# OIL BASINS LIMITED

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ASX Market Announcements

Australian Stock Exchange Limited

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Sydney NSW 2000

## VIC/P47 Resource Evaluation

## Highlights

- Seismic reprocessing across Vic/P47 has been completed
- Mapping and analysis of the reprocessed data has identified significantly larger Conventional Gas Potential than previously defined over the Judith Structure in Vic/P47
- **P50 unrisked Gas-in-Place (GIP)** in prospective Emperor Sandstones (previously discovered at the Judith-1 well) over the greater Judith structure within Vic/P47 is **estimated at 1.8 Trillion cubic feet (1.8 Tcf).** Note: (1 Tcf = $1x10^9$ cf)
- **P50 unrisked Gas Recoverable is estimated at 1.17 Tcf**

## Scope of Work

In 2016 Oil Basins Limited (OBL) commissioned 3D-GEO Pty Ltd (3D-GEO) to reprocess 3D seismic data recorded previously across the Vic/P47 Exploration Permit. This work involved merging and reprocessing field data from two separate 3D seismic surveys: the "Northern Fields Survey" acquired by Esso in 2001-2002 and the "Moby Survey" acquired by Bass Strait Oil (a previous operator of Vic/P47) in 2006. Pre- and post-stack inversion data were also acquired for QI geophysics.

Scope of work also included Quantitative Inversion geophysics together with interpretation and modelling of the reprocessed seismic data using the Petrel™ software.

Completed work includes:

- Merging and reprocessing two existing 3D seismic cubes
- Generation of amplitude-preserved gathers for Quantitative Inversion (QI) geophysics
- Re-interpretation of significant seismic events and targeted gas sands
- Construction of well-defined 3D models in two-way-time (TWT) and depth
- Sedimentological analysis and generation of a 3D lithological and facies model
- Evaluation of the Gas-in-Place volumes using probabilistic MonteCarlo distribution of rock volumes and reservoir parameters.

3D-GEO did not undertake any independent engineering assessment in relation to possible recovery factors. Recoverable resources reported here were estimated using recovery factors used previously in assessments of the Judith Field by Gaffney Cline and Associates in their 2008 and 2013 reports.

## Vic/P47 Overview

The Vic/P47 Exploration Permit (including the Moby Location) is located within Australia's premier oil and gas province, the offshore Gippsland Basin in Bass Strait. The permit covers 202 $km^2$ with relatively shallow water depths ranging from 20 to 85 metres.

Vic/P47 contains the Judith and Moby Gas Fields and is in close proximity to several significant oil and gas fields including: Patricia / Baleen (gas), Longtom (gas/condensate), Kipper (gas/oil) and Tuna (gas/oil) as shown in Figure 1.

The Judith-1 discovery well was drilled by Shell in 1989 discovering gas in multiple, low permeability fluvial sandstones in the Admiral Formation of the Emperor Subgroup. Wireline log analysis and formation pressure test data indicate some 186 m of net pay over a 448 m gross interval.

The Emperor Subgroup reservoirs had been viewed as likely non-commercial due to their low permeability. However this view changed when commercial flow rates (77 MMscf/day) were achieved for sandstone reservoirs in the Emperor Subgroup at Longtom-3 drilled 22 km to the west of Judith. The Longtom Gas Field was subsequently developed with long-reach horizontal wells and produced for several years before technical issues involving its sub-sea completion forced production to be suspended.

Moby-1 was drilled by Bass Strait Oil in 2004 and encountered gas in the Gurnard Formation, the uppermost unit of the Latrobe Group. Current mapping suggests that the Moby gas resource is small and uneconomic at present.

