EMPEROR ENERGY
LIMITED

ASX Market Announcements
ASX Limited
20 Bridge Street
Sydney NSW 2000

11 June 2021

Judith Gas Field

Positive initial results of AVO Analysis using recently acquired 3D Seismic Data

Key Points

- **New Seismic Data provides a significant increase in data quality and resolution.**
- **Structural Interpretation of the Judith Gas Field carried out using new 3D Seismic Data validates previous interpretation.**
- **AVO Gas Indicator shows strong responses through Judith Gas Sands.**
- **AVO response has been tied back to and correlated with historic Judith 1 and Kipper 1 Well data.**
- **Strong AVO Gas response seen over at least 500m of vertical relief in the Judith Structure.**
- **AVO Gas Indicator shows strong response in the interpreted Longtom 200 Gas sand located below the Total Depth of the Judith 1 Well.**
- **Outcomes of the AVO work show good AVA anomaly conformity with the Greater Judith structural closure at all target levels, increasing the chances of exploration success and significantly de-risking the planned Judith 2 Well.**
- **Increase in resource evaluation confidence fully justifies expenditure on new seismic data.**

1. Structural Interpretation of Judith using New Seismic Data

Emperor Energy is pleased to advise that its' team of consulting geologists and geophysicists is currently progressing through analysis of the Multi Client 3D Seismic Data that was acquired across the Judith Gas Field in mid-2020 by global seismic company CGG. The data was first accessed by Emperor Energy in April 2021 after completion of a commercial agreement with CGG for the purchase of a license to access the newly acquired 3D seismic data.

The initial phase of technical work has been to complete a revised analysis of the Judith structure through interpretation of the new seismic data to then develop new structural mapping and a 3-dimensional view of each gas bearing reservoir sand penetrated by the Judith-1 Discovery Well.

Figure 1 below shows the interpreted base of the Judith Gas Sand 2 across a depth range of 1600m to 3000m below the sea floor. Similar maps have been produced for other gas sand horizons. Figure 2 shows how the Judith Gas Field fits into a regional perspective including the Longtom and Kipper gas fields.

The quality of the Seismic data has allowed Emperor's geologists and geophysicists to build an updated and more accurate structural interpretation of the Judith Gas Field. There is a dramatic improvement in data resolution across the entire gas field except for relatively small areas at the top of the structure close to the major Rosedale Fault where the combination of steep dips and fault shadow effects still leaves these high areas with some reduction in seismic resolution.

The new data provides a significant step forward in the level of detail available to define the Judith Gas Field and contributes significantly to the de-risking of the proposed Judith-2 Well. Emperor Energy considers the quality of the data and output from its' analysis fully justifies the seismic license expenditure to access the data.

