



Dulang GCM (Malaysia)

Petronas Carigali experienced fouling of compressors due to liquid carry-over from certain scrubbers and separators within the Gas Compression Module (GCM) on Dulang B. As part of this project, Zeta-pdm Ltd undertook the design, engineering, supply and installation supervision, of the separation internals for the revamp & upgrade of the existing vertical Inlet Scrubbers V-541 / 551, Interstage Scrubbers V-545 / 555 and Discharge Scrubber V-568 and the horizontal HP Separator V-504.

Discovered in 1981, Dulang is a major oil field in the Malay Basin. Located 130 km off the east coast of the Malay Peninsula in depths of 76m the Dulang field is approx. 24 km long and 3.5 km wide. It is owned jointly by Petronas Carigali Sdn. Bhd and Esso Production Malaysia Inc.

The western and eastern portions are operated separately by Carigali and Esso, respectively. In addition, Carigali operates the central area known as the Dulang Unit Area. The Gas Compression Module (GCM) is positioned on Dulang B.



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General Information;

Zeta-pdm provided a detailed Computational Fluid Dynamics (CFD) analysis of all of the scrubbers and the separator, highlighting the deficiencies of the existing design and the causes of the high liquid carry-over.

The design of the new internals was challenging due to the "non-weld" requirements and relatively small vessel diameter of the scrubbers.

All the revamp internals were designed to optimise the operational flexibility of the scrubbers and the separator, whilst meeting stringent process, mechanical, HSE and quality specifications.

Zeta-pdm engineers also undertook the offshore supervision of the internals installation.

The scope included;

For the Inlet Scrubbers V-541 / 551, Interstage Scrubbers V-545 / 555 and Discharge Scrubber V-568;

- CFD Optimisation of the Revamp Separation Internals.
- 1 x Vane Type Inlet Device.
- Set x 4G-FD® Demisting Cyclones (20, 6 & 6 respectively).
- 1 x ZP-090 Vane Pack Pre-Conditioner (Discharge Scrubber only).
- New Supports (Non-weld).

For the HP Separator V-504.

- CFD Optimisation of the Revamp Separation Internals.
- 3 x ZP-4G® Inlet Cyclones.
- 1 x ZHB® Distribution Baffle.
- 28 x 4G-FD® Demisting Cyclones (20, 6 & 6 respectively).
- New Supports (Non-weld).



Trial Assembly of ZP-4G® Inlet Cyclones and ZHB® Distribution Baffle



Trial Assembly of 4G-FD® Demisting Cyclones

Vessel Principal Dimensions;

Inlet Scrubbers V-541 / 551
 1,200 mm ID x 2,659 mm T/T

Interstage Scrubbers V-545 / 555

830 mm ID x 2,806 mm T/T

Discharge Scrubber V-568
 1,340 mm ID x 2,680 mm T/T

HP Separator V-504.

4,420 mm ID x 13,720 mm T/T