# **GEORGINA ENERGY PLC**

Independent Review of SPE PRMS Prospective & Contingent Resources

EP125 - Mt Kitty EP112 Dukas EP82 - Mahler

**March 2025** 

**WESTMARKET OIL & GAS Pty Ltd** 

26/375 Hay Street Subiaco Western Australia 6008

Report Prepared by

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EP125 (Mt Kitty/) - EP112 (Dukas) - EP82 (Mahler) Prospect Assessment

Dear Sirs.

As requested, I have prepared an independent review of the presentation material for the above mentioned assets as provided by both Santos Limited (ASX:STO) and Central Petroleum Limited (ASX:CTP), the Owners. Included in this review are independent deterministic unrisked calculations of SPE PRMS 2C Contingent Resources for Mt Kitty, a Neoproterozoic subsalt prospect (which when drilled in 2014 flowed gas with exceptionally high concentrations of Helium and Hydrogen at 9% and 11.5% respectively) and 2U or "Best" Prospective (Recoverable) Resources [PRR] of Helium, Hydrogen, and Hydrocarbons for the Dukas (drilled in 2019) and Mahler prospects, two additional targets in the Neoproterozoic subsalt in the Southern Amadeus Basin.

The following table summarises the resources estimates calculated in this review.

The Mt Kitty Owners 2U estimates are classified as Contingent Resources (2C) requiring only a certified path to economic exploitation to convert to SPE PRMS Reserves. The plugged and suspended Mt Kitty Prospect well was previously drilled in 2014 to a relatively shallow well of 2,295m TD and produced a flow of 500,000 SCFGD gas to surface with exceptionally high concentrations of up to 9% Helium and 11% Hydrogen as well as a significant proportion of hydrocarbon gases at 40%. However, the well intersected only a short vertical section of fractured basement and did not find the targeted Heavitree sandstone reservoir-this Heavitree play remains as a potential flanking play of great significance which may be intersected in a planned re-entry well with a 500m horizontal section primarily designed to enhance flow from fractured basement.

The significance of fractured basement plays cannot be dismissed. The Bach Ho field in the Cuu Long Basin offshore Vietnam at its peak produced 280,000 BOPD and 142 MMCFGD from fractured granodiorite (same lithological basement as Mt Kitty) with a similar "buried hill" structure and has been in continuous production for 40 years with a peak production in 2001 of c.270,000 BOPD (1.6 billion CFGD equivalent) from a structural closure of only c.90 km² compared to Mt Kitty's aerial closure of c.600 km².

It is believed that in the absence of drilling and testing engineering mishaps, a planned horizontal well kicking off from the existing suspended vertical well, high concentrations of Helium and Hydrogen in gas flows to surface are a foregone conclusion with flow rates significantly enhanced in comparison to the vertical Mt Kitty 1 well by the planned 500m horizontal intersection of sub-vertical to vertical fracture systems.

	Terget Reservoir		P50/2U Helium		P50/2U Hydrogen		P50/2U Hydrocarbons	
Prospect			Owners	Georgina	Owners	Georgina	Owners	Georgina
Mt Kitty	BCFG	Fractured Basement	18	21	22	27	39	45
Dukas	BCFG	Heavitree	89	175	113	219	577	991
Mahler	BCFG	Fractured Basement	1	3	1	2	5	13

**Table.** Comparison of Prospective Recoverable Resources 2U estimates between this review and the Owners P50/2U. \*Note: Mt Kitty estimates are classified as Contingent Resources (2C).

I am independent of Westmarket Oil and Gas Pty Ltd and all associated entities, its Directors, senior management and advisers.

I am a senior Energy Industry executive that has worked in the Middle East North African (MENA) region, Australia and PNG for most of my career, with a very strong technical background having worked as both a geologist and a geophysicist successfully discovering and commercialising oil and gas resources within these countries. I have over 30 years' experience in the international upstream oil and gas industry and have held various managerial and senior technical roles with large E&P companies including BP, Ampolex Ltd, Oil Search Ltd, and most recently with Petsec Energy Limited as

CEO of their MENA business, and I now, inter alia, consult as an independent on CPR assignments.