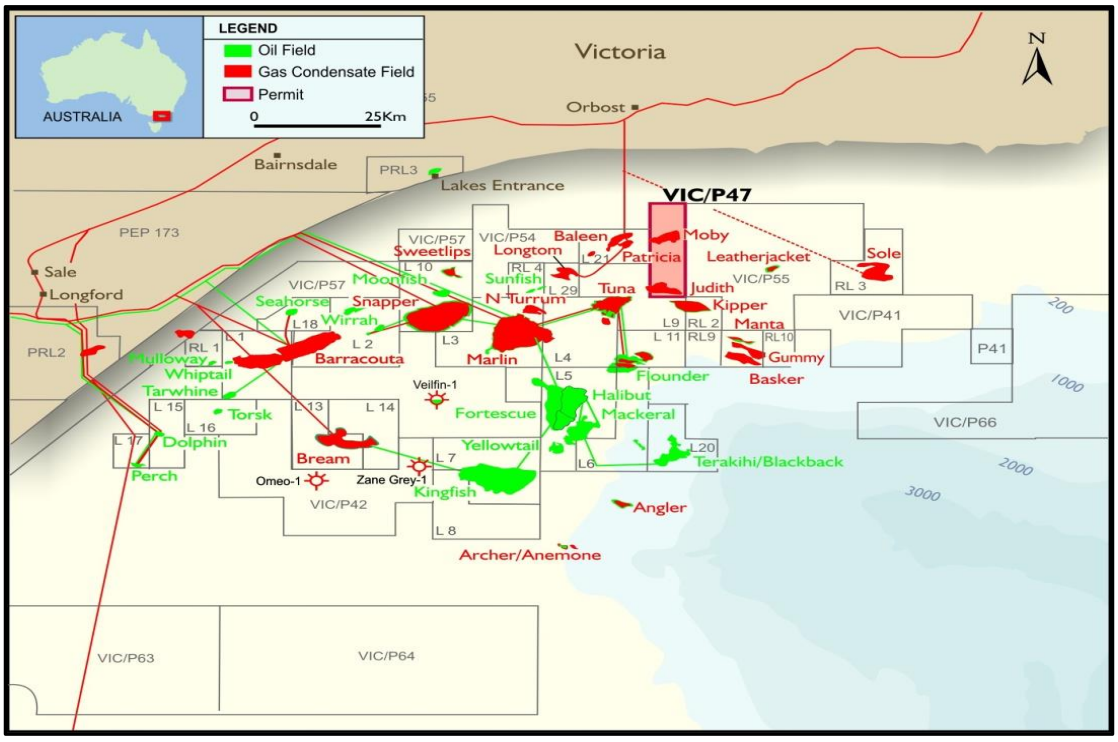


**Figure 1: Location of Vic/P47 offshore Gippsland Basin showing permits and oil and gas fields**

## Geophysical and geological analysis

Fault blocks south of the regional Rosedale Fault provide the primary Latrobe Group (Emperor subgroup) reservoir targets within Vic/P47. The Judith Fault Block was successfully drilled in 1989 by Shell encountering gas in four major sandstone sequences within the Emperor Subgroup. Wireline log analysis and formation pressure data indicates 185.5 m of net pay over a 447.5 m gross interval. The sandstones were not tested at Judith-1 and no formation fluid samples were obtained. However successful commercial production from reservoir sandstones in the same formation at Longtom suggests sufficient scope for reservoir development sufficient for gas production.

An example of interpretation on the reprocessed seismic is shown in Figure 2 with the resultant depth map at the Top Judith Gas Sand 1 (JGS 1) shown in Figure 3. The depth map shows the reservoir sandstones structurally bound with a three-way dip closure towards the East, West and South with closure ultimately dependent on fault seal against the Rosedale Fault and the Strzelecki Group to the North. Smaller, intermediary faults compartmentalize the closure between the Rosedale Fault and the southern boundary of the permit. However none of the intermediate faults, including faults to the north and west of Judith-1 are mapped with sufficient extent and throw to provide independent closure for the Judith Fault Block which opens and spills northwards to the Northern Fault Block.