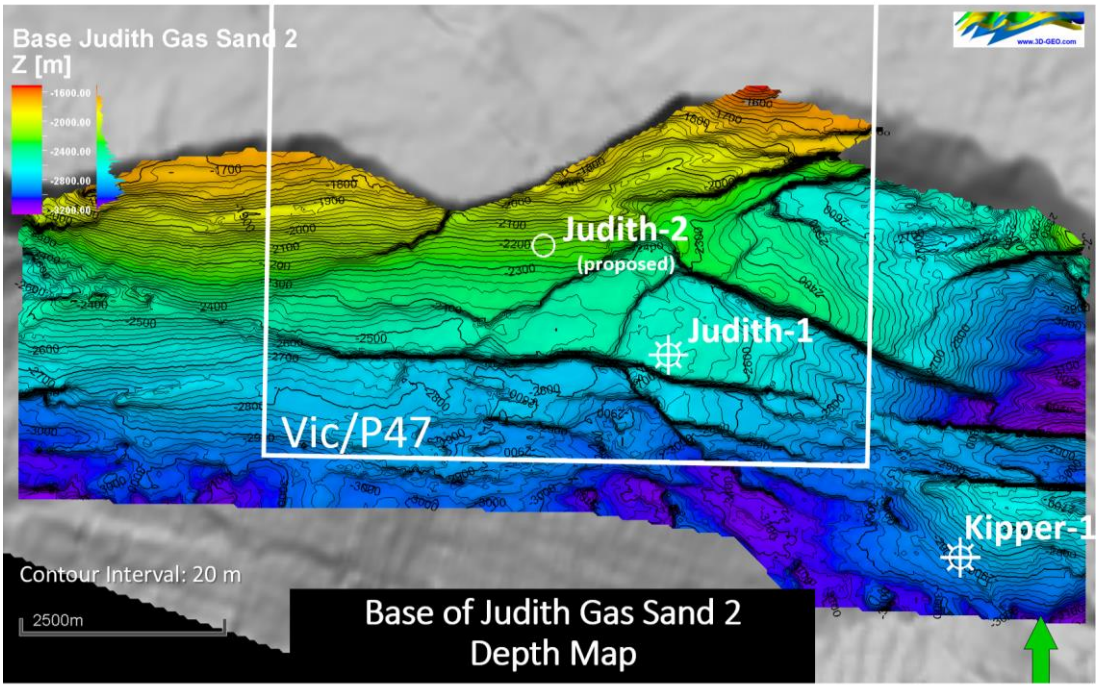

Figure 1: Interpreted Depth Map of Judith Gas Sand 2 with the overall structure varying in depth from 3000m (below sea floor) in the South to 1600m (below sea floor) in the North.

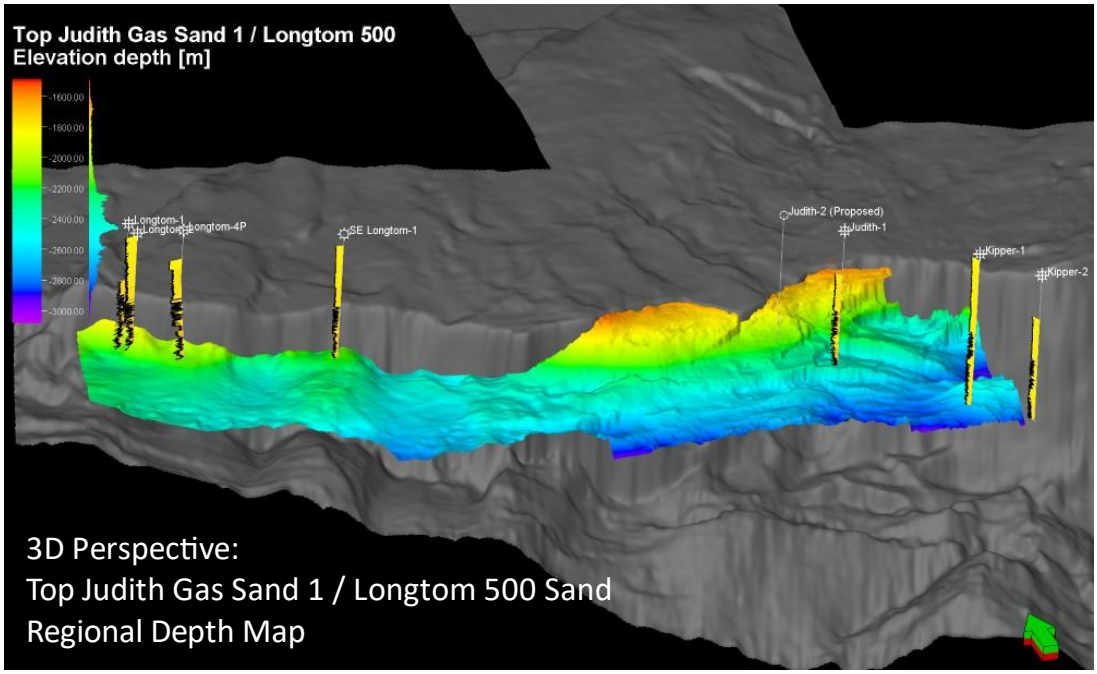

Figure 2: Regional Depth Map providing perspective on the structural relationship between the Judith, Longtom and Kipper Gas fields.

