



30th October 2023
ASX Market Announcements
ASX Limited
20 Bridge Street
Sydney NSW 2000

Judith Gas field - Results of Independent Quantitative Interpretation (AvO) Study

- Calibrated AvO (Amplitude vs Offset) modelling offers support for reservoired gas in Admiral Formation Judith sands at Judith-1 and in sands located in up-dip fault blocks including at the proposed Judith-2 well location.
- Admiral Formation Longtom sands below the Total Depth (TD) of Judith-1 also show seismic amplitudes and AVO responses indicative of gas pay.
- The presence of gas-charged Judith sands is indicated in Judith South fault blocks down-dip of Judith-1 and at Kipper-1 where gas was recovered from the Judith Gas Sand 2 equivalent, confirming the presence of gas in these sands.
- Gas is also modelled in Golden Beach and Kipper reservoirs extending from the Kipper Gas field, north-west into Vic/P47.
- The study has been fully integrated with recently updated petrophysics and seismic interpretations and calibrated to the Judith-1 and Kipper-1 wells.

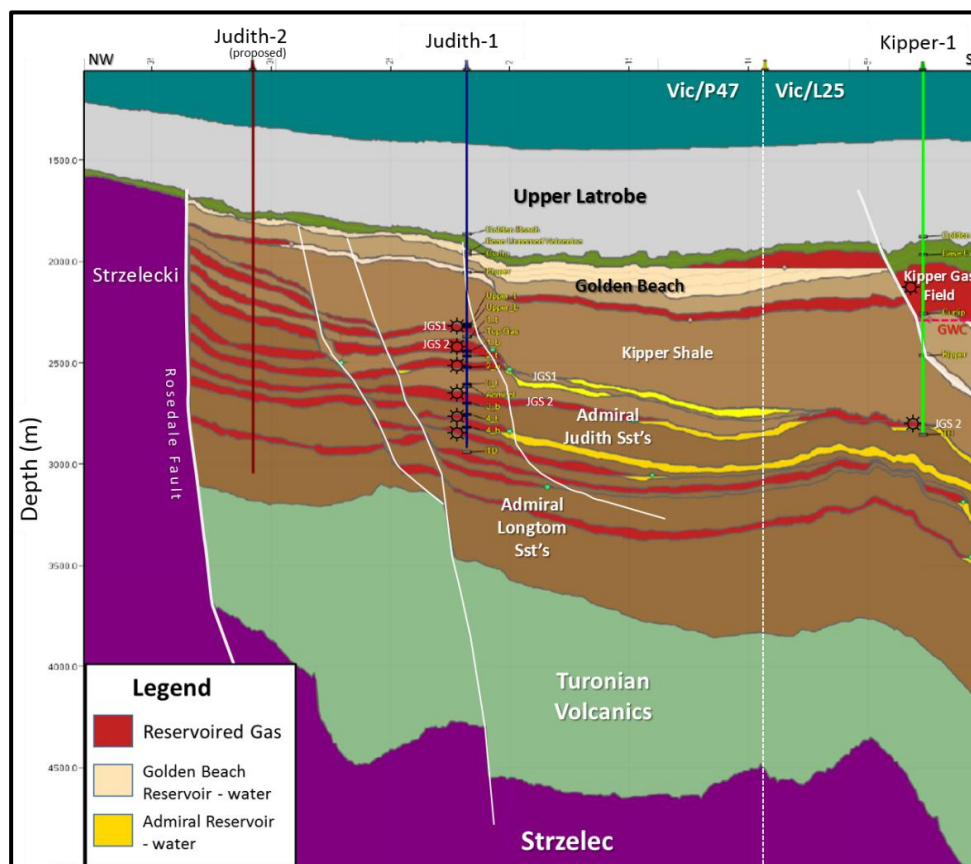


Figure 1: Composite Seismic Line: Judith – Kipper Gas Field showing AvO-modelled reservoired mobile gas in stacked Judith Gas Sands, underlying unpenetrated Longtom reservoirs & in Kipper and Golden Beach reservoirs.



Emperor Energy is pleased to announce the results of a new Quantitative Interpretation (AvO) study considering appraisal opportunities in Vic/P47 around the Judith-1 exploration well and the Kipper Gas Field, offshore Gippsland, Victoria, Australia. This work was undertaken by consulting geophysicist Dr Jarrod Dunne (QIntegral Pty Ltd).