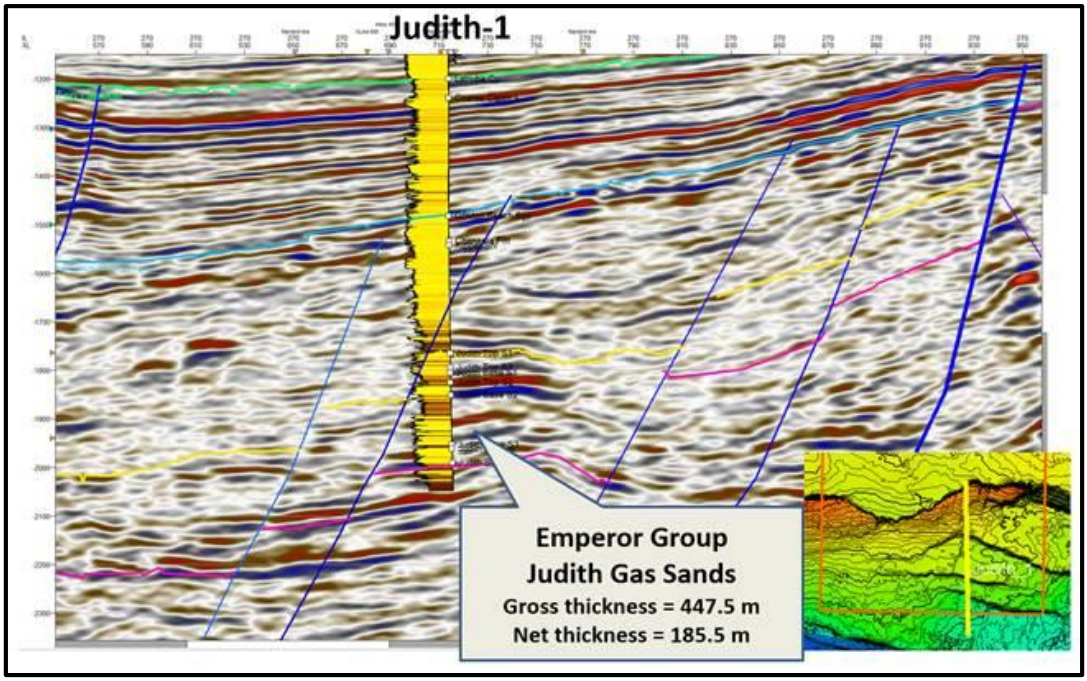


**Figure 2: Reprocessed Seismic Line 270 showing seismic interpretation and a general view of the structure around the intersecting Judith-1 with the superimposed Gamma Ray well log showing Judith gas sands.**