My current memberships of industry organizations include:

AAPG - The American Association of Petroleum Geologists

EAGE - The European Association of Geoscientists & Engineers

SPE – The Society of Petroleum Engineers

ASEG - The Australian Society of Exploration Geophysicists

PESA - The Petroleum Exploration Society of Australia

In relation to Prospective Resources described in this report, the estimated quantities of petroleum that may potentially be recovered by the application of a 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.

Yours Faithfully,

Maki M. Petkovski

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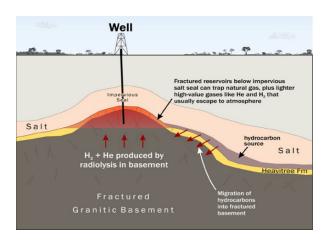
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# EP125 (Mt Kitty) - EP112 (Dukas) - EP82 (Mahler)

Westmarket Oil & Gas Pty Ltd ("WMOG") maintains the rights to the exploration and possible exploitation of two large prospective structures: the Mt Winter Prospect within EP155 in the Amadeus Basin in the Northern Territory and in the Western Officer Basin, the Hussar Prospect within EP513 in Western Australia; locations that have the potential for multi BCF volumes of Helium, Hydrogen, and in these mega-structures. WMOG is planning to optimise the evaluation of these prospects through the re-entry and deepening of the existing shallow wells previously drilled on the structures, should engineering studies demonstrate this to be a time and cost-effective endeavour.

The Company is currently reviewing opportunities to expand this portfolio by acquisition of negotiable equity into a number of additional seismically defined prospects within the Amadeus Basin; these are the previously drilled Mt Kitty (EP125) and Dukas (EP112) Prospects, and the undrilled Mahler Prospect in EP82, all of which are targeting the subsalt Helium, Hydrogen, and Hydrocarbon play previously identified within the basin where maximum concentrations of Helium up to 11% and Hydrogen up to 9% have been recorded in gas flows to surface. (Mt Kitty 2013)

**Figure 1**. Helium & Hydrogen Play summary schematic courtesy of Central Petroleum Limited (ASX:CTP) November 2024



All three prospects are targeting subsalt Neoproterozoic Helium, Hydrogen and Hydrocarbons in either the basal Heavitree sandstone formation and/or fractured granodioritic basement.

In the case of the previously drilled Mt Kitty, which flowed gas to surface at c.500,000 CFGD from a poorly engineered vertical well, in the absence of drilling and testing engineering mishaps, (a planned horizontal well kicking off from the existing suspended vertical well), high concentrations of Helium and Hydrogen in gas flows to surface are a foregone conclusion and in the case of the proposed Dukas 2 well, given the cuttings gas analysis from sediments just above the targeted Heavitree clastic horizon, high concentrations of Helium and Hydrogen are almost certain to be encountered.

Although Dukas-1 encountered high concentrations of over 2% Helium and 0.4% Hydrogen from cuttings gas while drilling the base of the Gillen Salt seal overlying the targeted Heavitree Formation, the well did not quite intersect the Heavitree; however highly overpressured formation fluids were present. These results clearly demonstrate that an active Helium, Hydrogen, and Hydrocarbon source system is present in the sub-salt play within the Amadeus Basin. In the presence of adequate porosity and permeability at the target level these gases are likely to flow to surface.

What is not known is the flow rates likely to be encountered in new drilling for these prospects, however in the case of a planned 500m horizontal well bore at Mt Kitty, designed to intersect a well defined vertical to sub-vertical fracture system, clearly it is reasonable to anticipate a dramatically enhanced flow rate compared to the original Mt Kitty vertical well which penetrated a total of only 155m of the vertically to sub-vertically fractured basement reservoir.