2. AVO Analysis of Judith Gas Sands 2 and 3

The next phase of work carried out was Amplitude Versus Offset (AVO) analysis and modelling that provides a Direct Hydrocarbon Indicator (DHI) in these reservoir sands across the Greater Judith Structure. The AVO analysis compares the seismic amplitude response that has been recorded from geophones located comparatively close to seismic signal source with data from those geophones located at distance from the seismic signal source.

AVO allows a comparison in the variations of fluid properties present in the porous space of the target gas sands. These variations have then been calibrated against data from the gas bearing zones of the existing Judith-1 Well (Drilled by Shell in 1989) and from equivalent gas bearing sands in the nearby Kipper-1 gas discovery drilled and developed as a producing gas field by Exxon Mobil.

AVO analysis provides a calculated geophysical interpretation of where the sand formations are gas charged and not water filled and provides the best available prediction for gas other than drilling.

Results of the AVO analysis have been very encouraging. Figures 3 and 4 below show the outcome of AVO analysis for the Judith Gas Sand 2 and Judith Gas Sand 3. These gas sands have net pay thicknesses of 45m and 85m respectively with a non-gas bearing interval between them of 72m. In both cases the AVO analysis shows strong AVO Gas Indication (brightening to orange) across the Judith Structure both within and outside the VicP/47 Permit area, including at Kipper-1 to the southeast where gas was recovered during drilling.

Faults that have been interpreted from the seismic data can been seen as darker areas in the AVO response map providing an indication of the extent of the accuracy of data interpretation and the AVO response.

The extent of the strong AVO response indicates interpreted gas extending over more than 500m of vertical relief through the permit area with the gas response extending up-dip in the Judith Gas Field from the Judith-1 Well. This adds considerable support to the Prospective Resource estimates previously published for the Judith Gas Field.

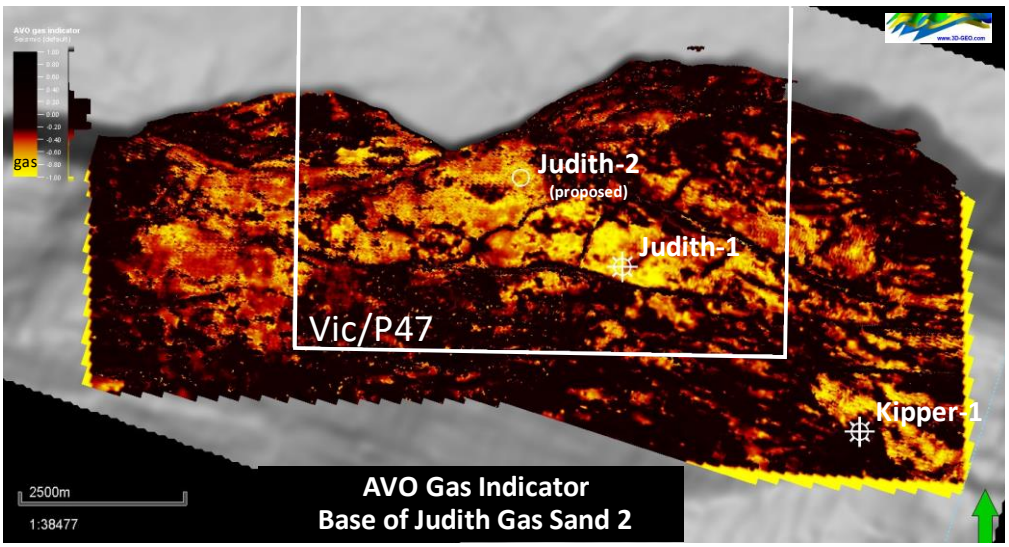

Figure 3: AVO Gas Indicator in the Judith Gas Sand 2 containing a 45m Net Pay Interval. Areas brightening to orange show a strong AVO gas indicator. (Emperor Energy VicP/47 Permit Boundary shown as white line)

