

# Roc / Phoenix area volumetric update

14 November 2016



## Highlights

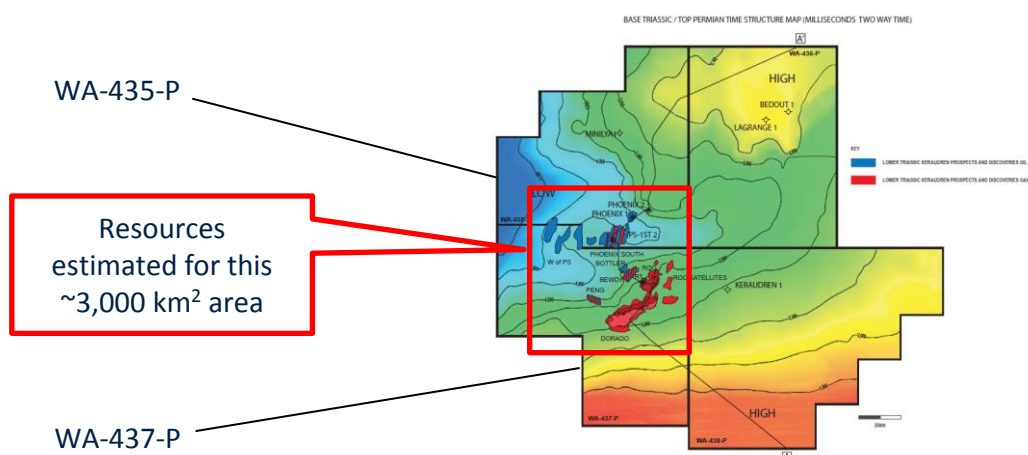
- Discovered gross 2C contingent resources of 109 million barrels of oil gross equivalent (“mmboe”)
- In addition, the Phoenix South-2 well is targeting 470 Bscf of gas and 25 mmbbls of condensate in the Caley Sandstone, being gross mean prospective resources equivalent to 107 mmboe
- Significant additional prospective resources also identified within the Roc and Phoenix South area

Carnarvon Petroleum Limited (“Carnarvon”) (ASX:CVN) provides the following contingent and prospective resource estimates for the Roc, Phoenix and Phoenix South area in the WA-435-P and WA-437-P permits (CVN 20% interest).

Carnarvon’s Managing Director and CEO, Adrian Cook said “our resource estimates are based on the successful drilling results to date and a foundation of quality data and extensive technical work completed over the course of the last two years. Contingent and prospective resource estimates by definition (refer annexure 1) have geological and commercial risks that require further work, including further exploration and appraisal drilling to unlock. This is a natural process for any new area and the currently drilling Phoenix South-2 well is the next logical step in clarifying the volume of resources underpinning a development. The scale of the potential in this project, coupled with the drilling success to date, make this one of the most exciting oil and gas projects in Australia.”

The resources included in this report cover an area around the Roc, Phoenix and Phoenix South discoveries, as per the figure below, that show:

