A.C.N. 004 247 214

Lakes Oil N.L.

ASX Announcement and Media Release 31 August 2020

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Lakes Oil N.L.
ASX Announcement
Nangwarry Resource Estimate

Highlights:

- *Independent estimate of Nangwarry carbon dioxide sales gas quantity prepared by ERC Equipoise Pte Ltd.*
- *Best estimate is that Nangwarry contains 25.1 Bscf (12.5 Bscf net to Lakes Oil) of saleable carbon dioxide.*
- *Memorandum of Understanding already in place with Supagas Pty Ltd for preliminary design and costing of carbon dioxide processing facility for Nangwarry.*
- *Through its subsidiary, Otway Energy Ltd, Lakes Oil has 50% interest in, and is Operator of, Nangwarry.*

The Directors of Lakes Oil NL (**Lakes Oil** or **Company**; ASX:LKO) are pleased to advise that the Company has received the following tabulated independent estimate of the recoverable sales gas volume of carbon dioxide (**CO_2**) contained within the Nangwarry reservoir.

Gross CO_2 Sales Gas (Bscf) For PEL 155		
Low	Best	High
7.8	25.1	82.1

Net CO_2 Sales Gas (Bscf) 50% LKO		
Low	Best	High
3.9	12.6	41.5

Notes:
1. Gross volumes represent a 100% total of estimated recoverable volumes within PEL 155.
2. Working interest volumes for Otway Energy Ltd's and Vintage Energy Ltd's share of the Gross recoverable volumes can be calculated by applying their working interest in PEL 155, which is 50% each.
3. Sales gas stream for Nangwarry is CO_2 gas.

The independent estimate, a copy of which is attached, was prepared by ERC Equipoise Pte Ltd (**ERCE**) using a probabilistic methodology. Under the June 2018 Society of Engineers Petroleum Resources Management System, (**PRMS**), volumes of non-hydrocarbon by-products cannot be included in any Reserves or Resources classification. However, the method used by ERCE is consistent with that prescribed by the PRMS.

ERCE is an independent consultancy specialising in geoscience evaluation, engineering and economic assessment. ERCE has the relevant and appropriate qualifications, experience and technical knowledge to appraise professionally and independently the assets.

ERCE's work was supervised by Mr Adam Becis, Principal Reservoir Engineer at ERCE, who has over 14 years of experience in the oil and gas industry. He is a member of the Society of Petroleum Engineers and also a member of the Society of Petroleum Evaluation Engineers. Mr Becis has consented to the form and context in which the estimate of carbon dioxide sales gas is presented.

Mr Richard Ash, Chairman of Lakes Oil, said "The estimated 25 billion scf total carbon dioxide sales gas volume reaffirms the commercial potential of the Nangwarry project. By way of comparison, a 150 tonne per day food-grade carbon dioxide plant would require around 15 Bscf of gas over 15 years. With carbon dioxide having a market value of around $10 to $15 per thousand cubic feet the Company aspires to bring the Nangwarry carbon dioxide project on line as quickly as possible."

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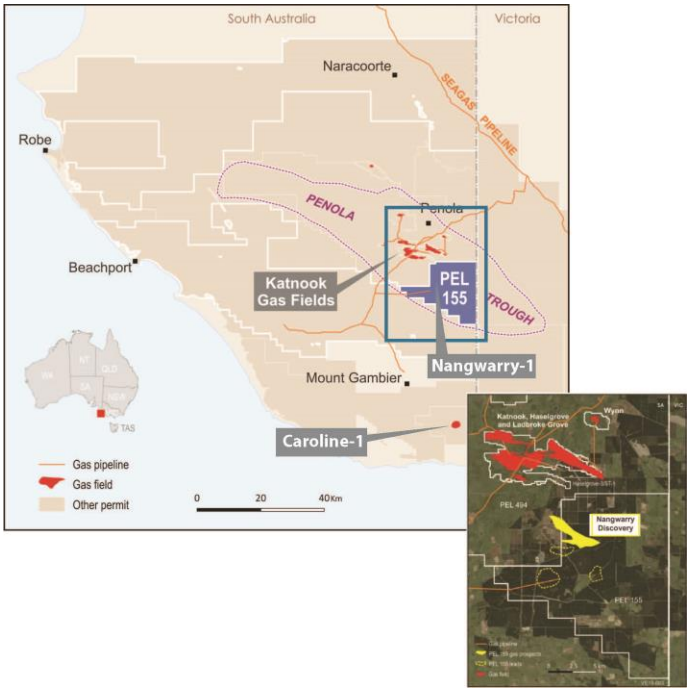
For and on behalf of the Board of Directors and for further information.

