

RPS

**INDEPENDENT RESOURCES
EVALUATION
OF THE KEPALA BURUNG PSC AND
SALAWATI KEPALA BURUNG PSC,
WEST PAPUA, INDONESIA
AS OF JANUARY 1, 2019**

Prepared by:

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Report No: **ECV2306**
Version/Date: Rev-0 / February 14, 2019

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Document Status

DATE:	February 14, 2019	PROJECT REFERENCES:	ECV2306
	PREPARED:	CHECKED:	APPROVED:
	P. Grassick, J. Tan	Jim Bradly	Gordon Taylor
SENT:	EDITION:	DESCRIPTION:	COMMENT:
2019-02-14	Rev-0	Final	Issue to Client
FILE LOCATION:			

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The opinions and interpretations presented in this report represent our best technical interpretation of the data made available to us. However, due to the uncertainty inherent in the estimation of all sub-surface parameters, we cannot, and do not guarantee the accuracy or correctness of any interpretation and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, cost damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees.

Except for the provision of professional services on a fee basis, RPS Energy Consultants Limited does not have a commercial arrangement with any other person or company involved in the interests that are the subject of this report.

The Directors,
RH Petrogas Limited,
20 Harbour Drive,
PSA Vista #06-03/03A
Singapore 117612

Project Ref: ECV2306

February 14, 2019

Gentlemen,

**INDEPENDENT RESOURCES EVALUATION OF THE KEPALA BURUNG PSC AND SALAWATI
KEPALA BURUNG PSC, WEST PAPUA, INDONESIA
AS OF JANUARY 1, 2019**

In response to your request, RPS Energy Consultants Limited (“RPS”) has completed an independent audit of the Kepala Burung Production Sharing Contract (the “Basin PSC”) and Salawati Kepala Burung PSC (the “Island PSC”) (each a “PSC” or “Property”) in which RH Petrogas Limited (“RH Petrogas” or the “Company”) holds a working interest. RH Petrogas’ participation in the Basin PSC is through its subsidiaries RHP Salawati Basin BV (“RHPSBBV”) with 25.936% working interest and Petrogas (Basin) Ltd (“PBL”) with 34.064% working interest, while the Company’s participation in the Island PSC is through its subsidiaries RHP Salawati Island BV (“RHPSIBV”) with 14.5122% working interest and Petrogas (Island) Ltd (“PIL”) with 18.702% working interest. Following the signing of the subscription and shareholders’ agreements with PT Citra Wahana Abadi (“CWA”) in relation to CWA’s share subscription in PBL (the “Basin SSHA”) and PIL (the “Island SSHA”) in July, 2018, the Company’s effective working interests in the Basin PSC and Island PSC are now 54.0913% and 29.9702% respectively.

RPS undertook this audit following the signing of a Letter of Engagement dated November 8, 2018.

INTRODUCTION

RH Petrogas is currently the Operator of the Basin PSC, located Onshore West Papua and a non-operating partner in the Island PSC, located Onshore and Offshore West Papua, Indonesia (“Bird’s Head”) (**Figure 1**). The Basin PSC covers an area of around 872 km² and contains 18 producing oil and gas fields. RH Petrogas was the non-operating partner in the Basin PSC from 2010 until December 2015 and has been the Operator since January 1, 2016. Previously, PetroChina International (Bermuda) Limited (“PetroChina”) was the Operator of the licence. The Island PSC covers an area of around 1,097 km² and contains seven producing oil and gas fields. RH Petrogas entered the Island PSC as a non-operating partner in 2010. The Island PSC is currently operated by PetroChina International (Kepala Burung) Limited and PT Pertamina Hulu Energi Salawati as a joint operating body.

In July 2018, the Company, signed a new production sharing contract for each of the Basin PSC (“New Basin PSC”) and Island PSC (“Salawati PSC”) (each a “PSC” or “Property”, and together with the Basin PSC and Island PSC, the “PSCs” or “Properties”). The New Basin PSC covers an enlarged area of around 1,030 km² which includes essentially the entire existing acreage of the Basin PSC. The Salawati PSC covers an area of around 1,137 km² which includes essentially the entire existing acreage of the Island PSC. Both the New Basin PSC and Salawati PSC are awarded with a new 20-year period and will come into effect when the current Basin PSC and Island PSC expire in 2020. PBL and PIL will each hold a 70% working interest in the New Basin PSC and Salawati PSC respectively and each will be the operator in their respective blocks, with Pertamina holding the remaining 30% working interest. Following the signing of the Basin SSHA and Island SSHA in July, 2018, the Company’s effective working interest upon commencement of the New Basin PSC and Salawati PSC will each be 57.8578% (before any local government owned company exercised its right to back in for a 10% working interest to be shared by all contractors in proportion to their working interests).

INDEPENDENT RESOURCES EVALUATION

BASIN AND ISLAND PSC, WEST PAPUA, INDONESIA AS OF JANUARY 1, 2019

The current producing horizons of the fields in the Basin PSC lie between 2,000 ft and 6,000 ft subsea, and comprise of three main reservoir targets: the Kais Formation limestones, Textularia II Formation, and “U” marker (“UMK”) Formation. In addition to the producing fields, two discoveries have been recently appraised. For the Island PSC, the current producing horizons of the fields lie between 3,000 ft and 6,000 ft subsea, and comprise one main reservoir target; namely the Kais Formation limestones. In addition to the producing fields, the Island PSC contains three undeveloped discoveries. Further, there remains undiscovered exploration potential within the PSCs which has not been reviewed by RPS.