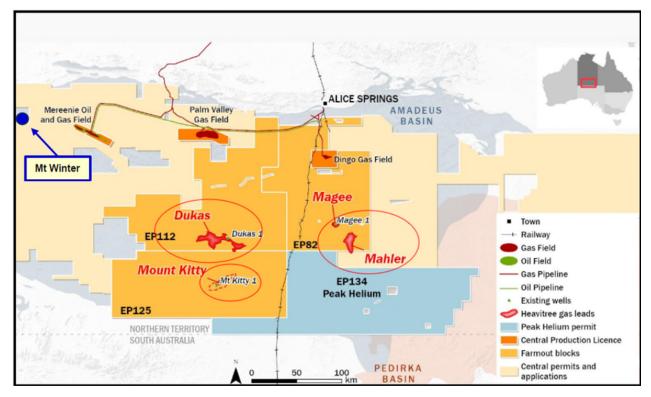


Figure 2. Prospect and well location map relative to Georgina's Mt Winter Prospect

The analysis of potential resources presented in this review applies the same range of input parameters provided by the Owners. However, the current analysis has made adjustments to the porosities for the Heavitree reservoir, based on the results from the Magee-1 well which tested Helium, Hydrogen, and Hydrocarbon gases from the Heavitree Formation and recorded primary porosities of up to 9%.

The owners, have completed independent evaluations of the three prospects available to WMOG. The resource estimates calculated by the current partners utilised probabilistic Monte Carlo simulation, a statistical approach to the uncertainty associated with their estimates. The following table summarises the comparison of unrisked SPE PRMS Prospective (Recoverable) Resource ("PRR") P50/2U resource estimates between the evaluations completed by the owners and the current analysis for WMOG.

	Terget Reservoir		P50/2U Helium		P50/2U Hydrogen		P50/2U Hydrocarbons	
Prospect			Owners	Georgina	Owners	Georgina	Owners	Georgina
Mt Kitty	BCFG	Fractured Basement	18	21	22	27	39	45
Dukas	BCFG	Heavitree	89	175	113	219	577	991
Mahler	BCFG	Fractured Basement	1	3	1	2	5	13

**Table 1.** Comparison of Prospective Recoverable Resources 2U estimates between this review and the Owners P50. \*Note: Mt Kitty estimates are classified as Contingent Resources (2C).

In all three prospects the current analysis resulted in an increase in resource estimates, as shown in Table 1. These differentials are firstly a function of the conservative estimates of porosity used by the owners, and secondly due to the owners applying a statistical approach to their resource estimates, even when there are associated wells in close proximity to these prospects providing a fixed calibration point. The current analysis utilises an unrisked deterministic approach to resource calculations given the available calibration points and presents a much broader range of outcomes (resource estimates) between 1U, 2U, and 3U as shown in Table 2 and in the case of Mt Kitty, 1C, 2C and 3C.

	Units	Prospect Resource Estimates @ 100% Equity						
		1C Helium		2C Hydrogen		3C Hydrocarbons		
		Owners	Georgina	Owners	Georgina	Owners	Georgina	
EP 125 Mt Kitty I	Prospect							
Helium	BCFG	3	2	18	21	55	162	
Hydrogen	BCFG	4	2	22	27	69	207	
Natural Gas (HC)	BCFG	7	4	39	45	117	323	
		P50/2U Helium		P50/2U Hydrogen		P50/2U Hydrocarbons		
		Owners	Georgina	Owners	Georgina	Owners	Georgina	
EP 112 Dukas Pro	ospect							
Helium	BCFG	13	0.4	89	175	816	2,451	
Hydrogen	BCFG	16	0.02	113	219	470	3,129	
Natural Gas (HC)	BCFG	100	20	577	991	2,193	10,920	
EP 82 Mahler Pro	ospect							
Helium	BCFG	0.2	0.1	1	3	5	34	
Hydrogen	BCFG	0.2	0.00	1	2	5	44	
Natural Gas (HC)	BCFG	0.5	0.2	5	13	26	186	

Table 2. Comparison of Prospective Recoverable Resources estimates between this review and the Farminor.

The most significant variable that has a major impact on resource estimates, that is difficult to predict, that is the presence (thickness) and quality of the target reservoir. The Magee -1 well is the only well to have drilled through and tested the Heavitree to date, providing a calibration point for the Neoproterozoic subsalt Heavitree Formation reservoir parameters for these prospects. The well intersection of 6.5m of Heavitree sandstone, although thinned from its normal thickness of approximately 200m, nonetheless provides data for our estimates. The Heavitree Quartzite is not fully cemented by silica cement or by overcompaction and log analysis suggests porosity in this section is 9%. This provides a fixed reference for use in resource estimates where the Heavitree Formation is the primary target.