The study was commissioned in response to technical questions from companies assessing the Judith Gas field opportunity and has been carried out using methods developed and applied by QIntegral in many basins around the world. This study leverages Dr Dunne's extensive experience working with several operators in the Gippsland Basin, including Nexus Energy who developed the neighbouring Longtom Gas Field.

AvO modelling was performed using QIntegral's Quiacito™ geophysical modelling software, which is designed to interpret and model seismic data along 2D profiles by characterizing the AvO response of hydrocarbon porefill in structural and stratigraphic traps. Among many other functions, the software performs Gassmann fluid substitution to simulate the effect of hydrocarbons on seismic data (Figure 2).

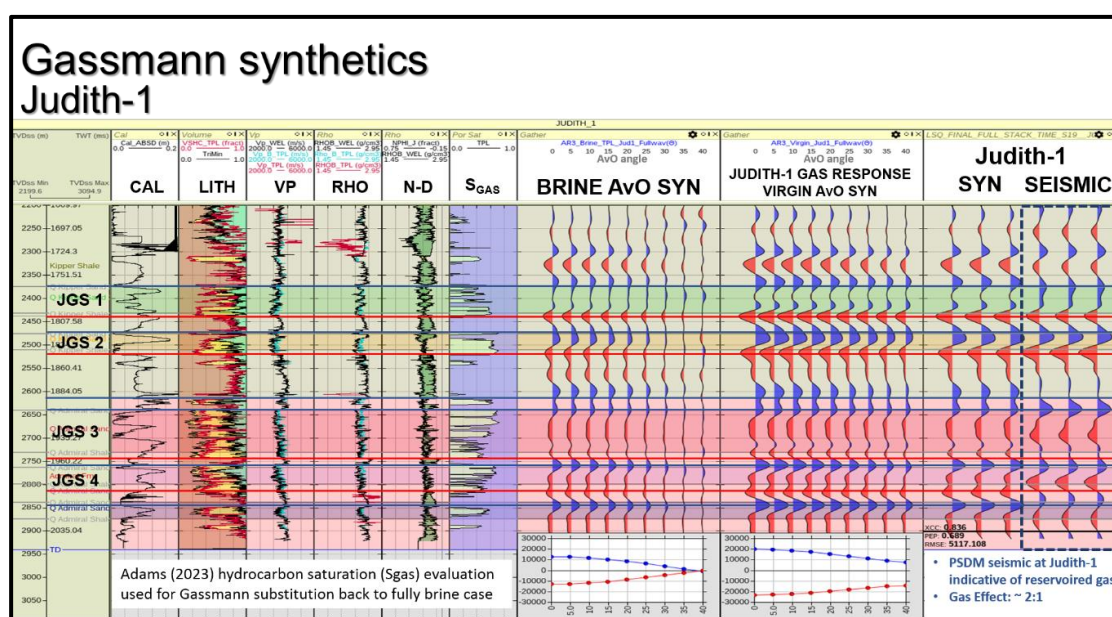


Figure 2: Judith-1 Gassman Synthetics showing brine saturation case and seismic response to gas saturation in Judith reservoirs. Gassmann synthetics and PSDM seismic indicative of gas on seismic at Judith-1.

Quiacito simultaneously models both the amplitude and time/depth behaviour of a prospect to answer critical questions such as:

- Should I expect hydrocarbon AvO anomalies, and what do they look like?
- Does my interpretation and evaluation of a prospect explain the geophysical data?

The modelling effort was underpinned by a regional rock physics database for the targeted Golden Beach and Admiral formations, which accounts for burial effects on the rock properties that control seismic reflections. This database also helped to overcome data gaps in the wireline logging at Judith-1, such as the lack of a shear sonic log.

High quality seismic-well ties were also conducted to calibrate the seismic response to nearby well control. The modelling was calibrated to match the TPL (2023) petrophysical evaluation by Steve Adams which provided reasonable interpretations of gas-water contacts in each sand based on the available formation pressure database (Table 1).



Steve Adams evaluated Judith-1 over the objective sections for porosity, net reservoir and gas saturations. His log interpretation shows the presence of **mobile gas** in Judith sand units 1, 2, 3 and 4 over a net reservoir thickness of 189.6 m. Gas is interpreted as most likely reservoir in separate gas columns based on pressure data and the log-derived (saturation-height) contacts. The evaluation by Steve Adams confirms previous analysis of mobile gas columns and gas saturations by Cernovskis (2022) while providing an **order of magnitude increase in permeabilities** over the previous analysis.