At the request of the Company, RPS has analysed the performance of the producing fields and made forecasts relating to the estimated Low, Best and High future production, costs, prices and cash flow.

Under the Basin PSC and Island PSC, contractors are entitled to receive in kind an amount of the oil and gas volumes for the recovery of their costs and their share of profits in accordance to the terms of the PSC. Under the New Basin PSC and Salawati PSC, contractors are entitled to a share of total production based on an agreed split.

RPS has estimated the volumes of the Proved Reserves (“1P”), Proved plus Probable Reserves (“2P”) and Proved plus Probable plus Possible Reserves (“3P”) for the producing fields of the PSC (see **Appendix I** for glossary). These estimates were based on data and information available up to January 2019. This report is based on production data available up to and including December 31, 2018, and has a Reference Date of January 1, 2019.

RPS has applied its expectation of the long term Brent Oil price at the Reference Date of January 1, 2019, which is based on a forward curve (year 2019 to 2024) and US\$70 per barrel flat real (at 2% inflation per annum) thereafter.

On the basis of independent assessment and other technical information made available concerning the Properties, RPS has prepared:

- a PSC Reserves Audit Statement (**Table 1**);
- a Contingent Resources Audit Statement (**Table 2**); and
- a SGX Main Board compliance summary table for the Reserves and Resources (**Table 3**).

Our assessment has an effective reference date of January 1, 2019. This letter and the attached Appendices form the integral parts of the RPS report.

Volumes presented in this report have been estimated using the March 2007 SPE/WPC/AAPG/SPEE Petroleum Resources Management System (“SPE PRMS”)¹ as the standard for classification and reporting (see **Appendix II**). In accordance with SPE-PRMS, RPS has estimated Net Entitlement Reserves. A report has been submitted to RH Petrogas which contains Net Entitlement Reserves. However, RH Petrogas has requested this version of the report be prepared for inclusion in their Annual Report and/or announcements. This version excludes Net Entitlement Reserves as RH Petrogas believes such information may risk revealing certain confidential information on the PSC terms when considered together with other publicly available information.

SUMMARY

The audit was completed in February 2019.

¹ Society of Petroleum Engineers / World Petroleum Council / American Association of Petroleum Geologists / Society of Petroleum Evaluation Engineers (SPE/WPC/AAPG/SPEE) Petroleum Resources Management System document (“SPE PRMS”), approved in March 2007

This audit was based on technical data, future development plans and resource estimates that have been provided by RH Petrogas to RPS.

RPS's approach in conducting this study has been to focus on validating the Operator's evaluations in regards to the key discipline areas (geology, geophysics, reservoir and production engineering). Emphasis was placed on the performance of currently producing wells and on workover and infill activities planned for the Property. The aim was to perform an independent audit that is sufficiently detailed to form a robust estimation of the future production and near-term exploration of the PSCs.

The Basin PSC is almost exclusively onshore and contains two separate blocks; namely the Arar Block to the north, and the Walio Block to the south (**Figure 1**). Within these areas there has been considerable oil and gas activity since the early 1970's, during which many wells have been drilled, multiple 2D seismic lines acquired and local 3D surveys shot over some of the 19 producing fields. The majority of the fields produce from the Tertiary age Kais Formation, which is a carbonate sequence that forms a broad shallow marine platform with localised reefal complexes. Other plays are noted and the Operator will focus near term exploration efforts on Pre-Tertiary clastic sequences that form the likely source rock for hydrocarbons, as well as reservoir hydrocarbons in the combination structural and stratigraphic traps.

The Island PSC is located both onshore and offshore and contains four separate blocks; namely the Salawati Ridge Block (onshore) and the Offshore Walio, and Koi Complex and Sele Strait Blocks (**Figure 1**). Within these areas there has been considerable oil and gas activity since the early 1970's, during which many wells have been drilled, multiple 2D seismic lines and local 3D surveys were acquired. The majority of the fields produce from the Tertiary age Kais Formation, which is a carbonate sequence that forms a broad shallow marine platform with localised reefal complexes. Other plays are noted and the Operator will focus near term exploration efforts on Pre-Tertiary clastic sequences that form the likely source rock for hydrocarbons as well as reservoir hydrocarbons in the combination structural and stratigraphic traps

The **Reserves** for the PSCs are based on the declining trends of current field production, and the Operator's future work plans and programmes to increase hydrocarbon production.

The field production forecasts have been used in a cashflow model with the estimated forecasted Capital Expenditures ("Capex") and Operating Expenses ("Opex"). By modelling the fiscal terms of the PSC, the production profiles are truncated where Opex exceeds revenues and/or at the end of the licence period of the respective PSCs. A summary of the Reserves is presented in **Table 1**.

Oil volumes are reported in Millions of stock tank barrels ("MMstb"). All volumes are reported as gross (100%) interest and net working interest and all lie entirely within the permit boundary of the PSCs.

RPS has not undertaken an assessment of the Stock Tank Oil Initially In-Place ("STOIP") and Gas Initially In-Place ("GIIP") volumes for the producing fields, as assessment of these more mature fields requires a dynamic assessment of the declining oil and gas production. Decline Curve Analysis ("DCA") was conducted on the producing fields using "type wells" devised from historic production to account for planned infill drilling and other activities. RPS has reviewed the historic production record and devised Low, Best and High "type wells" that reflect the range of performance. This, together with the Operator's 2019 Work Plan and Budget ("WP&B") has allowed the construction of oil production forecasts beyond that of the performance of the current wells.