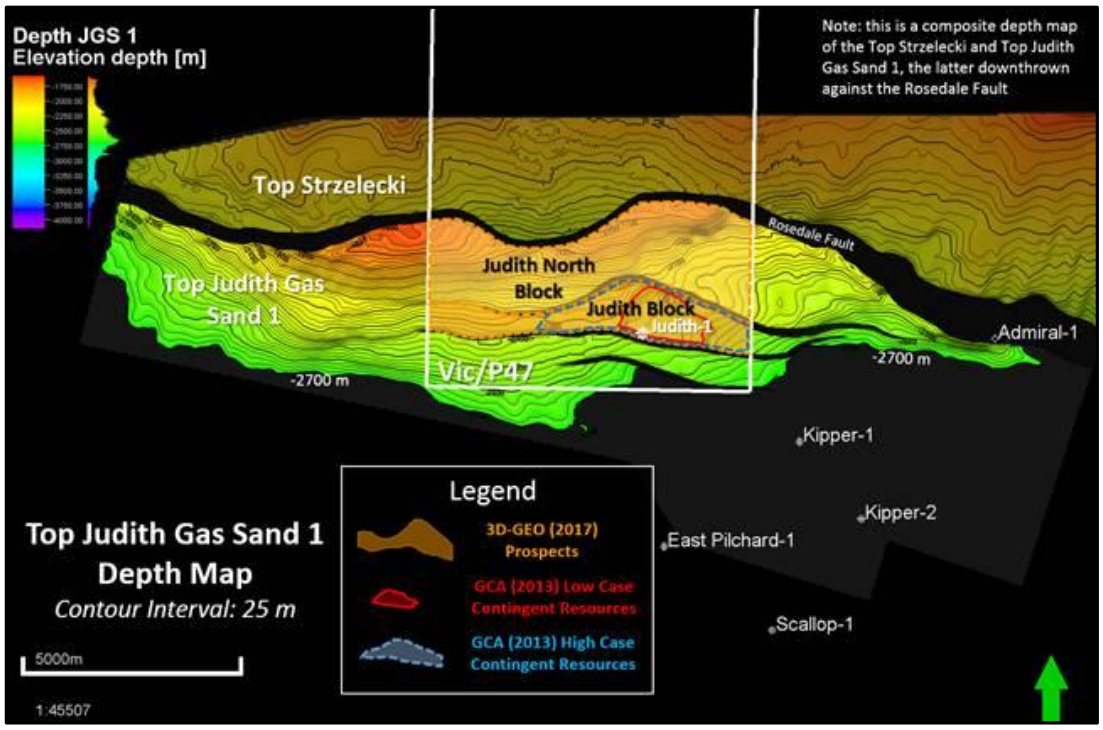


**Figure 3. Depth map of the Top of Strzelecki Group and Top Judith Gas Sand 1 (JGS 1) showing structural development of the prospective Judith Block and the Judith North Block downthrown against the Rosedale Fault.**

Quantitative Inversion (QI) was conducted on the reprocessed seismic data. Wireline log data from nearby gas discoveries (i.e. Kipper-1 and Judith-1) suggest that Acoustic Impedance (AI) and Fluid Factor (FF) can be used to distinguish hydrocarbons in porous and hydrocarbon filled reservoirs.

High amplitude values based on the Fluid Factor volume show a potential gas phase filling the Emperor reservoirs across the Judith Block and across significant (down-dip) parts of the North Block. The poor development or absence of gas indicative anomalies over the structurally high parts of the North Block is explained by the observation that these areas coincide with high structural dips where significant amplitude dimming is apparent on seismic (Figure 4). Fluid Factor and Acoustic Impedance-based approaches to gas indication are unreliable in areas of high structural dip.

Changing facies from fluvial-lacustrine to more terrestrial alluvial facies up-dip towards the Rosedale Fault to the north may also be a factor in amplitude reduction.

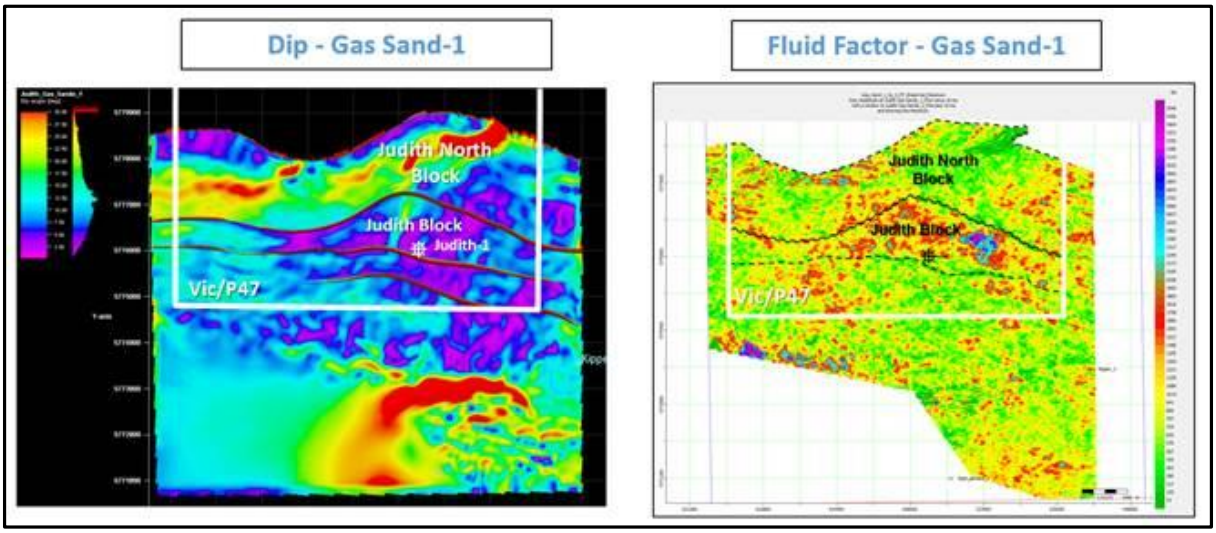


**Figure 4. Structural dip map on left with Fluid Factor amplitude response to gas in Judith Gas Sand 1 on the right. This depicts the potential for presence of gas across the Judith Block and areas of the Judith North Block. Lower Fluid Factor amplitude response to gas in areas of the Judith North Block correlates to areas of high structural dip.**

Three major environmental and lithological facies are modelled in a 3D structural framework. The facies were identified based on the well logs from Judith-1 and published sedimentological concepts for the area of study.