Well	Unit	From (mRT)	To (mRT)	Gross (m)	Net (m)	N/G (v/v)	phit (v/v)	Vsh (v/v)	Kis (mD)	Sgas (v/v)	HCPV (m)	Comment
Judith-1	Upper	2330.0	2343.0	12.9	11.6	0.89	0.18	0.19	182.6	0.42	0.89	Residual gas - water mobile
Judith-1	Unit_1	2391.0	2462.3	71.3	40.5	0.57	0.14	0.36	12.3	0.52	2.98	Mobile gas
Judith-1	Unit_2	2489.0	2543.0	53.9	38.8	0.72	0.15	0.35	24.2	0.64	3.71	Mobile gas
Judith-1	Unit_3	2626.0	2720.4	94.5	63.1	0.67	0.14	0.35	5.2	0.61	5.24	Mobile gas
Judith-1	Unit_4	2777.5	2839.0	61.6	47.1	0.76	0.13	0.39	1.6	0.56	3.34	Mobile gas
					189.6							

Table 1: Judith-1 petrophysical analysis (Adams, 2023)

The Gassmann AvO synthetic Virgin Case (second synthetic panel) in **Figure 2** shows reservoirs logged to a gas substitution response found in Judith-1. A 2:1 increase in seismic trace amplitudes (an AvO effect), represented by a low-impedance (soft) blue peak at the top of a gas-filled reservoir and a high-impedance (hard) red trough at the base, is modelled in gas-filled reservoirs compared to reservoirs filled with brine (first synthetic panel). This seismic amplitude increase at the top and base of gas sands is comparable with what is observed on the PSDM seismic at Judith-1.

The study includes an AvO assessment using Quiacito™ of the prospectivity up-dip and down-dip of Judith-1 using a composite full-stack PSDM seismic line that runs NW – SE from the Northern Terrace through the proposed Judith-2 well location, Judith-1 well, Kipper-1 well and across the Kipper Gas Field (**Figure 3**). The modelling evaluated each of the known Judith gas sands penetrated by Judith-1; possible deeper Longtom sands below the Total depth (TD) of Judith-1; and Kipper and Golden Beach sands that extend from the Kipper Gas Field at Kipper-1 north-west into Vic/P47.

The Quiacito™ synthetic seismogram model with gas pay assigned in each sand down to most-likely assessed gas-water contacts is shown in **Figure 4**. Judith sands in fault blocks up-dip and down-dip of Judith-1 display low impedance AvO characteristics of gas-filled sands. Calibration of these amplitudes suggests that some of these sands might vary in their thickness away from Judith-1. Deeper Longtom Admiral Formation sands were also modelled and show bright amplitudes and AvO that could reflect the presence of gas in extensively developed sand units.

The presence of gas is also indicated in Kipper and Golden Beach sandstones that extend to the NW of the Kipper Gas Field into Vic/P47.

The presence of gas in the various modelled reservoirs is detailed in **Figure 1**. The mapped extent of the AvO Shuey Fluid Factor response for Judith Gas Sand 2 (JGS 2) away from the modelled Composite Seismic Section across Vic/P47 is shown in **Figure 5**.