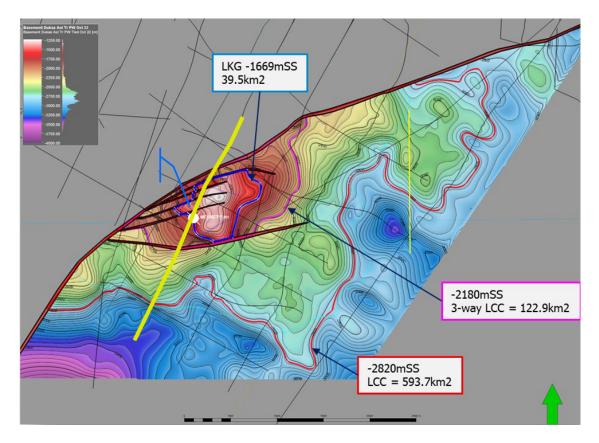
No Heavitree sandstone was intersected in the Mt Kitty-1 well; gases tested at the base of this well are from a 155.3m section of fractured granodiorite basement reservoir. The results from this well, in combination with the available seismic over the Mt Kitty and the Mahler Prospect suggest that both prospects are reliant on fractured basement for reservoir, although likely present as a circular flanking play, the Heavitree is not anticipated to be present at crestal locations on these structures. Overall fracture porosities within such fractured basement reservoirs are generally extremely low and are very difficult to predict but of course drilling horizontally through sub-vertically to vertically oriented fracture systems rather than vertically must produce significantly better result. As a result, resource volume estimates for these fractured basement targets in the Mt Kitty Prospect and the Mahler Prospect are modest relative to the size of these very large structures. It is pertinent to emphasise however that there is as yet unquantifiable potential Heavitree reservoir in surrounding flanking plays at both Mt Kitty and Mahler which may, if present, add significant resource potential.

#### **MT KITTY PROSPECT - EP125**

The Mt Kitty prospect is a very large seismically defined structure with a closure area of c.594 Km<sup>2</sup>. The well proposal for this prospect is a re-entry of the Mt Kitty-1 well, drilled by Santos in 2014, but with a 500m long lateral section designed to maximise the intersection of sub-vertical to vertical fractured basement networks.

The Mt Kitty-1 well did not find the primary Heavitree Formation reservoir target on the crest of the anticlinal structure and gas flowed to surface from fractured granodiorite basement, intersecting a bald crestal anticline. Gas tested from the fractured basement contained a large component of Nitrogen but showed extraordinarily high levels of Helium and Hydrogen at 9% and 11.5% respectively.

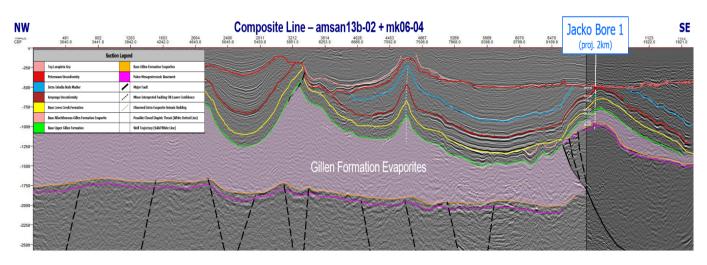
<sup>\*</sup>Note: Mt Kitty estimates are classified as Contingent Resources (2C).



The Mt Kitty prospect may host un-eroded Heavitree Fm within closure on the flanks of the bald crest that was drilled by Mt Kitty-1. Lateral drilling may intersect flanking Heavitree Fm and result in commercial flow rates of any reservoired gases. Fractured basement plays have proven to be prolific producers in other geological regimes such as the Bach Ho field in the Cuu Long Basin offshore Vietnam which at its peak produced 280,000 BOPD and 142 MMCFGD from fractured granodiorite (same basement as Mt Kitty) with a similar "buried hill" structure and has been in continuous production for 40 years with a peak production in 2001 of c.270,000 BOPD (1.6 billion CFGD equivalent) from a structural closure of only c.90 km² compared to Mt Kitty's aerial closure of c.600 km².

