

**JWB/E2039/nxd/0215**

**26<sup>th</sup> January, 2009**

**Cadogan Petroleum plc,**  
5th Floor,  
4/5 Grosvenor Place,  
London,  
SW1X 7HJ

Dear Sir,

### **Reserves and Resources Update**

In support of an application by Cadogan Petroleum plc ("Cadogan") to list its shares on the London Stock Exchange, Gaffney, Cline & Associates Ltd ("GCA") prepared a Competent Person's Report (CPR) dated 18<sup>th</sup> June, 2008. In that report, GCA assessed the petroleum Reserves and Resources in the assets held by Cadogan in Ukraine, as at an Effective Date of 31<sup>st</sup> January, 2008. These assets comprise 11 Licences, some in full or test production, some under appraisal and some at the exploration stage. A detailed description of the assets can be found in the CPR.

At Cadogan's request, GCA has now updated its assessment of the Reserves and Resources in the assets, to an Effective Date of 30<sup>th</sup> November, 2008. This is the first in a series of regular updates intended to keep investors informed as development of the assets progresses. The update takes account of recently obtained results from the Pirkovskoe-1 and Zagoryanskoe-3 wells, as well as the changed economic conditions.

In updating its assessment, GCA has relied on the accuracy and completeness of the data set of technical and financial information made available by Cadogan. GCA uses the SPE PRMS<sup>1</sup> as the basis for its classification and categorization of hydrocarbon volumes. All categories of Reserve volumes quoted herein have been determined within the context of an economic limit test (pre-tax and exclusive of accumulated depreciation amounts) assessment, except as otherwise noted.

GCA is an independent energy consultancy specialising in petroleum reservoir evaluation and economic analysis. In the preparation of this report, GCA has maintained, and continues to maintain, a strict consultant-client relationship with Cadogan. The directors of GCA have been, and continue to be, independent of Cadogan in the services they provide to Cadogan including the provision of the opinion expressed in this review. Furthermore, the directors of GCA have no interest in any assets or share capital of Cadogan, or in the promotion of Cadogan.

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<sup>1</sup> SPE PRMS is the Petroleum Resources Management System published by the Society of Petroleum Engineers (SPE), the World Petroleum Congresses (WPC), the American Association of Petroleum Geologists (AAPG) and the Society of Petroleum Evaluation Engineers (SPEE) in March, 2007. An abbreviated form of the SPE PRMS definitions and guidelines is given in Appendix I.

It should be recognised that the reported hydrocarbon volumes are estimates based on professional engineering judgement and are subject to future revisions, upward or downward, as a result of future operations or as additional information becomes available.

Tables 1, 2 and 3 list the Reserves, Contingent Resources and Prospective Resources respectively attributed to Cadogan's Licences. In summary, GCA estimates that, as at 30<sup>th</sup> November, 2008, Cadogan had<sup>2</sup>:

- Net Proved Reserves of 110 Bcf of gas, 7.7 MMbbl of condensate and 0.15 MMbbl of oil;
- Net Proved plus Probable Reserves of 330 Bcf of gas, 23 MMbbl of condensate and 0.76 MMbbl of oil; and
- Net Proved plus Probable plus Possible Reserves of 614 Bcf of gas, 44 MMbbl of condensate and 1.6 MMbbl of oil.

GCA also estimates that, as at 30<sup>th</sup> November, 2008, Cadogan had net Best Estimate Contingent Resources of 1,583 Bcf of gas, 48 MMbbl of condensate and 1.5 MMbbl of oil, together with the Prospective Resources listed in Table 3.

Values that have changed since the previous Resources assessment are shown in italics in Tables 1 to 3. Changes have occurred for three reasons:

- Deepening of the Pirkovskoe-1 well to a depth of 5,714 m and testing of various zones in this well, resulting in additional gas and condensate Reserves in the Pivnichna fault block of the Pirkovskoe field;
- Drilling of the Zagoryanskoe-3 well to a depth of 5,115 m and testing of this well in the Lower Visean V-26 zone, although to date this has resulted in the discovery of only minimal Contingent Resources in the Shengarivskoe fault block of the Zagoryanskoe field; and
- Continued production from Cadogan's minor Blazhivska, Sloboda Rungurske, Cheremkhivkse and Debeslavetska assets.

For the four minor producing assets just mentioned, GCA has simply subtracted the actual production since 31<sup>st</sup> January, 2008 from the Reserves reported as at that date. This is judged sufficient for the present Resources update given the size of these fields relative to the major assets.