Richard Ash
Chairman
Lakes Oil NL
Ph: +61 3 9629 1566

About Nangwarry

The Nangwarry project is a 50:50 joint venture between Lakes Oil subsidiary, Otway Energy Ltd (as Operator), and Vintage Energy Ltd. The project is located within Petroleum Exploration Licence 155, South Australia, about 30 km north of Mt Gambier and around 50 km north of the Caroline-1 carbon dioxide project.

The Caroline-1 project closed down in 2016 after producing 797,272 tonnes over nearly 50 years, with peak annual production of about 80 t/d. The Australian carbon dioxide market is now suffering tight supply.



The Nangwarry carbon dioxide resource was discovered in early 2020 through drilling of the Nangwarry-1 well. The Nangwarry reservoir contains a carbon dioxide rich (greater than 90%) gas resource, with the balance of the resource being natural gas.

The Nangwarry joint venture is planning to flow test the Nangwarry-1 well later in 2020 to confirm both gas deliverability and gas resource size.

The joint venture recently announced it had entered into a Memorandum of Understanding with Supagas Pty Ltd regarding preliminary design and costing of facilities for processing Nangwarry carbon dioxide. Minor quantities of natural gas that will be produced in association with carbon dioxide will be used to fuel the proposed carbon dioxide purification plant.

31 August 2020

Tim O'Brien
Lakes Oil NL
Level 3, 480 Collins Street
Melbourne VIC 3000 Australia

Danny Burns
Vintage Energy Ltd
58 King William Road
Goodwood SA 5034 Australia

Attention: Mr Tim O'Brien and Mr Danny Burns

Dear Sirs,

Re: Recoverable CO_2 volumes and Hydrocarbon Contingent Resources – Nangwarry Discovery, PEL 155

In accordance with your instructions, ERC Equipoise Pte Ltd ("ERCE") has estimated the recoverable CO_2 volumes and hydrocarbon Contingent Resources held by Otway Energy Ltd ("Otway"), a wholly-owned subsidiary of Lakes Oil NL ("Lakes Oil"), and Vintage Energy Ltd ("Vintage") within the Nangwarry discovery within the Petroleum Exploration Licence 155 (PEL 155), onshore South Australia. ERCE understands that Rawson Oil and Gas Ltd is also a wholly-owned subsidiary of Lakes Oil.

The effective date ("Effective Date") of this report is 1 August 2020. For the preparation of this report ERCE was provided with data and information by Lakes Oil and Vintage up to 1 August 2020.

ERCE has carried out this work in accordance with the June 2018 SPE/WPC/AAPG/ SPEE/SEG/SPWLA/EAGE Petroleum Resources Management System (PRMS) as the standard for classification and reporting. A summary of the PRMS is found in Appendix 1 of the report. The full text can be downloaded from:-

https://secure.spee.org/sites/spee.org/files/prmgmtsystem_final_2018.pdf.

Nomenclature that may be used in this report is summarised in Appendix 2.

Use of the Report

This report is produced solely for the benefit of and on the instructions of Lakes Oil and Vintage, and not for the benefit of any third party. Any third party to whom the client discloses or makes available this report shall not be entitled to rely on it or any part of it.

