SUMMARY - EP BRIDGING DOCUMENT GAS COMPRESSION RECOVERY PLAN

woodside

This summary of the Vincent Gas Compression Recovery Plan has been submitted to comply with Regulation 11(7)(8) of the Petroleum (Submerged Lands) (Management of Environment) Regulations 1999. It may not be used for any other purpose without prior approval from Woodside.

1. COORDINATES OF PETROLEUM ACTIVITY

The Vincent oil field is located in Production Licence WA-28-L in the Exmouth Sub-basin, 43 km north of the North West Cape and 10 km north-east of the Enfield oil field (Figure 1). The Vincent oil field development consists of subsea wells tied back to processing facilities on the *Maersk Ngujima-Yin* Floating Production Storage Offtake (FPSO) vessel. FPSO is located 42 km north of the North West Cape, east of the Vincent reservoir, in 350m water depth.

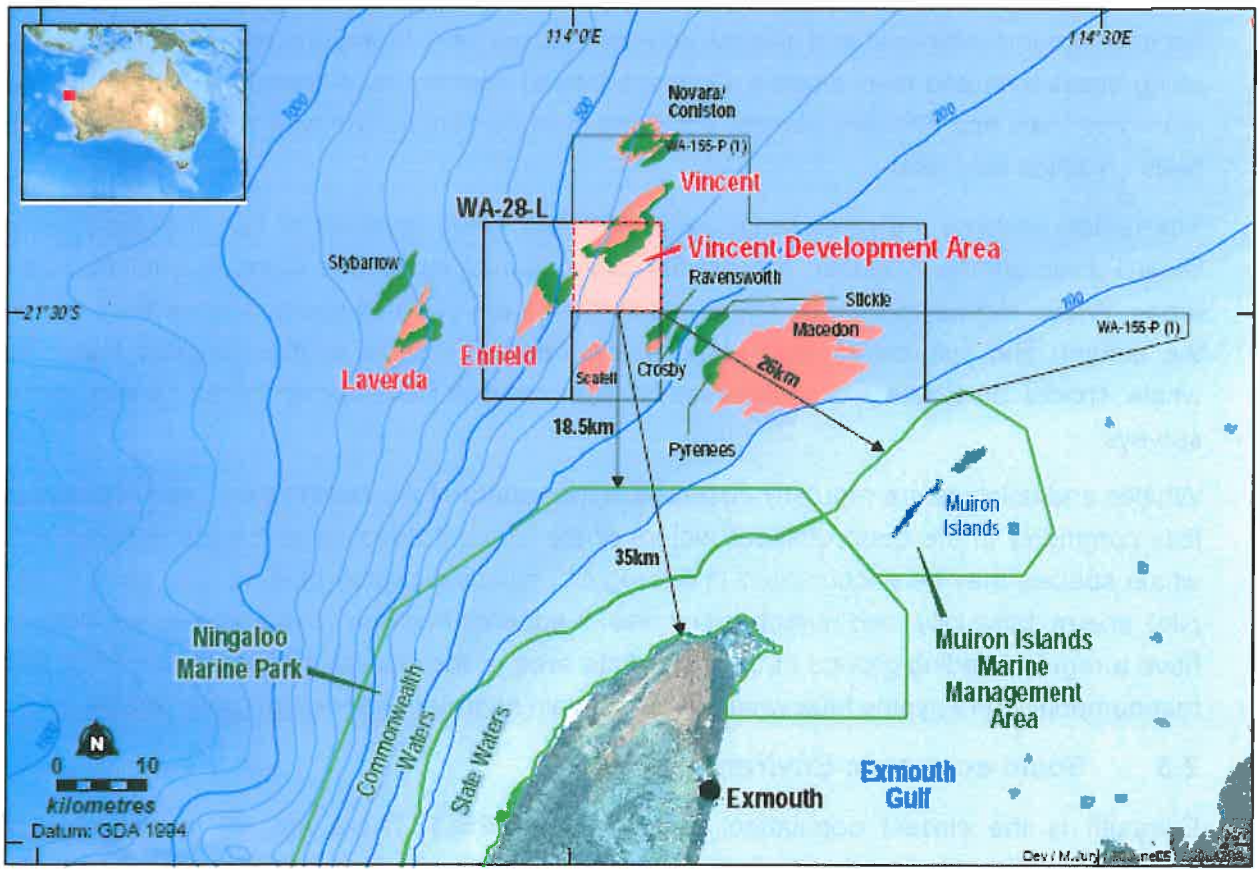

Figure 1: Location Map

2. DESCRIPTION OF RECEIVING ENVIRONMENT

2.1 Physical Environment

The North West Cape exists in an arid (mainly summer rain) sub-tropical environment with tropical cyclone activity from November to April. A typical year would see between two and three cyclones pass through the area.