The work programmes, assumptions regarding "type well" performance and ensuing forecasts have been used in a cashflow model with the estimated forecasted Capex and Opex costs.

The **Contingent Resources** are based on our assessment of developments of undeveloped discoveries. The estimated remaining Contingent Oil Resources volumes are reported in **Table 2**. These are presented on a "Gross 100% Licence Interest Basis" and "Working Interest Basis".

The changes in the net working interest Reserves and Contingent Resources of the Company as of 1 January 2019 in respect of the Basin and Island blocks as compared with the previous evaluation conducted by RPS with an effective date of 1 January 2018 are shown in Table 3. The increases in both Reserves and Contingent Resources from the previous update are due mainly to the new 20-year PSCs

(namely the New Basin PSC and the Salawati PSC) which were signed during 2018 and which will succeed the existing Basin PSC and Island PSC over essentially the same acreages when they expire in 2020.

Based on the audit, it is RPS's opinion that the estimates of total remaining recoverable hydrocarbon volumes form a reasonable representation of the future operation of the PSCs. The reported hydrocarbon resources estimates are based on professional judgment and are subject to future revisions, upward or downward, as a result of future planned operations or as additional information become available.

The data set included historical production data together with reports, presentations and financial information pertaining to the contractual and fiscal terms applicable to the assets. In carrying out this review, RPS has relied solely upon this information.

QUALIFICATIONS

RPS is an independent consultancy specialising in petroleum reservoir evaluation and economic analysis. Except for the provision of professional services on a fee basis, RPS does not have a commercial arrangement with any other person or company involved in the Property that is the subject of this report.

The lead professionals involved in this work are RPS Employees and hold degrees in geology, geophysics, petroleum engineering and related subjects; and have relevant experience in the practice of geology, geophysics or petroleum engineering.

Mr. Gordon Taylor, Director for RPS Energy, has reviewed the report. Mr. Taylor is a Chartered Geologist and Chartered Engineer with over 39 years' experience in upstream oil and gas.

The work was undertaken by a team of professional petroleum engineers, geoscientists and economists and is based on data supplied by RH Petrogas. In estimating Reserves, we have used standard petroleum engineering techniques. These techniques combine geological and production data with detailed information concerning fluid characteristics and reservoir pressure. We have estimated the degree of uncertainty inherent in the measurements and interpretation of the data and have calculated a range of Reserves. We have taken the working interest that RH Petrogas has in the Property as presented by RH Petrogas; we have not investigated, nor do we make any warranty, as to RH Petrogas' interest in the PSC.

BASIS OF OPINION

The evaluation presented in this report reflects our informed judgment, based on accepted standards of professional investigation, but is subject to generally recognised uncertainties associated with the interpretation of geological, geophysical and engineering data. The evaluation has been conducted within our understanding of petroleum legislation, taxation and other regulations that currently apply to the Property. However, RPS is not in a position to attest to the Property title, financial interest relationships or encumbrances related to the Property. Our estimates of Reserves and Resources are based on data provided by RH Petrogas. We have accepted, without independent verification, the accuracy and completeness of these data.

The report represents RPS's best professional judgment and should not be considered a guarantee or prediction of results. It should be understood that any evaluation, particularly one involving future performance and development activities may be subject to significant variations over short periods of time as new information becomes available. This report relates specifically and solely to the subject Property and is conditional upon various assumptions that are described herein. This report must, therefore, be read in its entirety. This report was provided for the sole use of RH Petrogas and its advisors on a fee basis.

RPS has given its written consent to the issue of this document with its name included within it; and with inclusion of the results presented therein and references thereto in submissions by RH Petrogas to the stock exchanges. Prior to the issuance of this report or sections of this report to a third party, RPS

requests that we are able to view the said release in order to check its wording and context. Specifically, excerpts may only be reproduced or published (as required for regulated securities reporting purposes) with the express written permission of RPS.

RPS accepts responsibility for the interpretations and professional opinions contained in this report, as set out in this part of this document; and to the best of our knowledge and belief RPS has taken all reasonable care to ensure that such is the case. The information contained in this report is in accordance with the facts and does not omit anything likely to affect the importance of such information.