Lakes Oil and Vintage agree to ensure that any publication or use of this report which makes reference to ERCE shall be published or quoted in its entirety and Lakes Oil and Vintage shall not publish or use extracts of this report or any edited or amended version of this report, without the prior written consent of ERCE. In the case that any part of this report is delivered in digital format, ERCE does not accept any responsibility for edits carried out by the client or any third party or otherwise after such material has been sent by ERCE to the client.

Disclaimer

ERCE has made every effort to ensure that the interpretations, conclusions and recommendations presented in this report are accurate and reliable in accordance with good industry practice. ERCE does not, however, guarantee the correctness of any such interpretations and shall not be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation or recommendation made by any of its officers, agents or employees.

ERCE has used standard petroleum evaluation techniques in the generation of this report. These techniques combine geophysical and geological knowledge with assessments of porosity and permeability distributions, fluid characteristics, production performance and reservoir pressure. There is uncertainty in the measurement and interpretation of basic data. ERCE has estimated the degree of this uncertainty and determined the range of petroleum initially in place and recoverable hydrocarbon volumes. In applying these procedures and tests, nothing came to the attention of ERCE that would suggest that information provided by Rawson and Vintage was not complete and accurate. ERCE reserves the right to review all calculations referred to or included in this report and to revise the estimates in light of erroneous data supplied or information existing but not made available which becomes known subsequent to the preparation of this report.

The accuracy of any resources estimates is a function of the quality and quantity of available data and of engineering interpretation and judgment. While the resources estimates presented herein are considered reasonable, the estimates should be accepted with the understanding that reservoir performance subsequent to the date of the estimate may justify revision, either upward or downward.

In the case of Contingent Resources or other gas resources presented in this report, there is no certainty that it will be commercially viable to produce any portion of the resources.

No site visits were undertaken in the preparation of this report.

Introduction

The Nangwarry CO_2 discovery is located within PEL 155, a 226 km^2 license in the Otway Basin, onshore South Australia, approximately 360 km SE of Adelaide.

The license, which expires 4th May 2021, is operated by Otway Energy Ltd ("Otway"), a subsidiary of Lakes Oil NL who holds 50%, with partner Vintage Energy Ltd ("Vintage") holding the remaining 50%. There is a 10% wellhead State Royalty for sale of petroleum and CO_2 production from the block.

Table 1: PEL 155 Summary

Country	Block	Participant	WI	Expiry	Area (km^2)
Australia	PEL 155	Otway Energy (Operator) Vintage Energy	50% 50%	4th May 2021	226

The Nangwarry discovery was drilled by Well Nangwarry-1. The well drilled directionally along an interpreted fault plane and reached a total depth of 4,300 mMD (4,128 mTVDSS) in January 2020, encountering gas within the Pretty Hill Formation.

Well Nangwarry-1 penetrated a three-way dip closed tilted fault block mapped on the 2008 Nangwarry 3D seismic survey. Six downhole gas samples were collected and two samples were compositionally analysed. The samples indicated an average CO_2 content of 90.6%. This has been taken into consideration in our estimates of recoverable resources, which have been split into non-hydrocarbon and hydrocarbon components. Contingent Resources are attributable to the hydrocarbon components of the gas.

To date, only one other well has been drilled in the PEL 155 license, Well Salamander-1. Well Salamander-1 was drilled in 2003 as a geothermal exploration well and penetrated minor gas pay. The accumulation was interpreted to be sub-commercial.

It is ERCE's understanding that a production flow test of the Pretty Hill formation is planned in Q4 2020. The future development of the Nangwarry discovery will be based on the test results.

The sales stream from the Nangwarry discovery is planned to be the CO_2 component of the gas. A gas plant will be installed that will separate the CO_2 from the hydrocarbon gas. The CO_2 will then be sold into the regional market. The hydrocarbon gas will utilized as fuel for the gas plant facility.