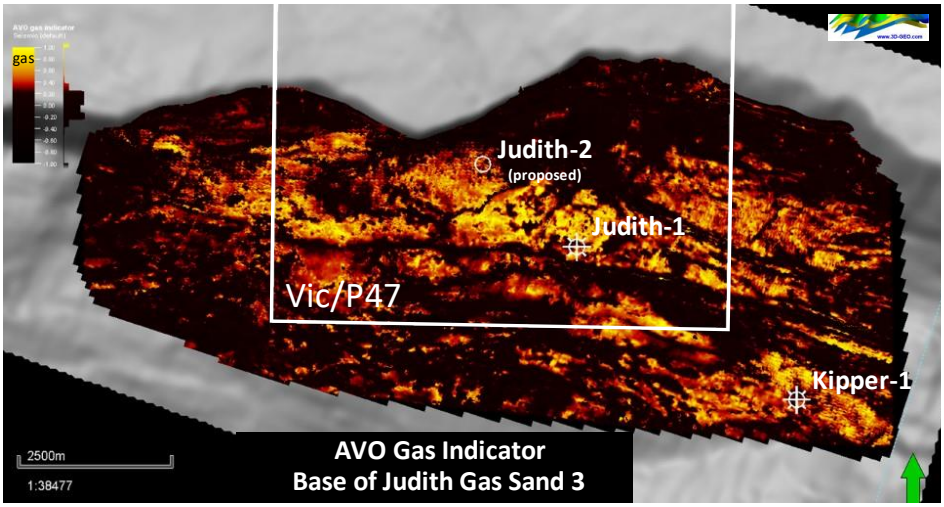

Figure 4: AVO Gas Indicator in the Judith Gas Sand 3 containing an 85m Net Pay Interval and located 72m beneath the Judith Gas Sand 2. Areas Brightening to orange show a strong gas indicator.

3. AVO Analysis of Longtom 200 Gas Sand

The interpreted Longtom 200 gas sand and other Longtom sands are located beneath the Total depth of the Judith-1 Well and have not been previously intersected in the Judith Structure however their presence is clearly visible on the new seismic data. They are seen as providing significant exploration upside for the planned Judith-2 Well that is designed to intersect the Longtom 200 sands at a depth of approximately 3000m. Based on Seismic correlations this sand is the equivalent of the main gas producing sand at the Longtom Gas Field located 15km to the west of Judith.

AVO analysis in the Longtom 200 sand again shows strong AVO response with gas indications extending across the Judith Structure. The strong AVO response extends from the southern boundary of the permit area up-dip and across the structural closure beyond the planned Judith-2 Well location. The strong AVO gas response is evident over more than 500m of vertical relief, similar to the Judith Gas Sands 2 and 3.