The Vincent Development Area is located on the continental slope in deep water, ranging from 230m in the south-east to 460m in the north-west. The majority of the seabed is generally featureless and consists of fine to medium sediment (silts and sands) with patches of coarser sediments (shells/gravels).

2.2 Biological Environment

Biological seabed surveys conducted at the continental slope in the North West Cape region concluded that while some rare and unusual species were collected, the same general suite of species is widespread and well represented along the continental shelf and upper slope in this region. Sponges, crustaceans, echinoderms and cnidarians were the most diverse groups, and contributed to approximately two-thirds of the species found.

There are no coral reefs in the Vincent development area. Microalgae and seagrasses habitats occur in inter-tidal and shallow sub-tidal waters (less than 50m) and mangroves exist along coast lines and river mouths. Dugongs inhabit shallow (less than 10m) waters on the mainland coast and offshore islands, occurring in close conjunction with seagrass and algae beds on which they feed.

The region contains a diverse range (approximately 1,400 species) of fish of tropical Indo-West Pacific affinity, however, the greater proportion of species is found in shallow water areas. Whale sharks and turtles aggregate in the waters of the Ningaloo Marine Park during the autumn and summer months respectively, frequently close to the Ningaloo Reef. No whale sharks or turtles were observed in the Vincent Development Area during aerial surveys.

Whales and dolphins are regularly observed in the waters of the North West Cape region, but less commonly in the deep offshore waters of the Vincent development area. A number of whale species may be encountered in the region, including pygmy blue, minke, short-finned pilot, sperm, false killer and humpback whales. It appears that only minke whales are likely to have a regular feeding ground in the immediate area of the Maersk Ngujima-Yin FPSO, and that humpback and pygmy blue whales are the main migratory species of great whales.

2.3 Socio-economic Environment

Exmouth is the closest population centre to the FPSO. There are no known sites of Aboriginal or European cultural significance within the Vincent development area. There are several commercial fisheries operating within the region surrounding the licence area. Recreational and game fishing is also common in the region, and is mainly concentrated in coastal and inshore areas.

Tourism is one of the major industries in the region and contributes significantly to the local economy in terms of both income and employment, and generally includes nature-based activities such as snorkelling and scuba activities, recreational boating and whale watching. These activities are limited to coastal waters and offshore islands.

3. DESCRIPTION OF ACTION

The Maersk Ngujima-Yin FPSO is operated by Maersk on behalf of the Vincent Joint Venture - Woodside (60%, operator) and Mitsui E&P Australia Pty Ltd. (40%). It is operated under the *Maersk Ngujima-Yin FPSO Environment Plan* (Woodside Reference No. V0000AH0500) approved by the Western Australian Department of Minerals and Petroleum (DMP) and Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA).

The FPSO receives well fluids (crude oil, reservoir/produced water and associated natural gas) from the production wells, separates and stores the crude oil until it can be transferred to trading tankers for export. During normal operation, some gas is used as fuel gas and surplus gas is reinjected into the reservoir.

On 13 April 2009, a fire occurred on-board the FPSO which damaged both High Pressure (HP) compressors and rendered the facility unable to compress and re-inject surplus gas. The facility was shutdown until the HP compression module was completely isolated. Production commenced on 13 June 2009 following receipt of regulatory approval from the National Offshore Petroleum Safety Authority (NOPSA) and DMP.

The bridging document to the *Maersk Ngujima-Yin FPSO Environment Plan*, is in place to manage flaring until gas compression is reinstated. The Recovery Plan has been approved by the DMP and DEWHA and specifies the following conditions:

- Up to 121,000 tonne of gas may be flared from June to December 2009. HP Compressor B must be refurbished and recommissioned (short term)
- HP Compressor A must be replaced and recommissioned (long term)
- Fortnightly production report and progress update submitted to DMP
- Monthly progress review with the DMP

Flaring from the FPSO under the Recovery Plan represents between 1–5% of the annual Woodside greenhouse footprint. Despite this, Woodside will endeavour to achieve the company wide greenhouse target for 2009.