The majority of sand bodies are fluvial sandstones (non-marine) interbedded with lacustrine shales, but with potential for the development of alluvial sandstones (with better reservoir development) towards the north against the Rosedale Fault as shown in Figure 5 below.

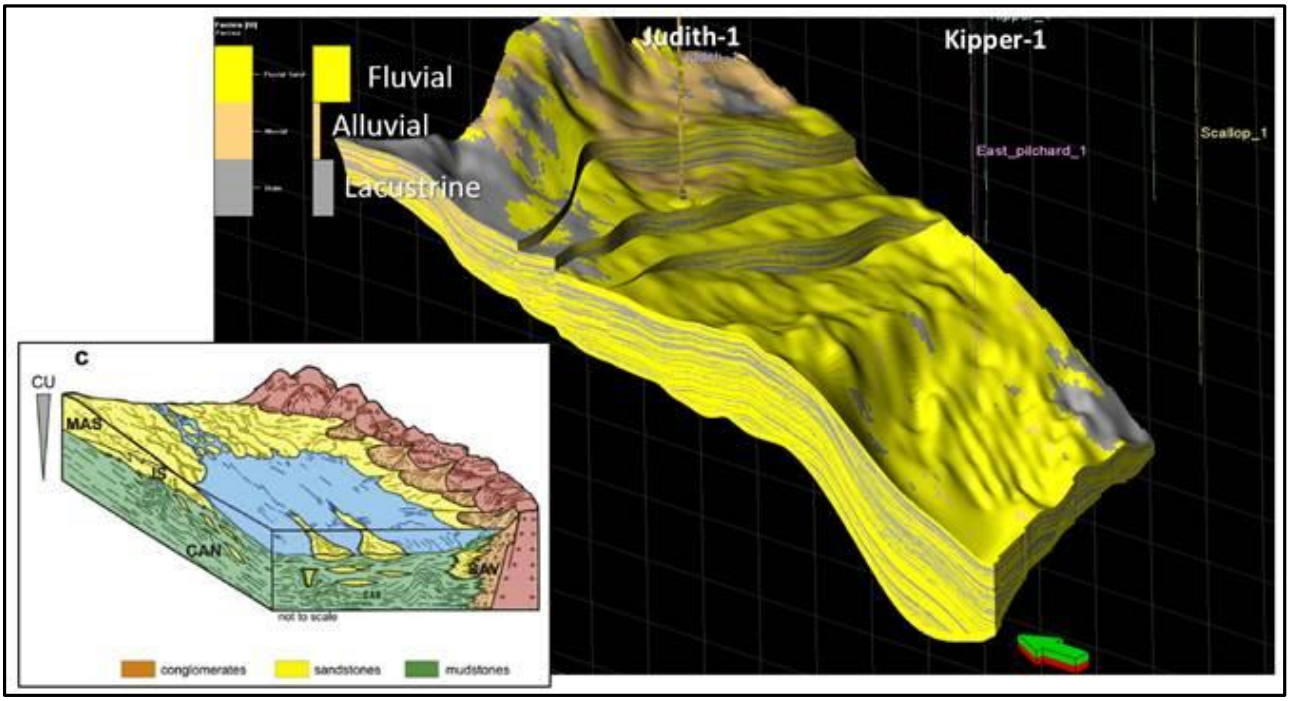


**Figure 5. 3D facies model using Petrel Software for the Judith Emperor reservoir sequence. Three lithological facies are modelled related to fluvial, lacustrine and alluvial depositional environments. The inset diagram provides a depositional analogue. This Figure also provides clear illustration of the steep structural dips in the Judith North Block.**

## Judith and Judith North Block Volumetric Summary

In 2013 Gaffney Cline & Associates (GCA, 2013) provided an independent assessment of gas resources at Judith-1 reporting Contingent Resource of 101 Bcf as shown in Table 1. However the assessment was confined to an area immediately around Judith-1 and covered only a part of the Judith Fault Block (see Figure 3),