Yours faithfully,

RPS Energy Consultants Limited



Gordon R Taylor, *CEng, CGeol*

Director, Consulting

INDEPENDENT RESOURCES EVALUATION
 BASIN AND ISLAND PSC, WEST PAPUA, INDONESIA AS OF JANUARY 1, 2019

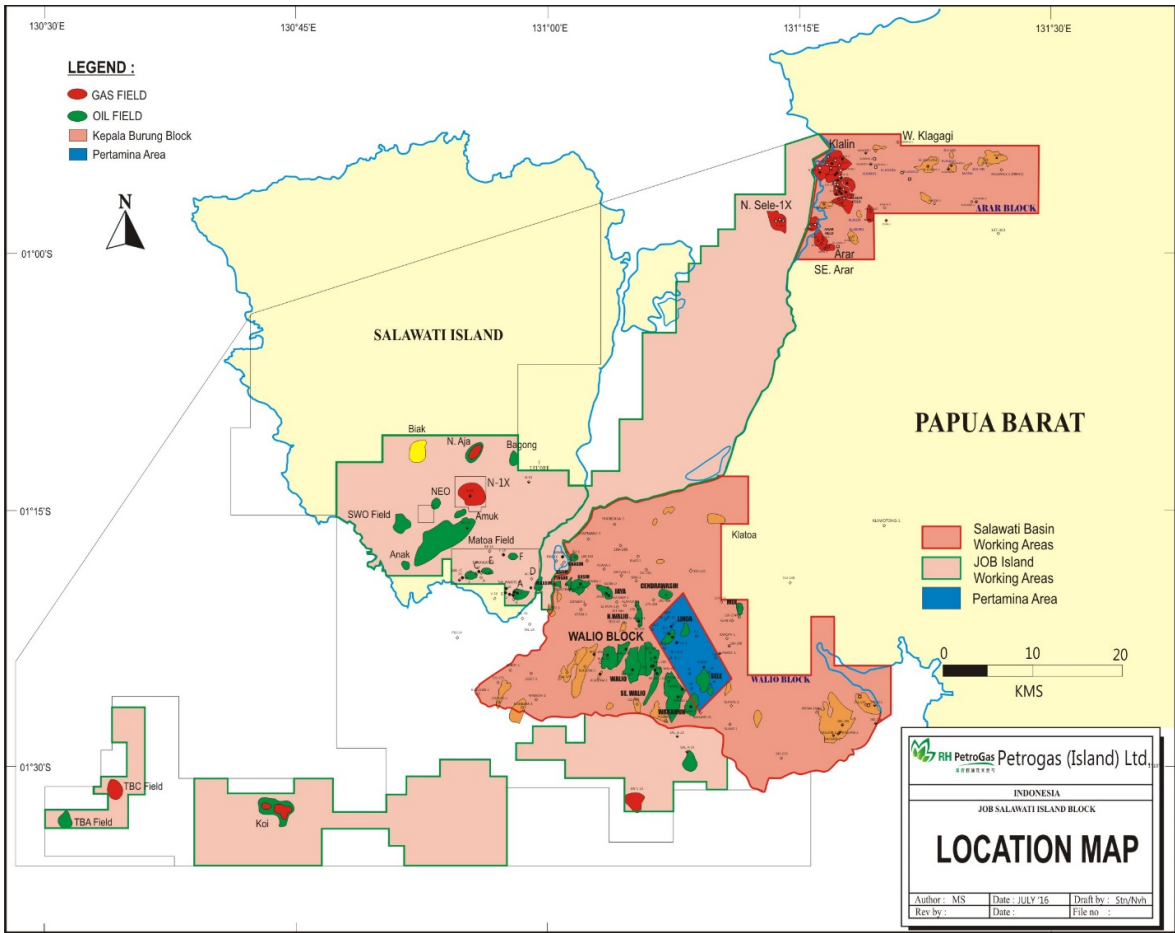


Figure 1 – Location of the Basin PSC, Onshore and Offshore West Papua (“Birds Head”), Indonesia



INDEPENDENT RESOURCES EVALUATION

BASIN AND ISLAND PSC, WEST PAPUA, INDONESIA AS OF JANUARY 1, 2019

Table I
Combined Oil, Gas and LPG Reserves for the Basin PSC (2019-2020),
New Basin PSC (2020-2040), Island PSC (2019-2020) and Salawati PSC
(2020-2040)
As of January 1, 2019

	Gross 100% License Basis ¹			RH Petrogas's Net Working Interest Basis ²		
	IP	2P	3P	IP	2P	3P
Oil Reserves (MMstb) ³	25.7	39.3	45.3	14.5	22.4	25.9
Gas Reserves (Bscf) ⁴	5.9	5.9	5.9	3.2	3.2	3.2
LPG Reserves (MT) ⁵	8,090	8,090	8,090	4,376	4,376	4,376
Notes:						
<p>1) All volumes reported below these columns are based on gross (100%) interest as the fields are within the PSCs licence boundary. These volumes include RH Petrogas's and its partner's interests including the Indonesian Government's share.</p> <p>2) The volumes reported under these columns are based on RH Petrogas's net working interest, which include the Indonesian Government's share under the PSCs.</p> <p>3) Oil Reserves includes Oil Reserves and Condensate Reserves.</p> <p>4) Based on approved sales volumes in WP&B 2019 with similar assumption applied until the current Basin PSC and Island PSC expires in 2020. Reserves are reported net of inerts and fuel.</p> <p>5) Based on approved sales volumes in WP&B 2019 with similar assumption applied until current Basin PSC expires in 2020.</p> <p>All Capex and Opex used in the valuation are based on the approved WP&B 2019, as well as RPS in-house estimates. The Reserves are estimated as of January 1, 2019 until the expiry of the respective PSCs.</p> <p>The figures presented in this table must be considered only in the context of the comments contained in the accompanying report dated February 14, 2019 of which this table forms an integral part.</p>						



INDEPENDENT RESOURCES EVALUATION

BASIN AND ISLAND PSC, WEST PAPUA, INDONESIA AS OF JANUARY 1, 2019

Table 2

Combined Contingent Oil, Condensate and Gas Resources Attributable to the Basin PSC (2019-2020), New Basin PSC (2020-2040), Island PSC (2019-2020) and Salawati PSC (2020-2040)