Data Provided

Otway Energy and Vintage provided ERCE with a dataset which comprised:

- Well data, including composite logs and end of well reports
- Open-hole well logs and digital interpreted petrophysical logs with associated reports
- Sample and PVT analysis data of reservoir fluids
- Reservoir pressure measurements
- TWT and depth grid for the main horizon
- Seismic data of various vintages and angle stacks/inversion products
- Seismic velocity model
- Static and dynamic reservoir models
- Technical Committee Meeting/Operating Committee Meeting slides
- Field Development Plans
- Development concept planning slides
- Legal and commercial documentation

ERCE has relied upon Otway Energy and Vintage for the completeness of all the data provided.

Work Completed

Using data and information made available by Otway Energy and Vintage, ERCE has completed a comprehensive review for the Nangwarry CO_2 discovery of the:

- CO_2 initially in place
- Hydrocarbons initially in place
- Recoverable CO_2 volumes at Low, Best and High levels of confidence
- Gas Contingent Resources at 1C, 2C and 3C levels of confidence

Our approach has been to commence our investigations with the most recent technical reports and interpreted data. From these we have been able to identify those items of basic data which require re-assessment. We have carried out a review of seismic data, petrophysical and reservoir engineering data and prepared independent estimates of hydrocarbon and CO_2 gas initially in place. We have reviewed the recovery factor assumptions used by Otway Energy and Vintage and carried out sensitivity analyses using the same. We have derived independent estimates of Contingent Resources for hydrocarbon gas volumes.

In estimating CO_2 and petroleum in place and recoverable, we have used standard techniques of petroleum engineering. These techniques combine geophysical and geological knowledge with detailed information concerning porosity and permeability distributions, fluid characteristics and reservoir pressure. There is uncertainty in the measurement and interpretation of basic data. We have estimated the degree of this uncertainty to calculate the range of non-hydrocarbons and hydrocarbons initially in place and recoverable volumes.

In the case of Contingent Resources or other gas resources presented in this report, there is no certainty that it will be commercially viable to produce any portion of the resources.

No site visit was undertaken in the generation of this report.

Summary of Results

Under the SPE PRMS, volumes of non-hydrocarbon by-products cannot be included in any Reserves or Resources classification. Therefore, ERCE has separately estimated the recoverable sales gas volumes of CO_2 for the Nangwarry discovery. The methodology followed to estimate the recoverable CO_2 is consistent with that prescribed under the PRMS for hydrocarbon Contingent Resources. The Low, Best and High Case recoverable sales gas of CO_2 are summarised in Table 2.

Table 2: ERCE estimates of gross recoverable CO_2 gas

CO_2 Sales Gas (Bscf)		
Low	Best	High
7.8	25.1	82.1

Notes:

1. Gross volumes represent a 100% total of estimated recoverable volumes within PEL 155.
2. Working interest volumes for Otway Energy and Vintage's share of the Gross recoverable volumes can be calculated by applying their working interest in PEL 155, which is 50% each.
3. Sales gas stream for Nangwarry is CO_2 gas.

ERCE has estimated gas Contingent Resources based on the recoverable hydrocarbon gas volumes from the Nangwarry discovery. The hydrocarbon gas volumes are planned to be used as fuel for the Nangwarry gas plant facility and therefore have been included as Consumed in Operations ("CiO"). The 1C, 2C and 3C Contingent Resources for the Nangwarry discovery are summarised in Table 3.

Table 3: ERCE gas Contingent Resources (CiO)

Gas Contingent Resources (Bscf)		
1C	2C	3C
0.8	2.6	8.8

Notes:

1. Gross Contingent Resources represent a 100% total of estimated recoverable hydrocarbon gas volumes within PEL 155.
2. Working Interest Contingent Resources for Otway Energy & Vintage's share of the Gross Contingent Resources can be calculated by applying their working interest in PEL 155, which is 50% each.
3. These are Contingent Resources that are subject to Chance of Development of 75% and are sub-classified as Development Unclarified.
4. Hydrocarbon gas also includes minor volume of nitrogen.
5. Contingent Resources will be Consumed in Operations (CiO) – used as fuel for CO_2 gas plant.