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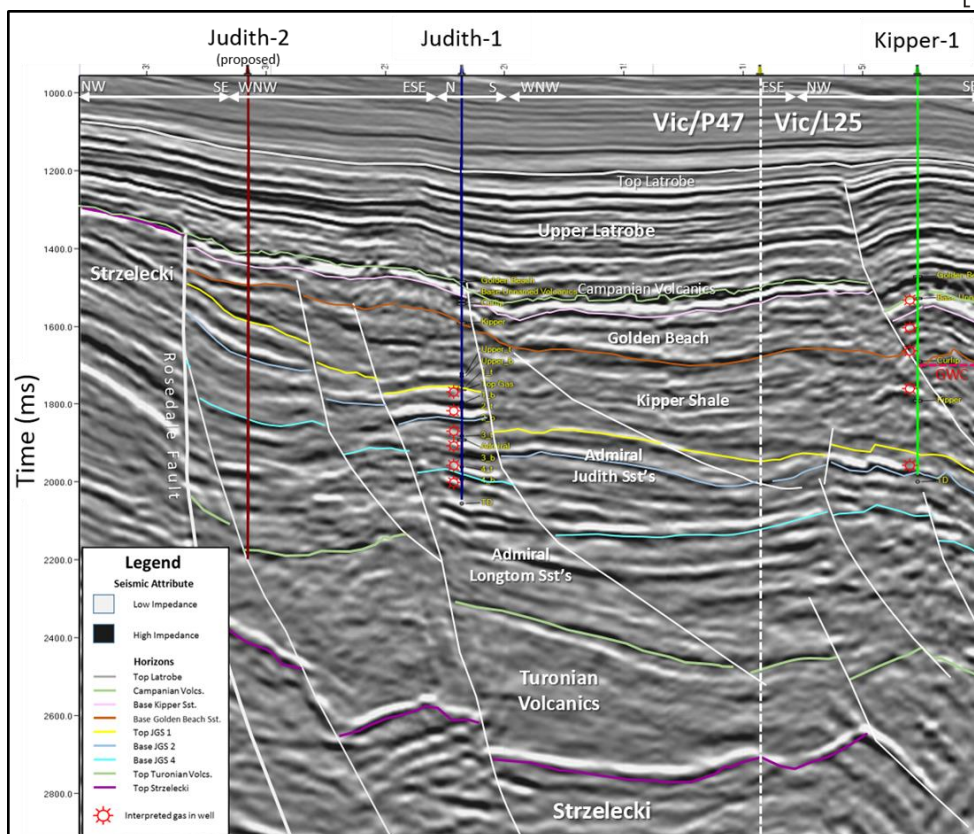
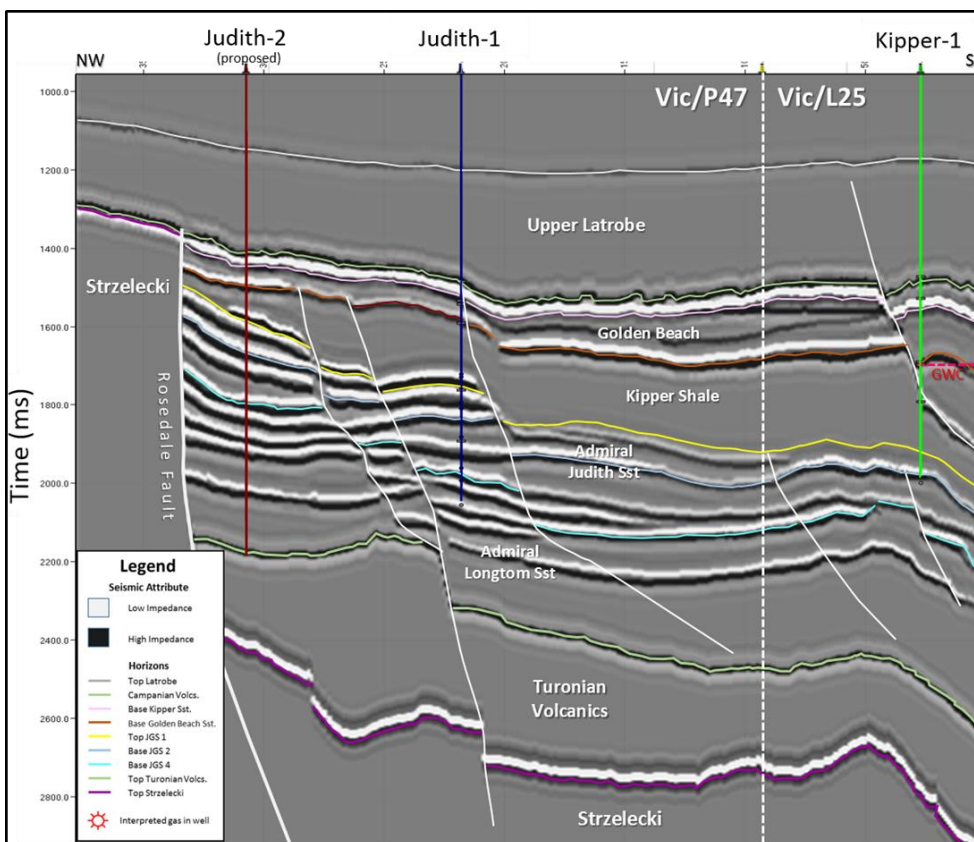