(<a href="https://www.saltworkconsultants.com/downloads/Bach\_Ho\_Cuong\_Warren\_09.pdf">https://www.saltworkconsultants.com/downloads/Bach\_Ho\_Cuong\_Warren\_09.pdf</a>) The fractured and altered Precambrian basement rocks are the most prolific reservoirs in the southern Gulf of Suez and the northern Red Sea rifts where hydrocarbons are produced from 8 fields, with porosity and permeability values up to 15% and 300 millidarcy, respectively.

(https://www.sciencedirect.com/science/article/pii/S0920410597000247)

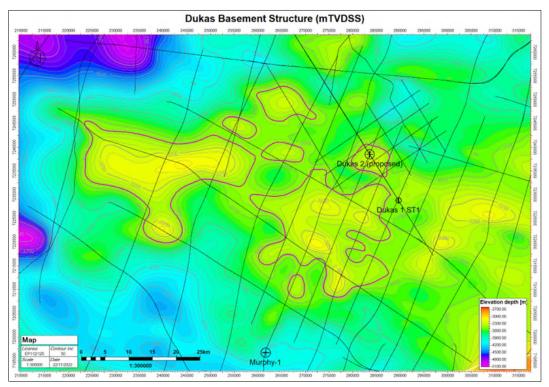


Seismic quality including 3D seismic across the Mt Kitty Prospect is generally good given the structure is at a relatively shallow depth of approximately 2,000m and with no apparent salt tectonics above the structure.

This, coupled with established evidence of gas flows to surface with unusually high Helium and Hydrogen concentrations significantly de-risk the proposed re-entry and horizontal drilling as planned.

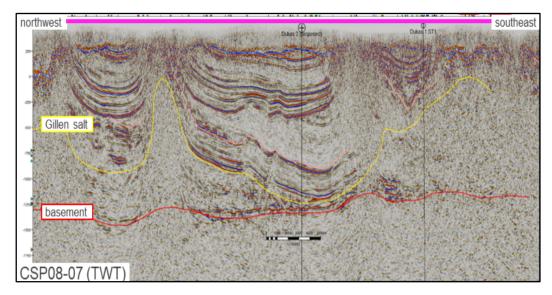
#### **DUKAS PROSPECT - EP112**

The Dukas prospect is an extremely large structure extending over 1,000 km² of mapped aerial closure and a vertical closure height of over 400m with the potential to contain multi-TCF Neoproterozoic subsalt Helium, Hydrogen, and Hydrocarbon gases.



The prospect was drilled in Dukas 1 ST-1 almost to the base of the Gillen Member salt seal by Santos (ASX:STO) in 2019 when highly over-pressured (approximately two times normal formation pressure gradient) fluid flows cut short further drilling into the Heavitree Formation reservoir due to limitations of the BOP pressure control on the drilling rig at the time. Gas analysis has confirmed the presence of Helium, Hydrogen, Hydrocarbons, and other inert gases in the circulating mud system from drilled cuttings, just above the Heavitree Formation target, of Helium 2.1%, Hydrogen 0.4% and gas 29.4% confirming an active gas play with unusually high Helium concentrations is present at the Dukas Prospect.

## **Dukas Seismic Cross Section**

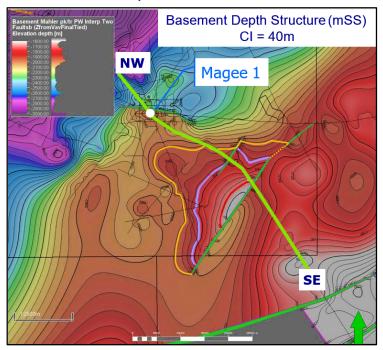


Seismic quality across the Dukas Prospect is generally poor given salt tectonics above the structure. A reprocessing program aimed at improving the existing dataset may provide a better understanding of the salt features and ultimately more confidence in depth mapping and well planning. Detailed velocity modelling and depth conversion is required to adequately map the configuration of the Prospect.