The Pirkovskoe-1 well has successfully flowed to surface at a rate of about 70,000 m<sup>3</sup>/d (2.8 MMcf/d) from the interval 5,061.5-5,064.5 m in the Lower Visean V-26 zone. Corresponding gas and condensate Reserves in the Lower Visean formation in the Pivnichna fault block have been estimated based on net pay, porosity and gas saturation inferred from the logs. Other parameters used in the calculation are unchanged from the previous assessment.

The log interpretation for Pirkovskoe-1 indicates the presence of net pay in other intervals. Several of the deeper intervals have been tested with negative results (negligible flow to surface). The reasons for this are not clear; formation damage cannot be excluded. Some shallower intervals remain to be tested. At present, however, any Resources in these other intervals remain Prospective.

The Zagoryanskoe-3 well has successfully flowed to surface at a rate of up to 100,000 m<sup>3</sup>/d (3.5 MMcf/d) on a restricted choke from the intervals 5,055-5,060 and

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<sup>2</sup> A Glossary of abbreviations is given at the end of this letter.

5,070-5083 m in the Lower Visean V-26 zone. However, after producing only 823,000 m<sup>3</sup> (29 MMcf) during testing, the tubing-head pressure has fallen by about 50 bars. This indicates that the well has encountered a small pocket of gas, probably trapped in an isolated sand body, with a GIIP of about 0.3 Bcf. Further appraisal is needed to see whether reservoir pressure rises slowly over time, which would indicate the presence of additional volumes of gas in tighter rock, and to test other zones that might allow commingled production to occur. At present, only minimal Contingent Resources can be attributed to the Lower Visean formation in the Shengarivskoe fault block.

Prospective Resources in the Shengarivskoe fault block are unchanged: the Tournaisian and Famennian formations are not penetrated by the Zagoryanskoe-3 well; net pay has been interpreted on the logs in the Upper Visean but this interval has not yet been tested; and the presence of other accumulations of gas up-dip of the well in the Lower Visean is not precluded.

An economic limit test (ELT) has been performed for each of the Proved and the Proved plus Probable Reserves in the Pirkovskoe field, including the Pivnichna fault block. The development scenario used for this is essentially the same as described in the CPR, except that the number of wells available for production in the near term has been revised because drilling and testing of the Pirkovskoe-1 and Pirkovskoe-2 wells have taken longer than planned and the old Pirkovskoe-460 well has had to be abandoned.

In view of the current volatility in oil prices, the ELT has been conducted using constant costs and prices. For ELT purposes, the gas and condensate prices in Ukraine are derived from the average price of Brent crude oil for November, 2008, which was U.S.\$53.20/bbl. Then:

- Condensate in Ukraine is assumed to track 78% of Brent price (excluding VAT, equivalent to 94% of Brent including VAT); and
- The price of Russian gas at the German border is estimated as U.S.\$216.10/Mcm from a historical relationship between this price and the Brent oil price; a transit cost of U.S.\$28/Mcm is subtracted from this to give the gas price at the Russian border (U.S.\$188.1/Mcm or U.S.\$5.3/Mcf); gas prices for industrial customers in Ukraine are assumed to converge to this value by 2011.

Under this scenario, the economic limit remains beyond the end of the expected production licence period in both the Proved and the Proved plus Probable cases. The end of the licence is thus used as the cut-off date for the Reserves volumes.

Yours sincerely,

**GAFFNEY, CLINE & ASSOCIATES**



John Barker

TABLE 1

**SUMMARY OF RESERVES  
AS OF 30<sup>TH</sup> NOVEMBER, 2008**

Field	Cadogan Interest (%)	Net Interest Gas Reserves, Bcf		
		Proved	Proved + Probable	Proved + Probable + Possible
Pirkovskoe (Main)	97.0	107	314	579
<i>Pirkovskoe (Pivnichna LV)</i>	97.0	<i>1.7</i>	<i>11</i>	<i>27</i>
Pirkovskoe (Pivnichna UV)	97.0	0.8	3.2	5.6
Debeslavetska	98.29	<i>0.7</i>	<i>2.0</i>	<i>2.5</i>
Cheremkhivkse	49.8	<i>0.2</i>	<i>0.3</i>	<i>0.3</i>
<b>Total</b>		<b>110</b>	<b>330</b>	<b>614</b>