Figure 3: Composite seismic line: Judith – Kipper Gas Field with interpretation



**Figure 4: Composite seismic line: Judith – Kipper Gas Field.
Quiacito™ synthetic seismogram model with gas pay.**



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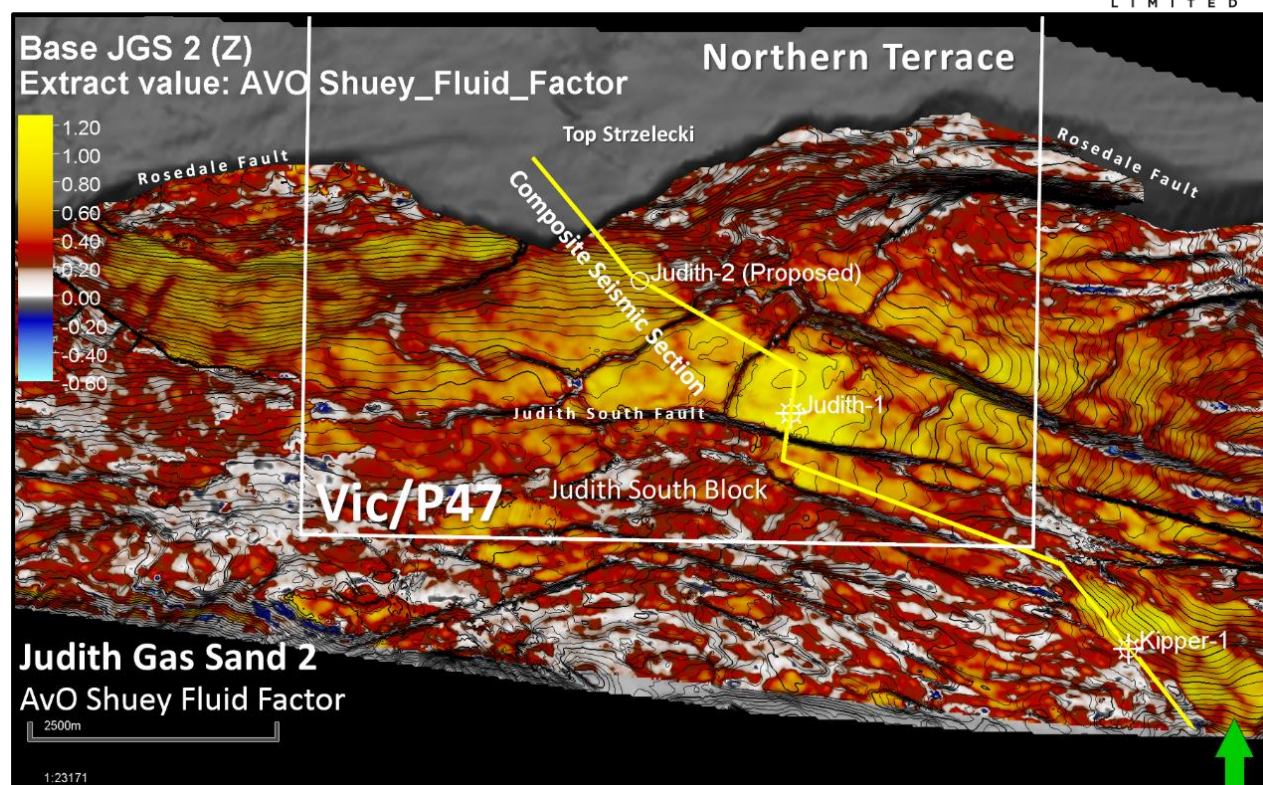


Figure 5: Judith Gas Sand 2: AvO Shuey Fluid Factor gas indicator.

Biography –Jarrod Dunne

Jarrod holds a Ph.D. in Geophysics from Melbourne University and is an active member of the ASEG. He has more than 25 years' working experience in seismic amplitude interpretation, reservoir characterization and seismic processing, applied throughout the world, having worked for Shell, Woodside and many smaller oil companies, including his current part-time role as Group Geophysical Specialist at Karoon Energy. He has remained actively involved in R&D throughout his career: publishing more than 30 papers and public reports; developing software; and through university collaborations. In 2018, he founded QIntegral providing specialist geophysical services, software, and training to a wide client base in the petroleum, minerals and gas storage sectors.

Disclaimer: the geophysical work described in this announcement is interpretative in nature and subject to the usual risks and disclaimers associated with the exploration and exploitation of petroleum resources.