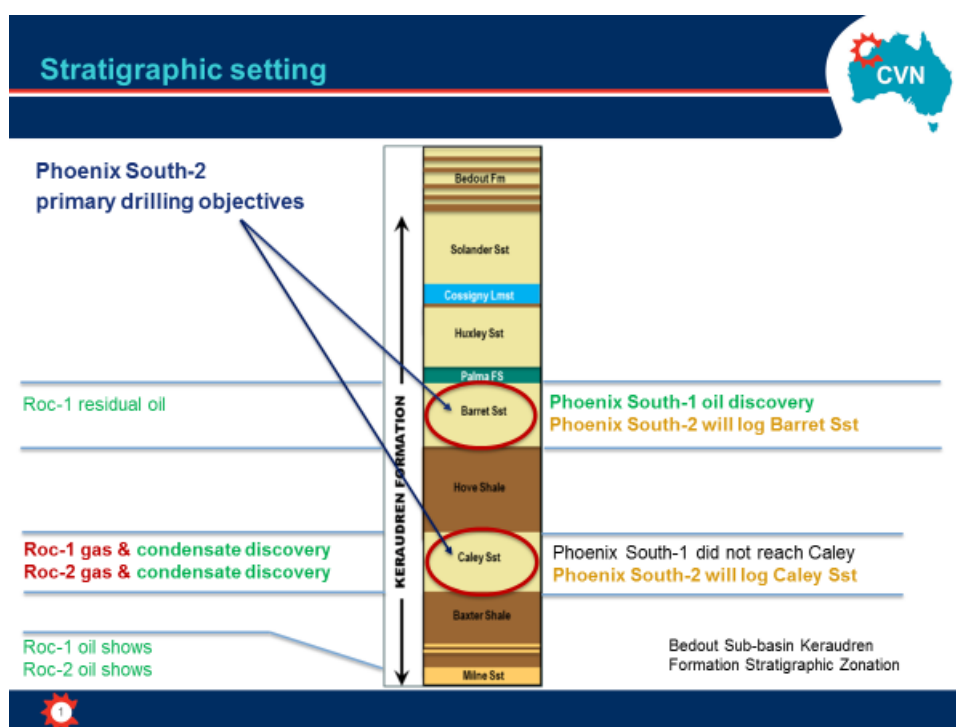
- Gross 2C contingent resources of 332 Bscf of gas, 20 million barrels of condensate and 31 million barrels of light oil, equivalent to 109 mmboe (refer Tables 1 and 4);
- 1.5 Tcf of gas, 86 million barrels of condensate and 121 million barrels of light oil in gross mean unrisksed prospective resources in Caley and Barret reservoirs alone (refer Tables 2 and 5); and
- Additional prospective resources in the Phoenix South and Dorado prospects in the Milne and Hove reservoirs. At this time, these resources generally have a lower geological chance of success compared with the Caley and Barret reservoir estimates (refer Tables 3 and 6).



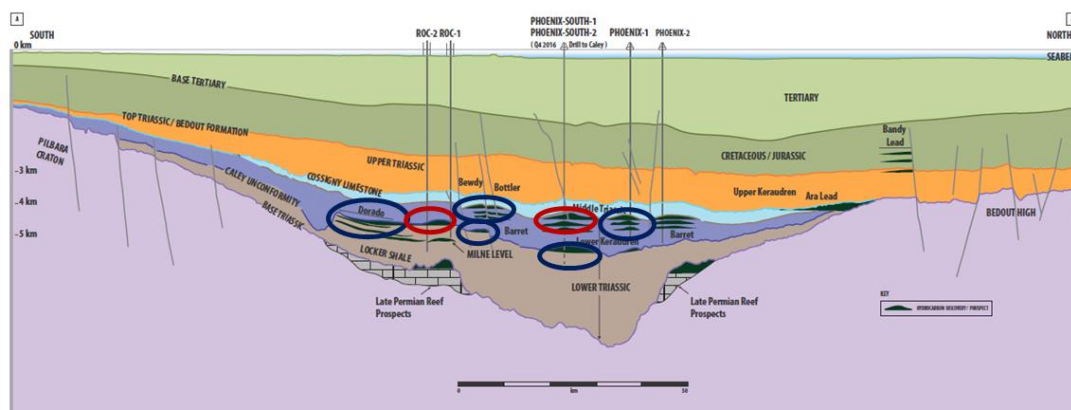
In the period since the initial Phoenix South resources were announced (7<sup>th</sup> April, 2015), a significant amount of data has been acquired within the WA-435-P and WA-437-P permits, including updated seismic data, additional well data from Roc-1 and Roc-2, and receipt of special core analysis (“SCAL”) data from the Phoenix South-1 well, resulting in an updated analysis of the recoverable resources within the area outlined above.



