BERYL ALPHA
TECHNICAL SPECIFICATIONS

ENTRY SPECIFICATION

Typical Receiving Pressures

- Beryl Alpha - 13 barg minimum
- Beryl Alpha Skene Systems - 9 barg minimum

Typical Liquids Inlet Specifications

- TAN less than 0.5 mg KOH/g
- Wax 7.5 wt %
- Oil (Typical) 38°API - 40°API
- Cloud Point 20°C – 25°C max

Typical Gas Inlet Specifications

- Up to saturated if import stream is part of a full well stream
- H2S normally less than 3 ppm mol (or up to NACE MR-01-75 limits if gas can be diluted by blending)

Produced Water Inlet

- Compositional and quantity information of any produced water should be provided if they are part of the import stream.
- Generally produced water should not have emulsion forming tendencies nor have a composition that may cause incompatibility with existing streams.
- All chemicals, (batch or continuous) added to any import streams must be minimized and approved by the Beryl field operator prior to use.
- Beryl Alpha is not designed to handle H2S beyond NACE MR-01-75 thresholds.

EXIT SPECIFICATION

Typical Gas Export Specification

- Export at all pressures up to 172.4 barg
- Temperature 50°C maximum
- Water Content of 3 lb/mmscf maximum
- Cricondenbar of 105 barg maximum
- H_2S content of 500 ppm mol maximum into SAGE pipeline
- CO_2 content of 22 mol% maximum
- Free of free liquids, mercaptans, metals (including mercury), radioactive components, glycols & alcohols, solids (including scale, sand etc).
- Prior approval must be given by SAGE owners before any chemicals, corrosion inhibitors etc. can be added to the pipeline export.

All the above gas export conditions will be subject to the capability of the SAGE terminal at St Fergus to receive and process the gas.

Typical Oil Export Specification

- Oil export by tanker only (via Beryl Alpha storage cells)
- Oil TVP 14.5 psia maximum at 85°F
- Less than 2% BS&W
- Typically 65°F bulk wax formation temperature maximum
- Typical TAN Number less than 0.5 mg KOH/g

Typical hydrocarbon fluid composition

Component Mole % (Dry)	Export Gas	Export Oil
Carbon Dioxide	3.3	0.0
Nitrogen	0.8	0.0
Methane	75.8	0.2
Ethane	10.0	0.4
Propane	6.3	1.7
iso-Butane	0.7	0.8
n-Butane	1.9	3.4
iso-Pentane	0.4	2.2
n-Pentane	0.4	3.5
Hexanes	0.3	5.9
Heptanes	0.1	12.5
116 C NBP	0.0	11.6
148 C NBP	0.0	10.1
183 C NBP	0.0	8.0
218 C NBP	0.0	7.9
253 + NBP	0.0	31.8
TOTAL	**100.00**	**100.00**

Process Facilities

Separation of oil, gas and water is carried out in two parallel two-stage separation trains. Train A is currently used to process fluids from the Buckland field and condensate from the Skene gas compression module. Train B handles all of Beryl Alpha's own platform wells plus fluids from the Nevis and Ness subsea developments. Two test separators run in parallel with the inlet separators. Crude oil is stored in cells at the base of the platform prior to being pumped to export tankers.

Produced water from train A is treated using a CFU (Compact Flotation Unit) prior to discharge to sea. Produced water from train B is mostly disposed of by re-injection into exhausted platform wells. Any

residual water in the oil from the production trains is further gravity separated in the storage cells and is discharged together with ballast water during the cell fill cycle. Another CFU is installed to provide final polishing treatment to storage cell ballast water immediately prior to discharge to sea.

Gas is compressed in two stages from the atmospheric separator pressure up to inlet separator pressure of 10 barg by a low pressure (LP) gas compressor. This gas is then mixed with gas from the inlet separator / test separators and is compressed to 170 barg by two parallel trains of compression (either the 'G160' compressor or the 'Additional Gas Compression Module' viz AGCM). This gas is either used for fuel, gas lift or exported to the SAGE pipeline. Each compression train includes a TEG system to dehydrate the gas to the required export water dewpoint specification.

De-aerated seawater is injected into Beryl platform and Nevis subsea wells using parallel high pressure water injection pumps. A separate water injection system for the Buckland field uses water drawn from a sub-surface aquifer, via an ESP and topsides water injection pump. The Buckland water injection system provides sulphate free water, to avoid the mixing of sea water with incompatible fluids in the Buckland reservoir.

In 2000, a new gas compression module was installed on the RAT to handle gas from the Skene sub-sea field. Gas export from the Skene system commenced in December 2001. Glycol regeneration, cooling medium, electrical power and other utilities are all provided to the Skene module from the main platform.