Field	Cadogan Interest (%)	Net Interest Condensate Reserves, MMbbl		
		Proved	Proved+ Probable	Proved + Probable + Possible
Pirkovskoe (Main)	97.0	7.6	22	42
<i>Pirkovskoe (Pivnichna LV)</i>	97.0	<i>0.08</i>	<i>0.7</i>	<i>1.9</i>
<b>Total</b>		<b>7.7</b>	<b>23</b>	<b>44</b>

Field	Cadogan Interest (%)	Net Interest Oil Reserves, MMbbl		
		Proved	Proved + Probable	Proved + Probable + Possible
Pirkovskoe (Pivnichna UV)	97.0	0.1	0.6	1.4
Blazhivska	95.0	<i>0.04</i>	<i>0.14</i>	<i>0.22</i>
Sloboda Rungurske	100.0	<i>0.004</i>	<i>0.02</i>	<i>0.02</i>
<b>Total</b>		<b>0.15</b>	<b>0.76</b>	<b>1.6</b>

**Notes:**

1. The above Reserves are reported after being subjected to economic limit tests, except for those in the minor Blazhivska, Sloboda Rungurske, Cheremkhivkse and Debetslavetska fields where production since 31<sup>st</sup> January, 2008 has simply been subtracted from the Reserves estimated at that date.
2. Reservoirs: UV = Upper Visean; LV = Lower Visean.
3. Values that have changed since the previous Resources report are shown in italics.

Checked: *JWB* Approved: *Gule*

TABLE 2

**SUMMARY OF CONTINGENT RESOURCES  
AS OF 30<sup>TH</sup> NOVEMBER, 2008**

Field	Cadogan Interest (%)	Net Gas Contingent Resources		
		Bcf		
		1C	2C	3C
Bitlya	97.1	236	539	943
Borynya	96.5	424	899	1,478
Pirkovskoe (Lev)	97.0	12	42	90
Zagoryanskoe (Yark+Zag)	90.0	40	95	247
<i>Zagoryanskoe (Shen)</i>	90.0	-	0.2	-
Krashnoyilska	98.5	3	8	19
<b>Total</b>	-	-	1,583	-

Field	Cadogan Interest (%)	Net Condensate Contingent Resources		
		MMbbl		
		1C	2C	3C
Bitlya	97.1	6.9	17.0	32.9
Borynya	96.5	11.0	26.8	58.2
Pirkovskoe (Lev)	97.0	1.3	2.8	6.3
Zagoryanskoe (Yark+Zag)	90.0	0.5	1.4	3.2
<i>Zagoryanskoe (Shen)</i>	90.0	-	0.01	-
<b>Total</b>	-	-	48.0	-

Field	Cadogan Interest (%)	Net Oil Contingent Resources		
		MMbbl		
		1C	2C	3C
Blazhivska	95.0	0.6	1.5	2.4

**Note:**

1. The primary Contingent Resource volume reported here is the 2C, or 'Best Estimate', value.
2. It is inappropriate to aggregate Contingent Resource volumes other than the 2C or "Best Estimate" values.
3. Fault blocks: Lev = Levchetskoe; Yark=Yarkinskoe; Zag=Zagoryanskoe; Shen=Shengarivskoe.
4. Values that have changed since the previous Resources report are shown in italics.

Checked: *JWB* Approved: *Gule*

**TABLE 3**  
(Page 1 of 3)

**SUMMARY OF PROSPECTIVE RESOURCES**  
**AS OF 30<sup>TH</sup> NOVEMBER, 2008**

**(a) GAS PROSPECTIVE RESOURCES**

Field	Cadogan Interest (%)	Net Gas Prospective Resources			GCoS (%)
		Bcf			
		Low Estimate	Best Estimate	High Estimate	
Pirkovskoe Piv UV	97	2	7	15	52
Pirkovskoe V24-25 + T1-2	97	340	780	1,500	20
Zagoryanskoe Yark UV	90	27	76	180	28
Zagoryanskoe Yark Fam	90	7	15	45	28
Zagoryanskoe Zag UV	90	5	14	50	28
Zagoryanskoe Zag Fam	90	1	2	6	28
Zagoryanskoe Shen UV	90	5	17	50	28
Zagoryanskoe Shen LV	90	1	2	18	45
Zagoryanskoe Shen T	90	1	5	14	45
Zagoryanskoe Shen Fam	90	1	3	9	28
Pokrovskoe UV	100	74	172	796	40
Pokrovskoe LVT	100	44	99	237	34