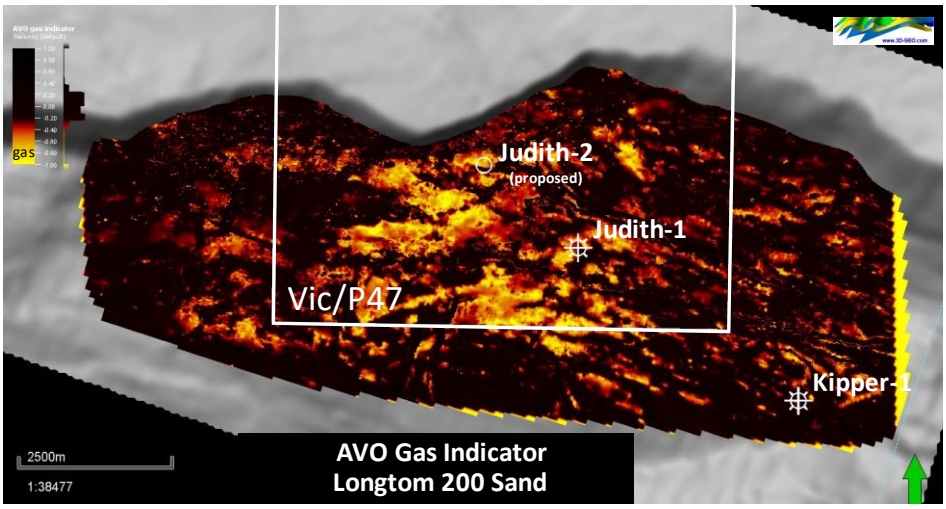

Figure 5: AVO Gas Indicator in the Longtom 200 Sand located some 70m beneath the base of the Judith Gas Sands, estimated to contain some 60m Gross Pay. Areas brightening to orange show a strong gas indicator.

4. Further Mapping and AVO to be Carried Out

The preliminary Structural Interpretation and AVO analysis to date has concentrated on evaluation of Judith Gas Sand 2, Judith Gas Sand 3 and the Longtom 200 Gas Sand.

Further analysis is to be carried out on the Judith Gas Sand 1, Judith Gas Sand 4, various additional Longtom sands and the extension of the Kipper Gas Sands into the Vic/P47 Permit area.

Figure 6 below shows the extent of AVO response shown in a seismic cross section running west to east through the Judith-1 Well. It indicates the nature of the multiple stacked gas targets that exist within the Judith Gas Field.

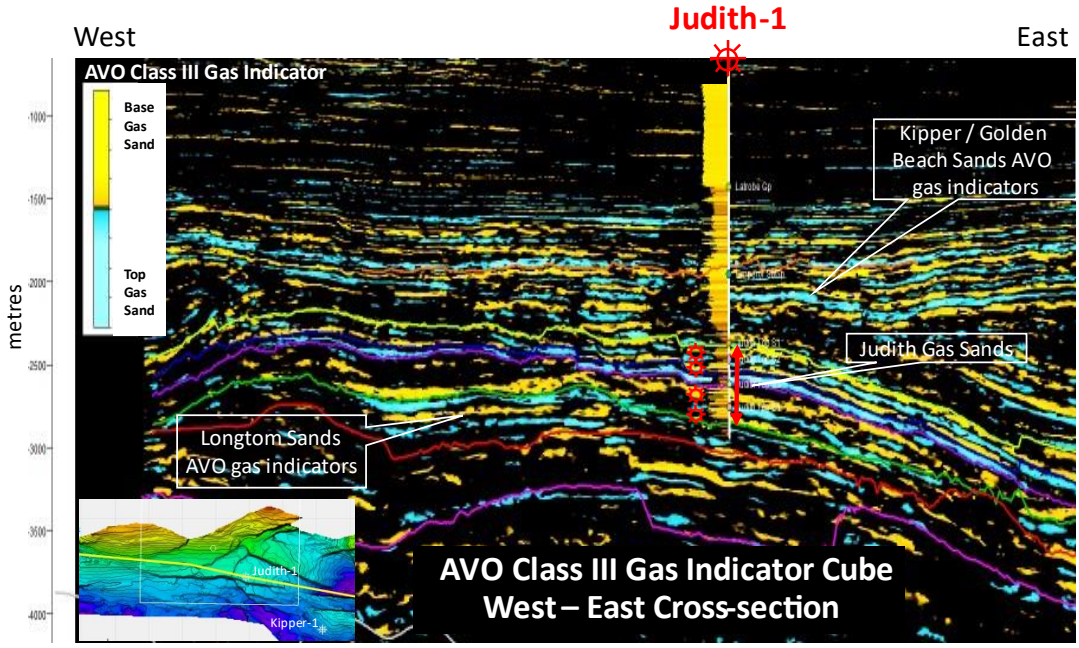

Figure 6: AVO Gas Indicator in a seismic cross section running West to East through the Judith 1 Well (Marked by Yellow line in box to bottom left). Yellow and Blue highlights indicate strong gas response in stacked gas targets.