As of January 1, 2019

	Gross Contingent Resources 100% License Basis ¹			RH Petrogas's Net Working Interest Basis ²		
	1C	2C	3C	1C	2C	3C
Oil and Condensate (MMstb)	39.2	44.1	58.2	22.7	25.5	33.7
Gas (Bscf)	283.4	425.1	605.8	163.5	245.5	350.0
Notes:						
<p>1. All volumes reported below these columns are based on gross (100%) interest as the fields are within the PSCs licence boundary. These volumes include Contractors' and the Indonesian Government's share.</p> <p>2. The volumes reported under these columns are based on RH Petrogas's net working interest, which include the Indonesian Government's share under the PSC.</p> <p>RPS has estimated a Chance of Commerciality for these Contingent Resources of 70% due to projects not being approved and the current market conditions.</p> <p>The volumes presented in this table must be considered only in the context of the comments contained in the accompanying report dated February 14, 2019; of which this table forms an integral part.</p>						

Table 3
Summary of Combined Oil and Gas Reserves and Resources for the Basin PSC (2019-2020), New Basin PSC (2020-2040), Island PSC (2019-2020) and Salawati PSC (2020-2040)
As of January 1, 2019


Category	Gross Attributable to Licence (MMstb/Bscf)	Net Attributable to Issuer ^[1]		Risk Factors ^[5]	Remarks
		(MMstb/Bscf)	Change from Previous Update ^[2] (%)		
RESERVES					
Oil					
1P	25.7	14.5	433% ^[3]		
2P	39.3	22.4	627% ^[3]		
3P	45.3	25.9	665% ^[3]		
Natural Gas					
1P	5.9	3.2	-41% ^[4]		
2P	5.9	3.2	-41% ^[4]		
3P	5.9	3.2	-41% ^[4]		
Natural Gas Liquids					
1P	N/A	N/A	N/A		
2P	N/A	N/A	N/A		
3P	N/A	N/A	N/A		
CONTINGENT RESOURCES					
Oil					
1C	39.2	22.7	170% ^[3]	70%	
2C	44.1	25.5	93% ^[3]	70%	
3C	58.2	33.7	80% ^[3]	70%	
Natural Gas					
1C	283.4	163.5	123% ^[3]	70%	
2C	425.1	245.5	96% ^[3]	70%	
3C	605.8	350.0	85% ^[3]	70%	
Natural Gas Liquids					
1C	N/A	N/A	N/A		
2C	N/A	N/A	N/A		
3C	N/A	N/A	N/A		

Notes: [1] - Net Attributable to Issuer means the Company's working interest share under the respective PSCs. The Company is entitled to a share of these volumes after considering the Indonesian Government's share pursuant to the terms of the PSCs.
[2] - Previous evaluation was conducted by RPS with an effective date of January 1, 2018.
[3] - The increases in both Reserves and Contingent Resources from the previous update are due mainly to the new 20-year PSCs (namely the New Basin PSC and the Salawati PSC) which were signed during 2018 and which will succeed the existing Basin PSC and Island PSC over essentially the same acreages when they expire in 2020.
[4] - Gas Reserves are based on gas sales forecasts up to the expiry of the existing Basin PSC and Island PSC in 2020. The decrease in Gas Reserves from the previous update of January 1, 2018 is due mainly to the sale and offtake of gas during 2018.
[5] Applicable to Resources. "Risk Factor" for Contingent Resources means the estimated chance, or probability, that the volumes will be commercially extracted.

1P: Proved
2P: Proved + Probable
3P: Proved + Probable + Possible
1C: Low Estimate Contingent Resource
2C: Best Estimate Contingent Resource
3C: High Estimate Contingent Resource

MMstb: Millions of Stock Tank Barrels
Bscf: Billions of Standard Cubic Feet

Name of Qualified Person: Gordon Taylor
Date: 14-Feb-19



Professional Society Membership: Fellow, Geological Society, Chartered Geologist (C.Geol)
Member, Institute Materials, Minerals & Mining, Chartered Engineer (C.Eng)



INDEPENDENT RESOURCES EVALUATION

BASIN AND ISLAND PSC, WEST PAPUA, INDONESIA AS OF JANUARY 1, 2019



INDEPENDENT RESOURCES EVALUATION
BASIN AND ISLAND PSC, WEST PAPUA, INDONESIA AS OF JANUARY 1, 2019

APPENDIX I

GLOSSARY OF TECHNICAL TERMS



INDEPENDENT RESOURCES EVALUATION

BASIN AND ISLAND PSC, WEST PAPUA, INDONESIA AS OF JANUARY 1, 2019

APPENDIX - GLOSSARY OF TECHNICAL TERMS

1C	Low Estimate Contingent Resources
2C	Best Estimate Contingent Resources
3C	High Estimate Contingent Resources
1P	Proved Reserves
2P	Proved plus Probable Reserves
3P	Proved plus Probable plus Possible Reserve
Acre	Area in acre
AOF	Absolute Open Flow
API	American Petroleum Institute
B	billion
bbl	barrels
bbl/d	barrels per day
BBTUD	Billions of British Thermal Units per Day
bcpd	barrels of condensate per day
BOE	barrel of oil equivalent
B_z	gas formation volume factor
B_{gi}	gas formation volume factor (initial)
B_o	oil formation volume factor
B_{oi}	oil formation volume factor (initial)
B_w	water volume factor
bcpd	barrels of condensate per day
bopd	barrels of oil per day
BTU	British Thermal Unit
Bscf	billions of standard cubic feet
bwpd	barrels of water per day
°C	Temperature in Centigrade
cc	cubic centimetre
CGR	condensate gas ratio
cP	Viscosity in centiPoise
DCQ	daily contracted quantity direct
DST	Drill Stem Test
Entitlement Volumes	the volumes of oil and/or gas which a Contractor receives under the terms of a PSC
ELT	Economics Limit Test
EUR	Estimated Ultimate Recovery