Background to Exploration Permit Vic/P47 - Judith Gas Field Project

The Judith Gas Field Project remains Emperor Energy's core asset and focus. The Judith Gas Field requires drilling of a successful Judith-2 Appraisal well to prove up Gas Reserves and provide economic justification for gas field and processing plant development.

Emperor Energy has de-risked the project through systematic analysis of all available data from the Judith-1 Gas Discovery Well (drilled by Shell in 1989) and by licensing access to new MC3D seismic data that was acquired in 2020 to define a Prospective Resource and smaller Contingent Resource.

Emperor Energy currently has a valid application with the National Offshore Petroleum Titles Authority (NOPTA) for a 2-year extension to the Primary Term of the Vic/P47 Work Program requirements. Emperor Energy is confident that a positive result in relation to this application should be received in November.

After extension of the Primary term is granted Emperor Energy will complete its application to the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) to acquire Environmental Approval for drilling of the Judith-2 Appraisal Well.

The 2-year extension being applied for will provide the required time to:

- Complete the NOPSEMA Judith-2 Well approval process.
- Firm up an Exploration Partner for the Judith-2 Well
- Contract a Drill Rig with shared mobilisation / demobilisation costs.
- Organise Long Lead Time Equipment for the well.

The Judith Gas Field recoverable gas resources identified within the 100% Emperor Energy owned Vic/P47 Exploration Permit are as follows:

- Judith & Longtom Gas Sands:
 - **1.627 TCF (P50)** Prospective Recoverable Resource
(3D-GEO, ASX release date 13 October 2022)
 - **198 BCF (P50)** 2C Contingent Recoverable Resource around Judith-1 Well
(3D-GEO, ASX release date 13 October 2022) (Probabilistic determination)
- Kipper and Golden Beach Sands
 - **622 BCF (P50)** Prospective Recoverable Resource
(3D-GEO, ASX release date 13 October 2022)

Gas is clearly recognized as a transition fuel in the ongoing shift to renewable energy which depends on reliable electricity generation as firming capacity to complement the variability of renewable energy sources. Gas fired generation clearly offers a lower carbon emission than the Brown Coal electricity generation that currently dominates the Victorian energy sector.



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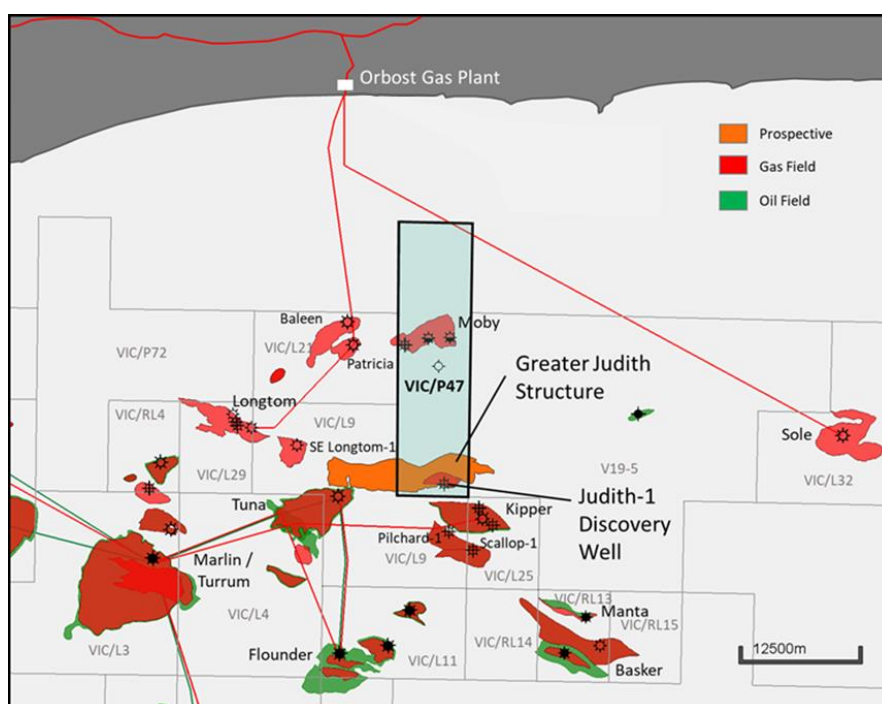


Figure 6: Location of 100% Emperor Energy owned Vic/P47 in the offshore Gippsland Basin (Bass Strait), showing the Judith Gas Field and proximity to Orbest Gas Plant, along with nearby oil and gas fields.