5. About the Judith Gas Field

The 100% Emperor Energy owned Judith Gas Field is located within the Vic/P47 Permit in the offshore Gippsland Basin, Victoria.

On 11 July 2019 Emperor Energy advised that an Independent Resource Statement had been completed for the Judith Gas Field within the 100% Emperor Energy owned Vic/P47 Exploration Permit located in the offshore Gippsland Basin, Victoria (Figure 3). The Resource Statement Highlighted:

- **2C Contingent Gas Resource of 150 Bcf**
- **P50 Unrisked Prospective Gas Resource of 1.226 Tcf**

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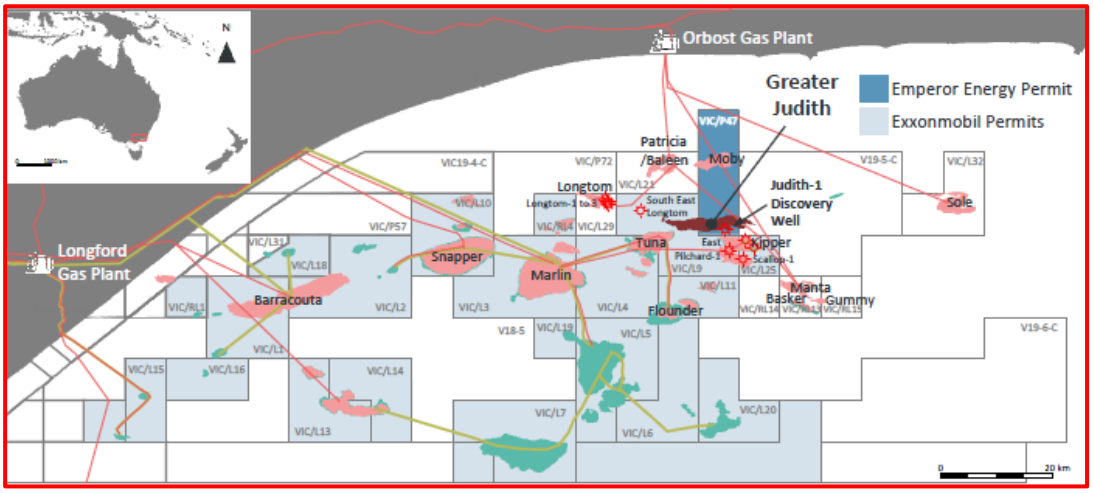

Figure 7: Location of 100% Emperor Energy owned Vic/P47 offshore Gippsland Basin showing regional permits along with oil and gas fields

Judith Gas Discovery		Contingent Resources		
		Low Estimate 1C	Best Estimate 2C	High Estimate 3C
GIIP	Bcf	180	278	386
Sales gas	Bcf	97	150	209
Condensate	MMbbl	1.4	2.2	3.2

Table 1: Summary of Contingent Resources for Judith within area of Vic/P47 (3D-GEO, July 2019, Determined by Probabilistic Method)

Greater Judith Area		Unrisked Prospective Resources		
		P90	P50	P10
Judith Deep	Bcf	38	62	92
West	Bcf	83	127	176
Central	Bcf	37	333	628
North	Bcf	29	166	315
North East	Bcf	49	279	494
North West	Bcf	15	102	226
South	Bcf	14	157	565
Total	Bcf	**265**	**1226**	**2496**

Table 2: Summary of Prospective Resources for Judith within area of Vic/P47 (3D-GEO, July 2019)

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This announcement has been authorised for release to the market by the Board of Directors of Emperor Energy Limited.

Yours faithfully

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