As of the effective date, the remaining contingencies of the project are:

- Demonstration of commercial flow rates during well testing
- Development planning based on well test results and ongoing studies
- Final investment decision (FID) to be approved by Otway Energy and Vintage
- Commitment to a gas sales agreement (GSA)
- Regulatory approvals for production

Professional Qualifications

ERCE is an independent consultancy specialising in geoscience evaluation, engineering and economic assessment. ERCE will receive a fee for the preparation of this report in accordance with normal professional consulting practices. This fee is not dependent on the findings of this report and ERCE will receive no other benefit for the preparation of this report.

Neither ERCE nor the Competent Person who is responsible for authoring this report, nor any Directors of ERCE have at the date of this report, nor have had within the previous two years, any shareholding in Lakes Oil or Vintage. Consequently, ERCE, the Competent Person and the Directors of ERCE consider themselves to be independent of the Company, its directors and senior management.

ERCE has the relevant and appropriate qualifications, experience and technical knowledge to appraise professionally and independently the assets.

The work has been supervised by Mr Adam Becis, Principal Reservoir Engineer at ERCE, who has over 14 years of experience in the oil and gas industry. He is a member of the Society of Petroleum Engineers and also a member of the Society of Petroleum Evaluation Engineers.

Yours faithfully

Adam Becis

Principal Engineer, ERCE

Appendix 1: SPE PRMS Guidelines

This report references the SPE/WPC/AAPG/SPEE/SEG/SPWLA/EAGE Petroleum Reserves and Resources Classification System and Definitions, Version 1.01, as revised in June 2018 and updated in November 2018 (PRMS).

The full text of the PRMS document can be viewed at:

https://secure.spee.org/resources/reserves-definitions-committee-rdc

PRMS classifies resources into discovered and undiscovered, and defines the recoverable resources classes of; Production, Reserves, Contingent Resources, and Prospective Resources, as well as Unrecoverable Petroleum.

A graphical representation of the PRMS resources classification framework can be seen below in Figure A. The horizontal axis reflects the range of uncertainty of estimated quantities potentially recoverable from an accumulation by a project, while the vertical axis represents the chance of commerciality, which is the chance that a project will be committed for development and reach commercial producing status.