The estimates in this update have focused primarily on the Caley and Barret reservoirs (refer outline of the stratigraphic setting below) where the joint venture has proved that hydrocarbons exist by recovering them to surface through drill string testing or wireline formation testing. They also only apply to resources within range of being tied back to a central hub development.



With discovered 2C resources around minimum economic levels, the joint venture was encouraged to assess additional resources to aid commercial development considerations. The next well in the program, the Phoenix South-2 well, commenced drilling on 28 October 2016 to appraise oil in the Barret Sandstone and explore the Caley Sandstone that is estimated to contain 470 Bscf of gas and 25 mmbbls of condensate on a gross mean case basis. Phoenix South-2 will also explore the potential in the Hove formation.



- **Contingent resources – Barret and Caley** (2C, gross field, CVN 20%)      Barrels of oil equivalent (Boe)      109 mmboe
- **Prospective resources – Barret and Caley** (Pmean, gross field, CVN 20%)      Barrels of oil equivalent (Boe)      214 mmboe (risked)



○ Gas and condensate flowing from the Roc-2 well



○ Oil recovered from the Phoenix South-1 well

Our first well into this basin (namely Phoenix South-1, refer illustration above) was a tremendous success with the extraction of light oil in late 2014. Our two Roc wells in 2016 extended our knowledge and success with the discovery and extraction of high quality gas and condensate. But critically the Roc-2 well projected our understanding of the basin into the realm of commercial potential with good volumes and a very strong flow rate. The currently drilling Phoenix South-2 well is targeting the combination of oil, gas and condensate and will be looking to improve on the current volume of discovered hydrocarbons. Our progress to date has been quite remarkable, and as covered in this update, the broader volume potential within the current area of focus is truly significant by any NWS field measure. With the whole basin currently held by Carnarvon and its partner, further success will also enable the joint venture to consider the even greater potential that is within the basin and outside of the current area of focus.

Yours faithfully



**Adrian Cook**  
 Managing Director  
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**Table 1: Gross volumetric estimates for contingent oil, gas and condensate**

	Light Oil			Natural Gas			Condensate			Barrels of Oil Equivalent		
	MMBBL 1C	MMBBL 2C	MMBBL 3C	BSCF 1C	BSCF 2C	BSCF 3C	MMBBL 1C	MMBBL 2C	MMBBL 3C	MMBOE 1C	MMBOE 2C	MMBOE 3C
<b>Roc (i), (ii)</b>	-	-	-	204.5	331.8	580.3	11.9	19.6	34.8	47.8	77.8	136.6
<b>Phoenix South (iii)</b>	7.3	24.0	71.0	-	-	-	-	-	-	7.3	24.0	71.0
<b>Phoenix</b>	2.0	7.0	16.0							2.0	7.0	16.0
<b>Total</b>	<b>9.3</b>	<b>31.0</b>	<b>87.0</b>	<b>204.5</b>	<b>331.8</b>	<b>580.3</b>	<b>11.9</b>	<b>19.6</b>	<b>34.8</b>	<b>57.1</b>	<b>108.8</b>	<b>223.6</b>