APPENDIX - GLOSSARY OF TECHNICAL TERMS

°F	Temperature in Fahrenheit
FBHP	flowing bottom hole pressure
FTHP	flowing tubing head pressure
FTHT	flowing tubing head temperature
ft	Length in feet
ft ³	Volume in cubic feet
ftSS	depth in feet below sea level
GEF	Gas Expansion Factor
GIP	Gas in Place
GIIP	Gas Initially in Place
gm	Weight in grams
gm/cc	Density in grams per cubic centimetre
GOR	gas/oil ratio
GRV	gross rock volume
GSA	Gas Sales Agreement
GWC	gas water contact
lb	Weight in pounds
lb/cuft	Density in pounds per cubic feet
KB	Kelly Bushing
km	Length in kilometres
km ²	Area in square kilometres
km ³	Volume in cubic kilometres
m	Length in meter
MM	million
MM\$	million US dollars
MD	measured depth
mD	permeability in millidarcies
MDT	Modular Formation Dynamics Tester
m ³	cubic metres
m ³ /d	cubic metres per day
MMscf/d	millions of standard cubic feet per day
MT	Metric Tonnes
Money of the Day	Cash values calculated to include the effect of inflation
NTG	net to gross ratio

APPENDIX - GLOSSARY OF TECHNICAL TERMS

NPV	Net Present Value
OWC	oil water contact
P1	Proved Reserves
P2	Probable Reserves
P3	Possible Reserves
P ₁₀	Probability of 10% chance the value would be larger than the reported and considered high value
P ₅₀	Probability of 50% chance the value would be larger than the reported and considered best value
P ₉₀	Probability of 90% chance the value would be larger than the reported and considered low value
P _b	bubble point pressure
P _c	capillary pressure
petroleum	deposits of oil and/or gas
phi	porosity fraction
phie	Effective porosity fraction
p _i	initial reservoir pressure
PRMS	Petroleum Resources Management System (SPE Terminology)
PSC	Production Sharing Contract
psi	pounds per square inch
psia	pounds per square inch absolute
psig	pounds per square inch gauge
rcf	Volume in reservoir cubic feet
Real	Cash values calculated to exclude the effects of inflation
scf	standard cubic feet measured at 14.7 pounds per square inch and 60°F
scfd	standard cubic feet per day
scf/stb	standard cubic feet per stock tank barrel
stb	stock tank barrels measured at 14.7 pounds per square inch and 60°F
stb/d	stock tank barrels per day
stb/MMscf	stock tank barrels per million standard cubic feet measured at 14.7 pounds per square inch and 60°F
STOIIP	stock tank oil initially in place
S _w	water saturation
US\$	United States Dollars
TAN	Total Acid Number (of oil)
Tscf	trillion standard cubic feet



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APPENDIX - GLOSSARY OF TECHNICAL TERMS

TVDSS	true vertical depth (sub-sea)
TVT	true vertical thickness
TWT	two-way time
US\$	United States Dollar
V _{sh}	shale volume
WI	Working Interest
WC	water cut
WHP	Well Head Pressure
φ	porosity



INDEPENDENT RESOURCES EVALUATION
BASIN AND ISLAND PSC, WEST PAPUA, INDONESIA AS OF JANUARY 1, 2019

APPENDIX II

RESERVES AND RESOURCES DEFINITIONS AND GUIDELINES



INDEPENDENT RESOURCES EVALUATION

BASIN AND ISLAND PSC, WEST PAPUA, INDONESIA AS OF JANUARY 1, 2019



INDEPENDENT RESOURCES EVALUATION BASIN AND ISLAND PSC, WEST PAPUA, INDONESIA AS OF JANUARY 1, 2019

RESERVES AND RESOURCES DEFINITIONS AND GUIDELINES

**Society of Petroleum Engineers (SPE), World Petroleum Council (WPC), American Association of Petroleum Geologists (AAPG), and Society of Petroleum Evaluation Engineers (SPEE)
Petroleum Resources Management System (PRMS)
Definitions and Guidelines (2)**

Preamble

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.

International efforts to standardize the definition of petroleum resources and how they are estimated began in the 1930s. Early guidance focused on Proved Reserves. Building on work initiated by the Society of Petroleum Evaluation Engineers (SPEE), SPE published definitions for all Reserves categories in 1987. In the same year, the World Petroleum Council (WPC, then known as the World Petroleum Congress), working independently, published Reserves definitions that were strikingly similar. In 1997, the two organizations jointly released a single set of definitions for Reserves that could be used worldwide. In 2000, the American Association of Petroleum Geologists (AAPG), SPE and WPC jointly developed a classification system for all petroleum resources. This was followed by additional supporting documents: supplemental application evaluation guidelines (2001) and a glossary of terms utilized in Resources definitions (2005). SPE also published standards for estimating and auditing Reserves information (revised 2007).

These definitions and the related classification system are now in common use internationally within the petroleum industry. They provide a measure of comparability and reduce the subjective nature of resources estimation. However, the technologies employed in petroleum exploration, development, production and processing continue to evolve and improve. The SPE Oil and Gas Reserves Committee works closely with other organizations to maintain the definitions and issues periodic revisions to keep current with evolving technologies and changing commercial opportunities.

The SPE PRMS document consolidates, builds on, and replaces guidance previously contained in the 1997 Petroleum Reserves Definitions, the 2000 Petroleum Resources Classification and Definitions publications, and the 2001 "Guidelines for the Evaluation of Petroleum Reserves and Resources"; the latter document remains a valuable source of more detailed background information.