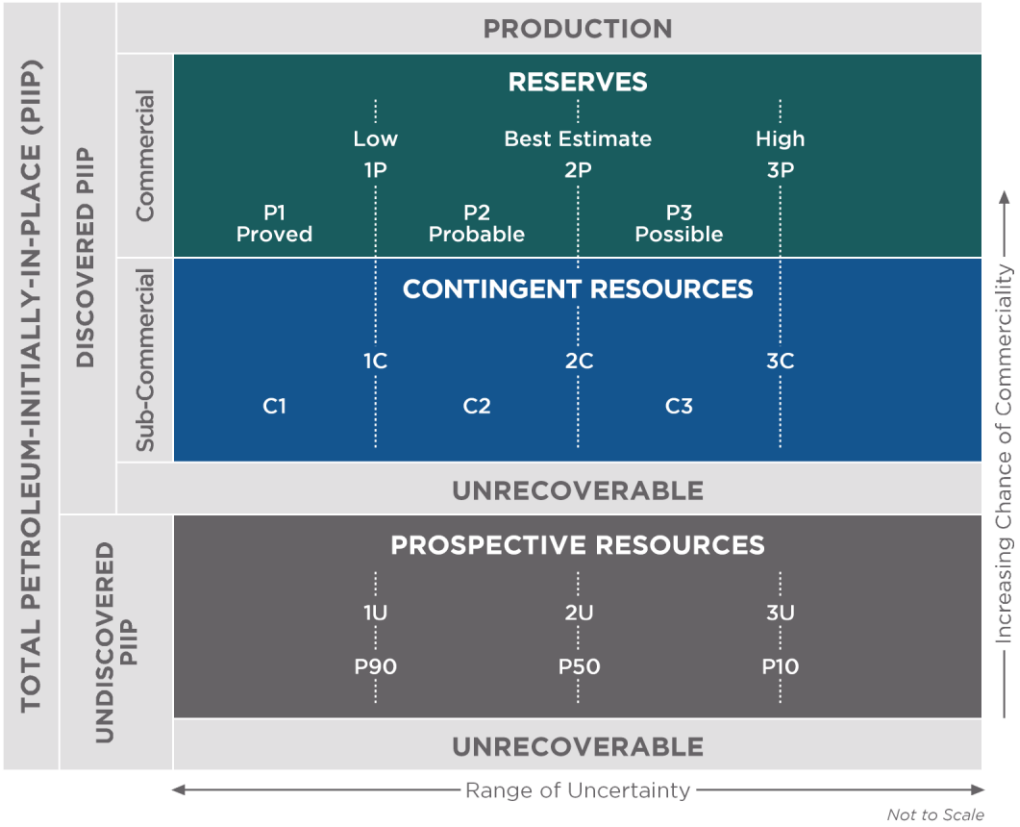


Figure A: PRMS Resources classification framework

(Source: PRMS, Version 1.01; page 1, Figure 1.1)

As illustrated below in Figure B, development projects and associated recoverable quantities may be sub-classified according to project maturity levels and the associated actions (i.e., business decisions) required to move a project toward commercial production.

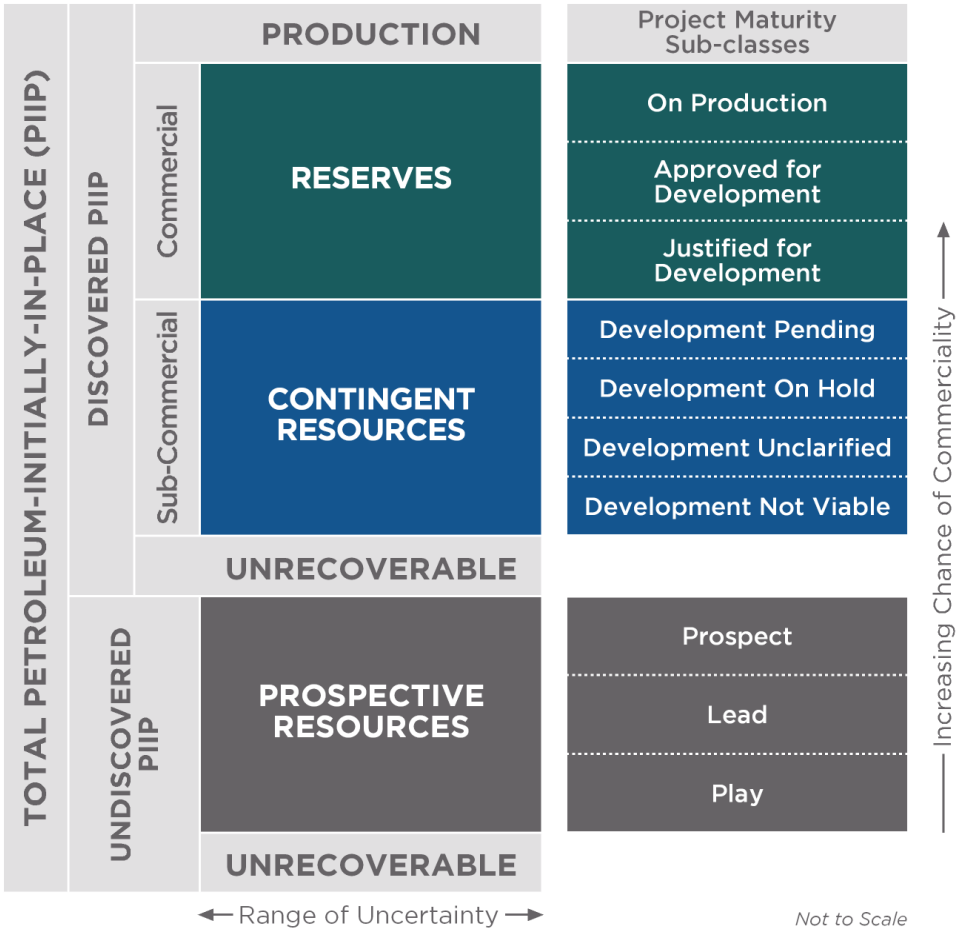


Figure B: PRMS Resources sub-classes

(Source: PRMS, Version 1.01; page 8, Figure 2.1)