**Table 2: Gross volumetric estimates for prospective oil, gas and condensate within the Caley and Barret reservoirs**

	Light Oil				Natural Gas				Condensate				Barrels of Oil Equivalent				Probability Geological Success	Risky MMBOE Pmean
	MMBBL P90	MMBBL P50	MMBBL Pmean	MMBBL P10	BSCF P90	BSCF P50	BSCF Pmean	BSCF P10	MMBBL P90	MMBBL P50	MMBBL Pmean	MMBBL P10	MMBOE P90	MMBOE P50	MMBOE Pmean	MMBOE P10		
<b>Phoenix South Caley</b>	-	-	-	-	123.0	384.0	470.0	926.0	5.0	18.0	25.0	54.0	26.6	85.4	107.5	216.5	52%	55.9
<b>Roc-2 C/D (ii)</b>	-	-	-	-	52.5	110.0	120.0	199.0	3.1	6.5	7.2	12.1	12.3	25.8	28.2	47.0	66%	18.6
<b>Dorado Caley</b>	-	-	-	-	58.7	338.0	545.0	1,260.0	2.5	16.6	31.6	74.9	12.8	75.9	127.2	296.0	36%	45.8
<b>Roc Satellites (iv)</b>	-	-	-	-	28.7	112.9	143.3	300.3	1.7	6.7	8.6	18.0	6.7	26.5	33.7	70.7	59%	19.9
<b>Phoenix</b>	-	-	-	-	37.0	137.0	194.0	417.0	2.0	7.0	11.0	26.0	8.5	31.0	45.0	99.2	52%	23.4
<b>Bewdy</b>	1.1	9.8	26.7	64.2	0.2	8.6	27.6	84.7	0.0	0.5	1.6	5.0	1.1	11.8	33.2	84.1	32%	10.6
<b>Bottler</b>	1.9	12.7	31.2	74.1	-	-	-	-	-	-	-	-	1.9	12.7	31.2	74.1	32%	10.0
<b>Peng</b>	0.3	4.1	9.7	23.6	4.9	18.2	22.6	46.4	0.3	1.1	1.4	2.8	1.5	8.4	15.0	34.5	59%	8.9
<b>West of PS (v)</b>	11.0	37.0	53.0	110.0	-	-	-	-	-	-	-	-	11.0	37.0	53.0	110.0	40%	21.2
<b>Total (Barret&amp;Caley)</b>	<b>14.3</b>	<b>63.6</b>	<b>120.6</b>	<b>271.9</b>	<b>305.0</b>	<b>1,108.6</b>	<b>1,522.5</b>	<b>3,233.4</b>	<b>14.6</b>	<b>56.4</b>	<b>86.3</b>	<b>192.8</b>	<b>82.4</b>	<b>314.5</b>	<b>474.0</b>	<b>1,031.9</b>		<b>214.3</b>

- (i) The Roc Contingent Resources reflects the assessment of the discovered hydrocarbons within Roc structure incorporating the results from Roc-1 and Roc-2.
- (ii) The Roc C/D sands were interpreted to be hydrocarbon bearing at Roc-1 and Roc-2 based on petrophysical data, however lack of definitive hydrocarbon sampling has resulted in Carnarvon prudently placing these sands into the prospective category
- (iii) The Phoenix South Contingent Resources reflects the assessment of the discovered hydrocarbons associated with the Phoenix South-1 well in the Barret sandstone formation.
- (iv) The Roc Satellites are an arithmetic addition of the recoverable from Roc North, North-East, East and South-East satellite structures
- (v) The range of satellite prospects west of the Phoenix South discovery have been collated and added arithmetically and appear in the form as "West of PS"

**Table 3: Gross volumetric estimates for prospective oil, gas and condensate within the Hove and Milne reservoirs**

	Light Oil				Natural Gas				Condensate				Barrels of Oil Equivalent				Probability Geological Success	Risked MMBOE Pmean
	MMBBL P90	MMBBL P50	MMBBL Pmean	MMBBL P10	BSCF P90	BSCF P50	BSCF Pmean	BSCF P10	MMBBL P90	MMBBL P50	MMBBL Pmean	MMBBL P10	MMBOE P90	MMBOE P50	MMBOE Pmean	MMBOE P10		
<b>Phoenix South Hove (vi)</b>	-	-	-	-	85.0	280.0	369.0	760.0	3.0	13.0	20.0	43.0	17.9	62.1	84.7	176.3	48%	40.7
<b>Dorado Milne A (vii)</b>	-	-	-	-	45.7	266.0	429.0	1,016.0	2.0	13.1	24.9	59.7	10.0	59.8	100.2	237.9	23%	23.3
<b>Dorado Milne B (vii)</b>	-	-	-	-	36.5	295.0	438.0	1,025.0	1.6	14.3	25.4	60.8	8.0	66.1	102.2	240.6	23%	23.8
<b>Dorado Milne C (vii)</b>	-	-	-	-	82.3	416.0	565.0	1,248.0	3.5	20.1	32.8	75.4	18.0	93.1	131.9	294.3	23%	30.7
<b>Dorado Milne D (vii)</b>	-	-	-	-	51.5	409.0	555.0	1,251.0	2.3	19.4	32.2	75.5	11.3	91.2	129.6	295.0	23%	30.1
<b>Total (Hove&amp;Milne)</b>	-	-	-	-	<b>301.0</b>	<b>1,666.0</b>	<b>2,356.0</b>	<b>5,300.0</b>	<b>12.4</b>	<b>79.9</b>	<b>135.3</b>	<b>314.4</b>	<b>65.2</b>	<b>372.2</b>	<b>548.6</b>	<b>1,244.2</b>		<b>148.6</b>