**TABLE 3**  
**(Page 2 of 3)**

**SUMMARY OF PROSPECTIVE RESOURCES**  
**AS OF 30<sup>TH</sup> NOVEMBER, 2008**

**(b) CONDENSATE PROSPECTIVE RESOURCES**

Field	Cadogan Interest (%)	Net Condensate Prospective Resources MMbbl			GCoS (%)
		Low Estimate	Best Estimate	High Estimate	
Pirkovskoe Piv UV	97	0.1	<b>0.6</b>	1.3	52
Pirkovskoe V24-25 + T1-2	97	16	<b>38</b>	76	20
Zagoryanskoe Yark UV	90	0.5	<b>1.1</b>	2.6	28
Zagoryanskoe Yark Fam	90	0.0	<b>0.1</b>	0.3	28
Zagoryanskoe Zag UV	90	0.1	<b>0.2</b>	0.8	28
Zagoryanskoe Zag Fam	90	0.01	<b>0.02</b>	0.04	28
Zagoryanskoe Shen UV	90	0.1	<b>0.3</b>	0.7	28
Zagoryanskoe Shen LV	90	0.02	<b>0.03</b>	0.3	45
Zagoryanskoe Shen T	90	0.01	<b>0.03</b>	0.08	45
Zagoryanskoe Shen Fam	90	0.01	<b>0.02</b>	0.05	28
Pokrovskoe UV	100	2.3	<b>5.4</b>	25.4	40
Pokrovskoe LVT	100	1.9	<b>4.4</b>	10.5	34

**TABLE 3**  
**(Page 3 of 3)**

**SUMMARY OF PROSPECTIVE RESOURCES**  
**AS OF 30<sup>TH</sup> NOVEMBER, 2008**

**(C) OIL PROSPECTIVE RESOURCES**

Field	Cadogan Interest (%)	Net Oil Prospective Resources MMbbl			GCoS (%)
		Low Estimate	Best Estimate	High Estimate	
Monastyretske	95.0	1.4	2.5	4.2	27
Sloboda Rungurske	100	5.9	10.3	17.8	19
Malynovetska	79.9	1.5	2.9	5.0	9

**Notes:**

1. It is inappropriate to report aggregated Prospective Resource volumes or to otherwise focus upon those other than the 'Best Estimate'.
2. The Geologic Chance of Success (GCoS) represents an indicative estimate of the probability that the drilling of this prospect would result in a discovery which would warrant the re-categorisation of that volume as a Contingent Resource. (The GCoS value for a Contingent Resource is 100 %). These GCoS percentage values have not been arithmetically applied within this assessment.
3. Reservoirs: UV = Upper Viséan; LV = Lower Viséan; T = Tournaisian; LVT = Lower Viséan and Tournaisian; Fam= Famennian.
4. Fault blocks: Piv=Pivnichna; Yark=Yarkinskoe; Zag=Zagoryanskoe; Shen=Shengarivskoe.

Checked: *JWB* Approved: *Gnt*

**GLOSSARY**

**List of Standard Oil Industry Terms and Abbreviations**

bbbl	Barrels
Bcf	Billion standard cubic feet
m	Metres
m <sup>3</sup>	Standard cubic metres
m <sup>3</sup> /d	Standard cubic metres per day
Mcm	Thousand standard cubic metres
MMbbl	Million barrels
MMcf	Million standard cubic feet
MMcf/d	Million standard cubic feet per day
U.S.\$	United States dollars

**APPENDIX I**

**SPE PRMS**

**Society of Petroleum Engineers, World Petroleum Council, American Association of Petroleum Geologists and Society of Petroleum Evaluation Engineers**

**Petroleum Resources Management System**

**Definitions and Guidelines <sup>(1)</sup>**

**March 2007**

**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.

The full text of the SPE PRMS Definitions and Guidelines can be viewed at:  
[www.spe.org/specma/binary/files/6859916Petroleum\\_Resources\\_Management\\_System\\_2007.pdf](http://www.spe.org/specma/binary/files/6859916Petroleum_Resources_Management_System_2007.pdf)

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<sup>1</sup> 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.

## **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.

### **On Production**

*The development project is currently producing and selling petroleum to market.*

The key criterion is that the project is receiving income from sales, rather than the approved development project necessarily being complete. This is the point at which the project “chance of commerciality” can be said to be 100%. The project “decision gate” is the decision to initiate commercial production from the project.