Competent Persons Statement

The Resources information in this ASX release is based on, and fairly represents, data and supporting documentation supplied in an Independent Technical Specialist's Report (ITSR) prepared by 3D-GEO Pty Ltd. The preparation of this report has been managed by Mr Keven Asquith who is Chairman and Director of 3D-GEO Pty Ltd.

Mr Asquith holds an Honours BSc. Geological Sciences – University of Western Ontario, Canada, 1978, and a Diploma in Project Management from the University of New England, Australia - 2000. Mr Asquith has over 35 years' experience in the sector and is a long-time member of the American Association of Petroleum Geologists (AAPG).

Mr Asquith is a qualified Petroleum Reserves and Resources Evaluator as defined by ASX listing rules. The Resources information in this ASX announcement was issued with the prior written consent of Mr Asquith in the form and context in which it appears.

3D-GEO Pty Ltd is an independent oil and gas consultancy firm. All the 3D-GEO staff engaged in this assignment are professionally qualified engineers, geoscientists or analysts, each with many years of relevant experience and most have in excess of 25 years of industry experience.

3D-GEO was founded in 2001 to provide geotechnical evaluations to companies associated with the oil and gas industry. 3D-GEO services domestic and international clients with offices in Melbourne and Madrid.

Reserves and resources are reported in accordance with the definitions of reserves, contingent resources and prospective resources and guidelines set out in the Petroleum Resources Management System (PRMS) approved by the Board of the Society of Petroleum Engineers in 2018.

The Independent Technical Specialist's Report (ITSR) has been prepared in accordance with the Code for the Technical Assessment and Valuation of Mineral and Petroleum Assets and Securities for Independent Expert Reports 2005 Edition ("The VALMIN Code") as well as the Australian Securities and Investment Commission (ASIC) Regulatory Guides 111 and 112.



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SPE-PRMS Society of Petroleum Engineer's Petroleum Resource Management System - Petroleum resources are the estimated quantities of hydrocarbons naturally occurring on or within the Earth's crust. Resource assessments estimate total quantities in known and yet-to-be discovered accumulations, resources evaluations are focused on those quantities that can potentially be recovered and marketed by commercial projects. A petroleum resources management system provides a consistent approach to estimating petroleum quantities, evaluating development projects, and presenting results within a comprehensive classification framework. PRMS provides guidelines for the evaluation and reporting of petroleum reserves and resources.

Under PRMS "**Reserves**" are those quantities of petroleum which are anticipated to be commercially recoverable from known accumulations from a given date forward. All reserve estimates involve some degree of uncertainty. The uncertainty depends chiefly on the amount of reliable geologic and engineering data available at the time of the estimate and the interpretation of these data. The relative degree of uncertainty may be conveyed by placing reserves into one of two principal classifications, either proved or unproved. Unproved reserves are less certain to be recovered than proved reserves and may be further sub-classified as probable and possible reserves to denote progressively increasing uncertainty in their recoverability.

"**Contingent Resources**" are those quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations, but the applied project(s) are not yet considered mature enough for commercial development due to one or more contingencies. Contingent Resources may include, for example, projects for which there are currently no viable markets, or where commercial recovery is dependent on technology under development or gaining access to existing infrastructure or where evaluation of the accumulation is insufficient to clearly assess commerciality. Contingent Resources are further categorized in accordance with the level of certainty associated with the estimates and may be sub-classified based on project maturity and/or characterized by their economic status.

"**Prospective Resources**" are those quantities of petroleum estimated, as of a given date, to be potentially recoverable from undiscovered accumulations by application of future development projects. Prospective Resources have both a chance of discovery and a chance of development. Prospective Resources are further subdivided in accordance with the level of certainty associated with recoverable estimates assuming their discovery and development and may be sub-classified based on project maturity.

The estimated quantities of petroleum that may potentially be recovered by the application of future development project(s) relate to undiscovered accumulations. These estimates have both an associated risk of discovery and a risk of development. Further exploration appraisal and evaluation is required to determine the existence of a significant quantity of potentially moveable hydrocarbons.

We thank shareholders and our team for their ongoing support and welcome any questions they may have. This announcement has been authorised for release to the market by the Board of Directors of Emperor Energy Limited.

Yours faithfully

Carl Dumbrell

Company Secretary

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