- (vi) The Phoenix South Hove prospect is an additional prospective horizon recognised from seismic and nearby well data that may occur deeper in the formation than the Barret and could be penetrated by Phoenix South-2  
(vii) The Dorado Milne prospects are additional prospective horizons recognised from seismic that may occur deeper in the formation than the Caly

**Table 4: Net volumetric estimates for contingent oil, gas and condensate**

	Light Oil			Natural Gas			Condensate			Barrels of Oil Equivalent		
	MMBBL 1C	MMBBL 2C	MMBBL 3C	BSCF 1C	BSCF 2C	BSCF 3C	MMBBL 1C	MMBBL 2C	MMBBL 3C	MMBOE 1C	MMBOE 2C	MMBOE 3C
<b>Roc (i), (ii)</b>	-	-	-	40.9	66.4	116.1	2.4	3.9	7.0	9.6	15.6	27.3
<b>Phoenix South (iii)</b>	1.5	4.8	14.2	-	-	-	-	-	-	1.5	4.8	14.2
<b>Phoenix</b>	0.4	1.4	3.2	-	-	-	-	-	-	0.4	1.4	3.2
<b>Total</b>	<b>1.9</b>	<b>6.2</b>	<b>17.4</b>	<b>40.9</b>	<b>66.4</b>	<b>116.1</b>	<b>2.4</b>	<b>3.9</b>	<b>7.0</b>	<b>11.4</b>	<b>21.8</b>	<b>44.7</b>

**Table 5: Net volumetric estimates for prospective oil, gas and condensate within the Caley and Barret reservoirs**

	Light Oil				Natural Gas				Condensate				Barrels of Oil Equivalent				Probability Geological Success	Risked MMBOE Pmean
	MMBBL P90	MMBBL P50	MMBBL Pmean	MMBBL P10	BSCF P90	BSCF P50	BSCF Pmean	BSCF P10	MMBBL P90	MMBBL P50	MMBBL Pmean	MMBBL P10	MMBOE P90	MMBOE P50	MMBOE Pmean	MMBOE P10		
Phoenix South Caley	-	-	-	-	24.6	76.8	94.0	185.2	1.0	3.6	5.0	10.8	5.3	17.1	21.5	43.3	52%	11.2
Roc-2 C/D (ii)	-	-	-	-	10.5	22.0	24.0	39.8	0.6	1.3	1.4	2.4	2.5	5.2	5.6	9.4	66%	3.7
Dorado Caley	-	-	-	-	11.7	67.6	109.0	252.0	0.5	3.3	6.3	15.0	2.6	15.2	25.4	59.2	36%	9.2
Roc Satellites (iv)	-	-	-	-	5.7	22.6	28.7	60.1	0.3	1.3	1.7	3.6	1.3	5.3	6.7	14.1	59%	4.0
Phoenix	-	-	-	-	7.4	27.4	38.8	83.4	0.4	1.4	2.2	5.2	1.7	6.2	9.0	19.8	52%	4.7
Bewdy	0.2	2.0	5.3	12.8	0.0	1.7	5.5	16.9	0.0	0.1	0.3	1.0	0.2	2.4	6.6	16.8	32%	2.1
Bottler	0.4	2.5	6.2	14.8	-	-	-	-	-	-	-	-	0.4	2.5	6.2	14.8	32%	2.0
Peng	0.1	0.8	1.9	4.7	1.0	3.6	4.5	9.3	0.1	0.2	0.3	0.6	0.3	1.7	3.0	6.9	59%	1.8
West of PS (v)	2.2	7.4	10.6	22.0	-	-	-	-	-	-	-	-	2.2	7.4	10.6	22.0	40%	4.2
<b>Total (Barret&amp;Caley)</b>	<b>2.9</b>	<b>12.7</b>	<b>24.1</b>	<b>54.4</b>	<b>61.0</b>	<b>221.7</b>	<b>304.5</b>	<b>646.7</b>	<b>2.9</b>	<b>11.3</b>	<b>17.3</b>	<b>38.6</b>	<b>16.5</b>	<b>62.9</b>	<b>94.8</b>	<b>206.4</b>		<b>42.9</b>