### **Approved for Development**

*A discovered accumulation where project activities are ongoing to justify commercial development in the foreseeable future.*

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.*

In order 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, based on the reporting entity's assumptions of future prices, costs, etc. (“forecast case”) and the specific circumstances of the project. Evidence of a firm intention to proceed with development within a reasonable time frame will be sufficient to demonstrate commerciality. There should be a development plan in sufficient detail to support the assessment of commerciality and a reasonable expectation that any regulatory approvals or sales contracts required prior to project implementation will be forthcoming. Other than such approvals/contracts, there should be no known contingencies that could preclude the development from proceeding within a reasonable timeframe (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.

## **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:

- (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 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**

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.

### **Developed Reserves**

*Developed Reserves are 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**

*Developed Producing Reserves are expected to be recovered from completion intervals that are open and producing at the time of the estimate.*

Improved recovery reserves are considered producing only after the improved recovery project is in operation.

### **Developed Non-Producing Reserves**

*Developed Non-Producing Reserves include shut-in and behind-pipe Reserves*

Shut-in Reserves are expected to be recovered from:

- (1) completion intervals which 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 which will require additional completion work or future re-completion prior to start of production. In all cases, production can be initiated or restored with relatively low expenditure compared to the cost of drilling a new well.

### **Undeveloped Reserves**

*Undeveloped Reserves are quantities expected to be recovered through future investments:*

- (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.

## **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.

### **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 re-classification 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.

### **Development Unclassified or 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 eventual commercial development, but further appraisal/evaluation activities are on hold pending the removal of significant contingencies external to the project, or substantial further appraisal/evaluation activities are required to clarify the potential for eventual commercial development. Development may be subject to a significant time delay. Note that a change in circumstances, such that there is no longer a reasonable expectation that a critical contingency can be removed in the foreseeable future, for example, 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 Not Viable**

*A discovered accumulation for which there are no current plans to develop or to acquire additional data at the time due to 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 any further data acquisition or studies on the project for the foreseeable future.

## **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.*

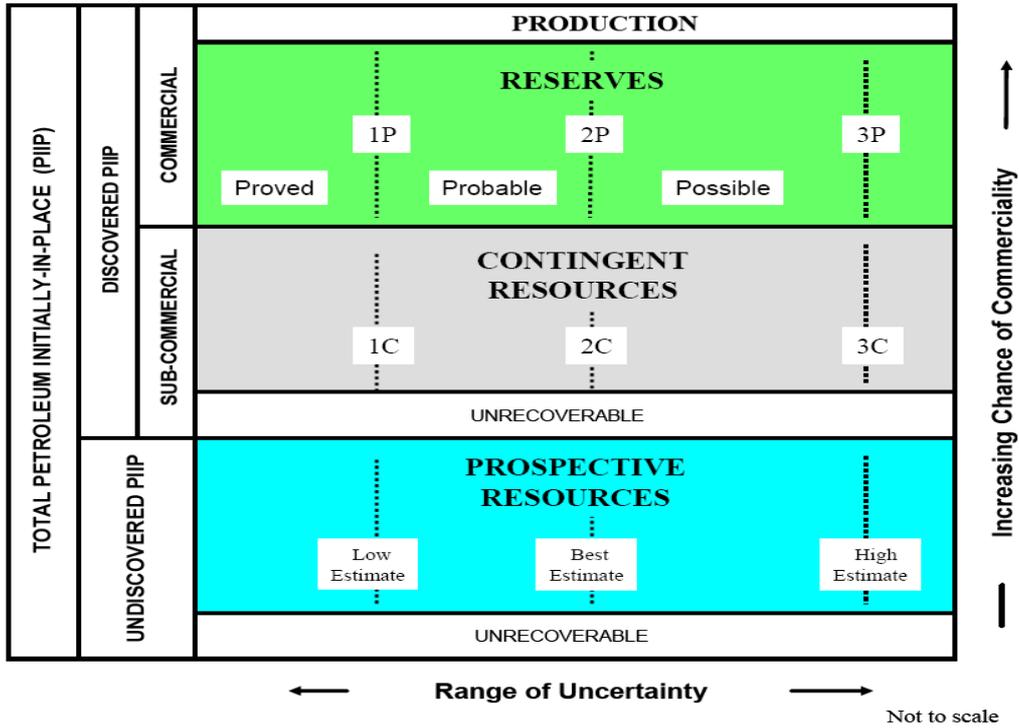
Project activities are focused on acquiring additional data and/or undertaking further evaluation designed to confirm whether or not the lead can be matured into a prospect. Such evaluation includes the assessment of the chance of discovery and, assuming discovery, the range of potential recovery under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

### RESOURCES CLASSIFICATION



### PROJECT MATURITY