4. MAJOR ENVIRONMENTAL HAZARDS AND CONTROLS

Greenhouse gas emissions from operational flaring is identified as a High environmental hazard in the Maersk Ngujima-Yin FPSO Environment Plan. The impacts and controls specified in the Environment Plan remained mostly unchanged while operating under the Gas Compression Recovery Plan (Table 1). The controls around the compression and re-injection of flared gas are not applicable.

Table 1: Impacts and safeguards associated with operational flaring

Hazard	Potential Impacts	Safeguards/Controls
Greenhouse gas emissions from operational flaring	• Flare will be visible from coastline affecting the amenity of the area as a nature-based tourism destination. • Flaring results in the use of non-renewable, natural resources and the release of greenhouse gases. • Poor combustion at the flare tip can also result in emission of CO and smoke.	Design • Flare tip designed to be smokeless and cokeless. • Flare tip specified/designed for base load flaring and emergency flaring. • Facility equipment and control system design and shutdown logic. • Vessel piping and control systems designed to avoid lifting PSV. • Knockout vessels and piping slopes to prevent liquids carry over. • Logic used in the Cause and Effects. • Blowdown valves provided with limit switches to indicate they may have failed open. Shutdown valves also have limit switches to advice if failed to close. • Normal flare purge gas is nitrogen, not fuel gas, minimising continuous flaring.
		Operations • Re-pressuring of the production system undertaken in a controlled manner to provide progressive test of systems and assurances of integrity prior to resumption of production. • No process start up until flare pilots is ignited. • Leak testing after maintenance to avoid leaks resulting in an ESD. • Routine PSV change out and inspection. • Operational checks performed on SDV, BDV, etc. • Trip review process. • Inspections of flare system and scheduled physical inspections. • Alarms to CCR – e.g. BDV fails open, SDV fails to close. • Auto-shutdown and total depressurisation of system under emergency circumstances.

		• Depressurisation of flow lines and shut in of wells undertaken as a safety response to an emergency shutdown. • HP/LP flare gas flow meters to monitor volumes flared. • Routine inspections by operators for noise, condensation, or icing downstream of valves to indicate leaking valves. • Acoustic leak detectors can be used downstream of suspect valves. • Monitoring by camera. • Monitoring of performance against annual EIP objectives. • Monitoring and reporting of volume of gas flared as a KPI – including daily reports, monthly production summary, monthly HS&E performance reports, NPI reporting, and Greenhouse Challenge reporting.
		<u>Procedures</u> • Vincent Flaring Guidelines and Year 1 Flare Estimate. • Vincent Greenhouse Gas Management Plan. • System 48: Flare & Vent Systems Technical Systems Manual. • System 35: Gas Processing, Gas Injection & Gas-lift Technical • Systems Manual. • System 41: Glycol Regeneration Technical Systems Manual. • System 49: Drainage Systems (Topsides) Technical System Manual. • Maintenance Concepts. • Vincent Operations Integrity Management Procedure.

5. MANAGEMENT APPROACH

The management approach follows the Woodside's Management System (in line with an ISO-14001 management system).

6. CONSULTATION

Woodside is committed to ensuring stakeholders are informed of activities associated with the Maersk Ngujima-Yin FPSO. The consultation program includes:

- The formation of the Woodside Greater Enfield Area Corporate Affairs and Sustainability team to manage the consultation process;
- Face-to-face briefings and discussions;
- Written updates posted to stakeholders, including the Exmouth community and non-government organisations, and;
- A 1800 toll-free telephone number -1800 654 249

Since the incident on 13th April, Woodside has written to key stakeholders including; non-government organisations, Department of Environment, Water, Heritage and the Arts (DEWHA), fishing associations and local community groups to inform them of the nature of the incident, as well as reinstatement of production and associated flaring. These stakeholders will be informed once compression has recommenced.

Woodside shall provide the following information to the DMP on a fortnightly basis and meet with the DMP monthly to review progress against plan:

- Field daily production rates of oil, gas and water
- Daily flaring rates and flaring against the agreed plan
- Daily productions of oil, gas and water for individual wells
- Available pressure and temperature measurements
- Results of well tests, fluid tests and fluid sampling
- Analysis of reservoir performance and pressure trends
- Progress on re-instating of HP compression against plan

7. CONTACT DETAILS

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