A summary of key definitions of the PRMS Reserves and Resource categories, classes and sub-classes can be found in Tables 1-3 and a glossary of selected PRMS terms can be found in Table 4, below:

Table 1: PRMS Recoverable Resources Classes and Sub-Classes

Classes/Sub-classes	Definition	Guidelines
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: discovered, recoverable, commercial, and remaining based on the development project(s) applied. Reserves 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 the development and production status. To be included in the Reserves class, a project must be sufficiently defined to establish its commercial viability (see PRMS Section 2.1.2, Determination of Commerciality). This includes the requirement that 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 five years is recommended as a benchmark, a longer time-frame could be applied where, for example, development of an economic project is 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 maturity and economic 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.

Classes/Sub-classes	Definition	Guidelines
On Production	The development project is currently producing or capable of producing and selling petroleum to market.	The key criterion is that the project is receiving income from sales, rather than that the approved development project is necessarily complete. Includes Developed Producing Reserves. The project decision gate is the decision to initiate or continue economic production from the project.
Approved for Development	All necessary approvals have been obtained, capital funds have been committed, and implementation of the development project is ready to begin or is under way.	At this point, it must be certain that the development project is going ahead. The project must not be subject to any contingencies, such as outstanding regulatory approvals or sales contracts. Forecast capital expenditures should be included in the reporting entity's current or following year's approved budget. The project decision gate is the decision to start investing capital in the construction of production facilities and/or drilling development wells.
Justified for Development	Implementation of the development project is justified on the basis of reasonable forecast commercial conditions at the time of reporting, and there are reasonable expectations that all necessary approvals/contracts will be obtained.	To move to this level of project maturity, and hence have Reserves associated with it, the development project must be commercially viable at the time of reporting (see PRMS Section 2.1.2, Determination of Commerciality) and the specific circumstances of the project. All participating entities have agreed and there is evidence of a committed project (firm intention to proceed with development within a reasonable time-frame}) There must be no known contingencies that could preclude the development from proceeding (see Reserves class). The project decision gate is the decision by the reporting entity and its partners, if any, that the project has reached a level of technical and commercial maturity sufficient to justify proceeding with development at that point in time.

Classes/Sub-classes	Definition	Guidelines
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 owing to one or more contingencies.	Contingent Resources may include, for example, projects for which there are currently no viable markets, where commercial recovery is dependent on technology under development, where evaluation of the accumulation is insufficient to clearly assess commerciality, where the development plan is not yet approved, or where regulatory or social acceptance issues may exist. 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 the economic status.
Development Pending	A discovered accumulation where project activities are ongoing to justify commercial development in the foreseeable future.	The project is seen to have reasonable potential for eventual commercial development, to the extent that further data acquisition (e.g., drilling, seismic data) and/or evaluations are currently ongoing with a view to confirming that the project is commercially viable and providing the basis for selection of an appropriate development plan. The critical contingencies have been identified and are reasonably expected to be resolved within a reasonable time-frame. Note that disappointing appraisal/evaluation results could lead to a reclassification of the project to On Hold or Not Viable status. The project decision gate is the decision to undertake further data acquisition and/or studies designed to move the project to a level of technical and commercial maturity at which a decision can be made to proceed with development and production.