These definitions and guidelines are designed to provide a common reference for the international petroleum industry, including national reporting and regulatory disclosure agencies, and to support petroleum project and portfolio management requirements. They are intended to improve clarity in global communications regarding petroleum resources. It is expected that SPE PRMS will be supplemented with industry education programs and application guides addressing their implementation in a wide spectrum of technical and/or commercial settings.

It is understood that these definitions and guidelines allow flexibility for users and agencies to tailor application for their particular needs; however, any modifications to the guidance contained herein should be clearly identified. The definitions and guidelines contained in this document must not be construed as modifying the interpretation or application of any existing regulatory reporting requirements.

² These Definitions and Guidelines are extracted from the Society of Petroleum Engineers / World Petroleum Council / American Association of Petroleum Geologists / Society of Petroleum Evaluation Engineers (SPE/WPC/AAPG/SPEE) Petroleum Resources Management System document ("SPE PRMS"), approved in March 2007, and available, free and in full, at: www.spe.org/spe-app/spe/industry/reserves/index.htm



INDEPENDENT RESOURCES EVALUATION

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RESERVES

Reserves are those quantities of petroleum anticipated to be commercially recoverable by application of development projects to known accumulations from a given date forward under defined conditions.

Reserves must satisfy four criteria: they must be discovered, recoverable, commercial, and remaining based on the development project(s) applied. Reserves are further subdivided 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 development and production status. To be included in the Reserves class, a project must be sufficiently defined to establish its commercial viability. There must be a reasonable expectation that all required internal and external approvals will be forthcoming, and there is evidence of firm intention to proceed with development within a reasonable time frame. A reasonable time frame for the initiation of development depends on the specific circumstances and varies according to the scope of the project. While 5 years is recommended as a benchmark, a longer time frame could be applied where, for example, development of economic projects are deferred at the option of the producer for, among other things, market-related reasons, or to meet contractual or strategic objectives. In all cases, the justification for classification as Reserves should be clearly documented. To be included in the Reserves class, there must be a high confidence in the commercial producibility of the reservoir as supported by actual production or formation tests. In certain cases, Reserves may be assigned on the basis of well logs and/or core analysis that indicate that the subject reservoir is hydrocarbon-bearing and is analogous to reservoirs in the same area that are producing or have demonstrated the ability to produce on formation tests.

Proved Reserves

Proved Reserves are those quantities of petroleum, which by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be commercially recoverable, from a given date forward, from known reservoirs and under defined economic conditions, operating methods, and government regulations.

If deterministic methods are used, the term reasonable certainty is intended to express a high degree of confidence that the quantities will be recovered. If probabilistic methods are used, there should be at least a 90% probability that the quantities actually recovered will equal or exceed the estimate. The area of the reservoir considered as Proved includes:

- the area delineated by drilling and defined by fluid contacts, if any, and
- adjacent undrilled portions of the reservoir that can reasonably be judged as continuous with it and commercially productive on the basis of available geoscience and engineering data.

In the absence of data on fluid contacts, Proved quantities in a reservoir are limited by the lowest known hydrocarbon (LKH) as seen in a well penetration unless otherwise indicated by definitive geoscience, engineering, or performance data. Such definitive information may include pressure gradient analysis and seismic indicators. Seismic data alone may not be sufficient to define fluid contacts for Proved Reserves (see “2001 Supplemental Guidelines,” Chapter 8). Reserves in undeveloped locations may be classified as Proved provided that the locations are in undrilled areas of the reservoir that can be judged with reasonable certainty to be commercially productive. Interpretations of available geoscience and engineering data indicate with reasonable certainty that the objective formation is laterally continuous with drilled Proved locations. For Proved Reserves, the recovery efficiency applied to these reservoirs should be defined based on a range of possibilities supported by analogs and sound engineering judgment considering the characteristics of the Proved area and the applied development program.

Probable Reserves



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Probable Reserves are those additional Reserves which analysis of geoscience and engineering data indicate are less likely to be recovered than Proved Reserves but more certain to be recovered than Possible Reserves.

It is equally likely that actual remaining quantities recovered will be greater than or less than the sum of the estimated Proved plus Probable Reserves (2P). In this context, when probabilistic methods are used, there should be at least a 50% probability that the actual quantities recovered will equal or exceed the 2P estimate. Probable Reserves may be assigned to areas of a reservoir adjacent to Proved where data control or interpretations of available data are less certain. The interpreted reservoir continuity may not meet the reasonable certainty criteria. Probable estimates also include incremental recoveries associated with project recovery efficiencies beyond that assumed for Proved.

Possible Reserves

Possible Reserves are those additional Reserves which analysis of geoscience and engineering data indicate are less likely to be recoverable than Probable Reserves

The total quantities ultimately recovered from the project have a low probability to exceed the sum of Proved plus Probable plus Possible (3P), which is equivalent to the high estimate scenario. When probabilistic methods are used, there should be at least a 10% probability that the actual quantities recovered will equal or exceed the 3P estimate. Possible Reserves may be assigned to areas of a reservoir adjacent to Probable where data control and interpretations of available data are progressively less certain. Frequently, this may be in areas where geoscience and engineering data are unable to clearly define the area and vertical reservoir limits of commercial production from the reservoir by a defined project. Possible estimates also include incremental quantities associated with project recovery efficiencies beyond that assumed for Probable.