**Table 1: Summary of Gross Contingent Resources for the Judith Discovery**

***(from Gaffney Cline & Associates, 2013)***

| | Gas-In-Place (Bcf) | | | Gas Recoverable (Bcf) | | |
|---|---|---|---|---|---|---|
| | | | | Gross Contingent Resources | | |
| **Block** | **P90** | **P50** | **P10** | **C1** | **C2** | **C3** |
| **Judith** | 67 | 155 | 368 | 37 | 101 | 276 |
| Total | **67** | **155** | **368** | **37** | **101** | **276** |

The recently completed seismic interpretation and mapping together with Quantitative Inversion outputs from the newly reprocessed 3D seismic data indicates the presence of additional potential in the Judith Block with significant upside in the Judith North Block located up-dip from Judith-1. The presence of gas in the Emperor reservoir sandstones across the prospective blocks is supported by the Quantitative Inversion results.

Input reservoir parameters used by GCA have been used as the basis for calculation of the new Gas-in-Place assessment by 3D-GEO as shown in Table 2.

**Table 2. Summary of Gas-in-Place for the Judith and Judith North Blocks- unrisked, probabilistic conservative case (3D-GEO evaluation, 2017)**

| | Gas-In-Place (Bcf) | | | Gas Recoverable (Bcf)[1] | | |
|---|---|---|---|---|---|---|
| **Block** | **P90** | **P50** | **P10** | **P90** | **P50** | **P10** |
| **Judith** | 300 | 420 | 550 | 165 | 273 | 413 |
| **North** | 1200 | 1380 | 1550 | 660 | 897 | 1163 |
| Total | **1500** | **1800** | **2100** | **825** | **1170** | **1575** |

[1] Gas recovery factors from Gaffney Cline & Associates (2008 & 2013)

## References

**Nourollah, H. and 3D-GEO, 2017.** Vic/P47 Judith and Judith North Prospects gas-in-place evaluation. *Unpublished report for Oil Basins Limited, August 2017.*

**Gaffney Cline & Associates (2008).** Contingent and Prospective gas resources certification Judith Field, Judith NWS-1, NWS-2 and TDS-1 Prospects, offshore Vic/P47, Australia as of 30 April 2008Update to the resource assessment for the Judith field, offshore Victoria, Australia as at 31st March, 2013. *Unpublished report for Bass Strait Oil Company, June 2008.*

**Gaffney Cline & Associates (2013).** Update to the resource assessment for the Judith field, offshore Victoria, Australia as at 31st March, 2013. *Unpublished report for Bass Strait Oil Company, April 2013.*

## About 3D-GEO Pty Ltd

3D-GEO Pty Ltd is a seismic and structural modelling consultancy based in Melbourne, Australia. With a collaborative mixture of petroleum industry experience and academic rigour, 3D-GEO provides innovative solutions to a broad range of clients across the Australasia region and the Middle East. 3D-GEO has extensive exploration experience in fold and thrust belt structural analysis, as well as demonstrated expertise in the extensional basins of Austral-Asia and the Sub-continent.

## Competent Person Statement

Information on the Reserves and Resources in this release is based on an independent evaluation conducted by 3D-Geo Pty Ltd (3D-GEO). The work was undertaken by a team of geoscientists. The technical assessment was performed primarily by Mr Hadi Nourollah, Director 3D-GEO. Mr Nourollah holds the qualification MSc (Petroleum Geoscience) from Imperial College London; has over 14 years of experience as a geophysicist and is an active Member of Society of Exploration Geophysicists (SEG). 3D-GEO's approach has been to reprocess the seismic volumes and re-interpret the new seismic volume using both standard interpretation modelling techniques and quantitative inversion. 3D-GEO then independently estimate ranges of in-place volumes.

3D-GEO has estimated the degree of uncertainty inherent in the measurements and interpretation of the data and have calculated a range of in-place volumes, based on their revised interpretation. 3D-GEO and Mr Nourollah have given their consent at the date of the release to the inclusion of this statement and the information in the form and context in which they appear in this release.

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