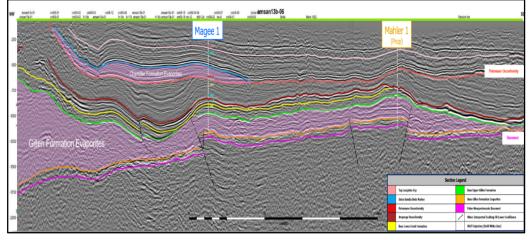
## MAHLER PROSPECT (EP125)

The Mahler Prospect is interpreted to be a 3-way dip closure against a basement inversion and is the smallest of the three prospect opportunities at approximately 150 km² of interpreted aerial closure and a vertical closure height exceeding 250m. The Mahler Prospect provides the shallowest sub-salt target depth at approximately 1,825m from surface. At this shallow target depth it is possible that the Heavitree Formation may be missing and the Mahler Prospect is a 'bald hill'. However, the structural complexities associated with this inversion, with a number of reverse faults suggests that the basement at this location is likely well fractured with the potential for an excellent basement reservoir. Hence the Mahler prospect is primarily a fractured basement play. Again, the potential for un-eroded flanking Heavitree plays should not be discounted.

Magee-1 is the closest well to the Mahler Prospect approximately 30 km NW of the Mahler structure drilling through a 4.5m, thinned section of Heavitree Quartzite. The well flowed Helium at 6% and provided a porosity reference of 9% for the Heavitree Quartzite.



The available seismic data over Mahler is of reasonable quality, however seismic coverage is limited and the scale of the structure is not adequately defined. More pre-drilling seismic is essential prior to any commitment to drilling.



#### **DISCUSSION**

All three Prospects are of significant scale whereas Dukas is a mega-structure, likely the largest identified to date in Australia. At the Mt Kitty prospect, a fractured basement play has successfully been drill tested with a short vertical section which has resulted in the definition of Contingent Resources with extraordinarily high concentrations of Helium and Hydrogen with significant volumes of hydrocarbon gas requiring only an economic exploitation assessment to result in SPE PRMS Reserves. Some of the world's most significant petroleum fields are hosted by fractured basement. A proposed re-entry of the Mt Kitty 1 well with a planned horizontal section through the existing fractured basement reservoir is bound to produce gas to surface with a high concentration of Helium, Hydrogen and gaseous hydrocarbons. Further investigation of a potential flanking Heavitree play at Mt Kitty and possibly Mahler is warranted.

Given that an active Helium, Hydrogen, and Hydrocarbons gas system has clearly been proven, with world class scale of Helium and Hydrogen concentrations evident at Mt Kitty and Magee, each of these prospects warrant further evaluation.

The Mahler and Mt Kitty prospects are clearly identified on the existing seismic dataset as valid structures. The Dukas Prospect underlays major salt tectonism, the structure, if present, is hidden by this salt activity and in part is a velocity feature that is identified through accurate velocity modelling and detailed depth conversion. An independent interpretation of the dataset at Dukas is highly recommended prior to any drilling with careful analysis of interval velocities aimed at generating a suite of velocity models prior to depth conversion.

All three prospects suffer from reservoir uncertainty, however, the only way to reduce, and assess this risk is in the case of Mahler, more pre-drilling seismic, in the case of Dukas, more seismic analysis and in the case of Mt Kitty, is to re-drill the prospect with a long-reach lateral section designed to maximise the intersection of vertical to sub-vertical fractures within the basement reservoir and to possibly intersect flanking Heavitree Fm reservoir.

Any lateral drilling targeting fracture networks in basement reservoirs requires a detailed analysis of present-day stress and fracture orientations, direction. Conductive (open) fracture networks are generally orientated obliquely to S<sub>Hmax</sub> of the present-day stress field, the strike of open fracture networks needs to be identified based on the direction of S<sub>Hmax</sub> in order to orient new wells towards the optimum azimuth. The owners, from drilled data and geophysics, have determined that the fracture system in basement encountered at Mt Kitty is largely oriented sub-vertically to vertically so that sub-horizontal to horizontal lateral drilling will maximise potential productivity.

**END**