unique for each application and so a design basis is determined by first gaining a thorough understanding of the client requirements.

Membranes offer specific advantages over solvent based processes including:

- Low operator requirement
- Elimination of solvents from plant environment
- Simple operation
- Ideal for onshore and offshore applications
- No moving parts

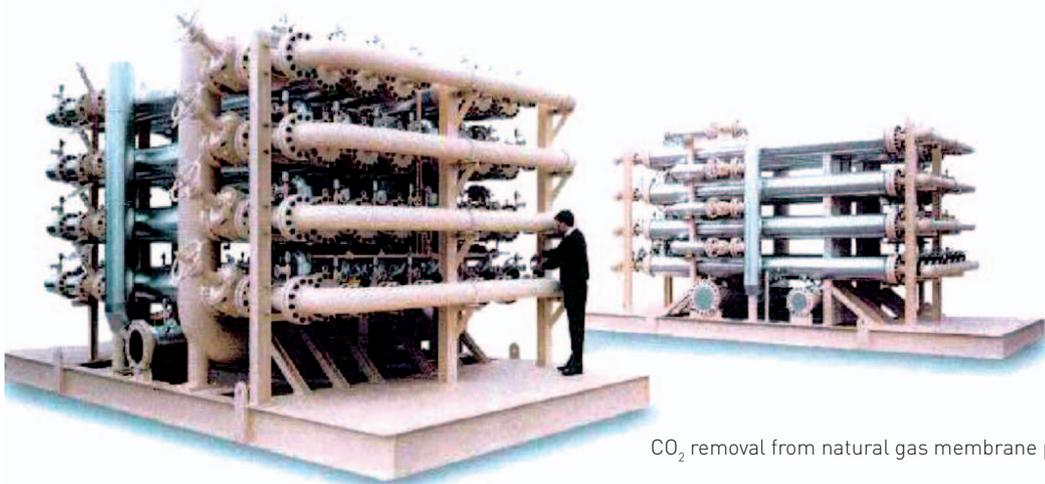
In the same manner that SUEZ evaluates solvents for CO<sub>2</sub> removal, SUEZ reviews the suitability of membranes for a given application and works with the membrane vendor to provide a solution that is specifically tailored to suit the requirements of each application.

This includes developing the optimum overall plant configuration and pre-treatment to ensure the membranes are protected from contamination by heavy hydrocarbons and other impurities.

Where CO<sub>2</sub> levels are high enough a plant design combining membrane and amine solvent may offer the best overall plant solution.

#### Reference Clients

- Origin Energy
- Santos
- BHP Billiton



CO<sub>2</sub> removal from natural gas membrane package