Probable and Possible Reserves

(See above for separate criteria for Probable Reserves and Possible Reserves.)

The 2P and 3P estimates may be based on reasonable alternative technical and commercial interpretations within the reservoir and/or subject project that are clearly documented, including comparisons to results in successful similar projects. In conventional accumulations, Probable and/or Possible Reserves may be assigned where geoscience and engineering data identify directly adjacent portions of a reservoir within the same accumulation that may be separated from Proved areas by minor faulting or other geological discontinuities and have not been penetrated by a wellbore but are interpreted to be in communication with the known (Proved) reservoir. Probable or Possible Reserves may be assigned to areas that are structurally higher than the Proved area. Possible (and in some cases, Probable) Reserves may be assigned to areas that are structurally lower than the adjacent Proved or 2P area. Caution should be exercised in assigning Reserves to adjacent reservoirs isolated by major, potentially sealing, faults until this reservoir is penetrated and evaluated as commercially productive. Justification for assigning Reserves in such cases should be clearly documented. Reserves should not be assigned to areas that are clearly separated from a known accumulation by non-productive reservoir (i.e., absence of reservoir, structurally low reservoir, or negative test results); such areas may contain Prospective Resources. In conventional accumulations, where drilling has defined a highest known oil (HKO) elevation and there exists the potential for an associated gas cap, Proved oil Reserves should only be assigned in the structurally higher portions of the reservoir if there is reasonable certainty that such portions are initially above bubble point pressure based on documented engineering analyses. Reservoir portions that do not meet this certainty may be assigned as Probable and Possible oil and/or gas based on reservoir fluid properties and pressure gradient interpretations.



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CONTINGENT RESOURCES

Those quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations by application of development projects, but which are not currently considered to be commercially recoverable 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 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

Those quantities of petroleum which are estimated, as of a given date, to be potentially recoverable from undiscovered accumulations.

Potential accumulations are evaluated according to their chance of discovery and, assuming a discovery, the estimated quantities that would be recoverable under defined development projects. It is recognized that the development programs will be of significantly less detail and depend more heavily on analog developments in the earlier phases of exploration.

Prospect- A project associated with a potential accumulation that is sufficiently well defined to represent a viable drilling target.

Project activities are focused on assessing the chance of discovery and, assuming discovery, the range of potential recoverable quantities under a commercial development program.

Lead- A project associated with a potential accumulation that is currently poorly defined and requires more data acquisition and/or evaluation in order to be classified as a prospect.

Project activities are focused on acquiring additional data and/or undertaking further evaluation designed to confirm whether or not the lead can be matured into a prospect. Such evaluation includes the assessment of the chance of discovery and, assuming discovery, the range of potential recovery under feasible development scenarios.

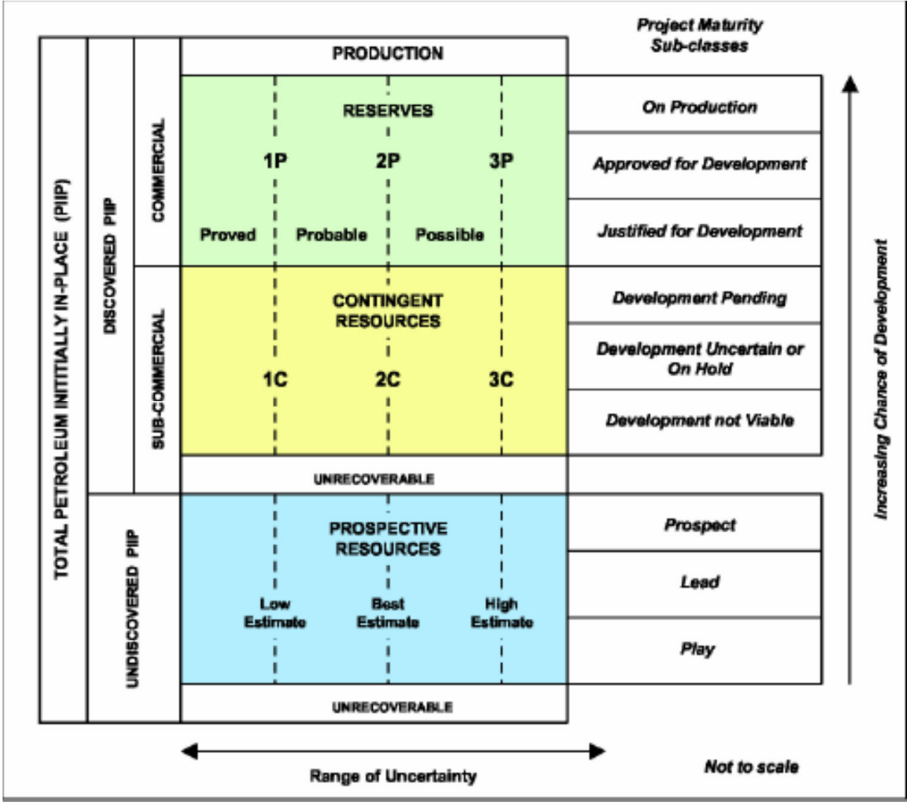
Play- A project associated with a prospective trend of potential prospects, but which requires more data acquisition and/or evaluation in order to define specific leads or prospects.

Project activities are focused on acquiring additional data and/or undertaking further evaluation designed to define specific leads or prospects for more detailed analysis of their chance of discovery and, assuming discovery, the range of potential recovery under hypothetical development scenarios.



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