Classes/Sub-classes	Definition	Guidelines
Development on Hold	A discovered accumulation where project activities are on hold and/or where justification as a commercial development may be subject to significant delay.	The project is seen to have potential for commercial development. Development may be subject to a significant time delay. Note that a change in circumstances, such that there is no longer a probable chance that a critical contingency can be removed in the foreseeable future, could lead to a reclassification of the project to Not Viable status. The project decision gate is the decision to either proceed with additional evaluation designed to clarify the potential for eventual commercial development or to temporarily suspend or delay further activities pending resolution of external contingencies.
Development Unclarified	A discovered accumulation where project activities are under evaluation and where justification as a commercial development is unknown based on available information.	The project is seen to have potential for eventual commercial development, but further appraisal/evaluation activities are ongoing to clarify the potential for eventual commercial development. This sub-class requires active appraisal or evaluation and should not be maintained without a plan for future evaluation. The sub-class should reflect the actions required to move a project toward commercial maturity and economic production.
Development Not Viable	A discovered accumulation for which there are no current plans to develop or to acquire additional data at the time because of limited production potential.	The project is not seen to have potential for eventual commercial development at the time of reporting, but the theoretically recoverable quantities are recorded so that the potential opportunity will be recognized in the event of a major change in technology or commercial conditions. The project decision gate is the decision not to undertake further data acquisition or studies on the project for the foreseeable future.
Prospective Resources	Those quantities of petroleum that are estimated, as of a given date, to be potentially recoverable from undiscovered accumulations.	Potential accumulations are evaluated according to the chance of geologic 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.

Classes/Sub-classes	Definition	Guidelines
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 geologic 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 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 geologic 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 that requires more data acquisition and/or evaluation 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 geologic discovery and, assuming discovery, the range of potential recovery under hypothetical development scenarios.

Table 2: PRMS Reserves Status Definitions and Guidelines

Status	Definition	Guidelines
Developed Reserves	Expected quantities to be recovered from existing wells and facilities.	Reserves are considered developed only after the necessary equipment has been installed, or when the costs to do so are relatively minor compared to the cost of a well. Where required facilities become unavailable, it may be necessary to reclassify Developed Reserves as Undeveloped. Developed Reserves may be further sub-classified as Producing or Non-producing.
Developed Producing Reserves	Expected quantities to be recovered from completion intervals that are open and producing at the effective date of the estimate.	Improved recovery Reserves are considered producing only after the improved recovery project is in operation.
Developed Non-Producing Reserves	Shut-in and behind-pipe Reserves.	Shut-in Reserves are expected to be recovered from (1) completion intervals that are open at the time of the estimate but which have not yet started producing, (2) wells which were shut-in for market conditions or pipeline connections, or (3) wells not capable of production for mechanical reasons. Behind-pipe Reserves are expected to be recovered from zones in existing wells that will require additional completion work or future re-completion before start of production with minor cost to access these reserves. In all cases, production can be initiated or restored with relatively low expenditure compared to the cost of drilling a new well.
Undeveloped Reserves	Quantities expected to be recovered through future significant investments.	Undeveloped Reserves are to be produced (1) from new wells on undrilled acreage in known accumulations, (2) from deepening existing wells to a different (but known) reservoir, (3) from infill wells that will increase recovery, or (4) where a relatively large expenditure (e.g., when compared to the cost of drilling a new well) is required to (a) recomplete an existing well or (b) install production or transportation facilities for primary or improved recovery projects.

Table 3: PRMS Reserves Category Definitions and Guidelines

Category	Definition	Guidelines
Proved Reserves	Those quantities of petroleum that, 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 (P90) that the quantities actually recovered will equal or exceed the estimate. The area of the reservoir considered as Proved includes (1) the area delineated by drilling and defined by fluid contacts, if any, and 2) 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 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 in undeveloped locations may be classified as Proved provided that: A. The locations are in undrilled areas of the reservoir that can be judged with reasonable certainty to be commercially mature and economically productive. B. 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	Those additional Reserves that analysis of geoscience and engineering data indicates 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	Those additional reserves that analysis of geoscience and engineering data indicates 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 (P10) 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 economic production from the reservoir by a defined, commercially mature 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 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 mature and economically 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 elevation and there exists the potential for an associated gas cap, Proved Reserves of oil 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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