**Table 6: Net volumetric estimates for prospective oil, gas and condensate within the Hove and Milne reservoirs**

	Light Oil				Natural Gas				Condensate				Barrels of Oil Equivalent				Probability Geological Success	Risked MMBOE Pmean
	MMBBL P90	MMBBL P50	MMBBL Pmean	MMBBL P10	BSCF P90	BSCF P50	BSCF Pmean	BSCF P10	MMBBL P90	MMBBL P50	MMBBL Pmean	MMBBL P10	MMBOE P90	MMBOE P50	MMBOE Pmean	MMBOE P10		
Phoenix South Hove (vi)	-	-	-	-	17.0	56.0	73.8	152.0	0.6	2.6	4.0	8.6	3.6	12.4	16.9	35.3	48%	8.1
Dorado Milne A (vii)	-	-	-	-	9.1	53.2	85.8	203.2	0.4	2.6	5.0	11.9	2.0	12.0	20.0	47.6	23%	4.7
Dorado Milne B (vii)	-	-	-	-	7.3	59.0	87.6	205.0	0.3	2.9	5.1	12.2	1.6	13.2	20.4	48.1	23%	4.8
Dorado Milne C (vii)	-	-	-	-	16.5	83.2	113.0	249.6	0.7	4.0	6.6	15.1	3.6	18.6	26.4	58.9	23%	6.1
Dorado Milne D (vii)	-	-	-	-	10.3	81.8	111.0	250.2	0.5	3.9	6.4	15.1	2.3	18.2	25.9	59.0	23%	6.0
<b>Total (Hove&amp;Milne)</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>60.2</b>	<b>333.2</b>	<b>471.2</b>	<b>1,060.0</b>	<b>2.5</b>	<b>16.0</b>	<b>27.1</b>	<b>62.9</b>	<b>13.0</b>	<b>74.4</b>	<b>109.7</b>	<b>248.8</b>		<b>29.7</b>

Refer to the Cautionary Statement and Competent Person Statement Information on page 7 of this announcement

Carnarvon uses probabilistic methods for estimation of petroleum resources at the field and project levels. Unless otherwise stated, all petroleum estimates reported at the company level are aggregated by arithmetic summation by category.

## **Annexure 1**

### **Cautionary Statement**

Prospective Resources are the estimated quantities of petroleum that may potentially be recovered by the application of a future development project and may relate to undiscovered accumulations. These estimates have both an associated risk of discovery and risk of development. Further exploration and appraisal is required to determine the existence of a significant quantity of potentially moveable hydrocarbons.

### **Prospective and Contingent Resources**

Prospective resources describe hydrocarbon volumes that may be produced in the event that they are discovered by an exploration well.

Contingent resource estimates describe those quantities of petroleum to be potentially recoverable from known accumulations, but the project is not considered mature enough for commercial development due to one or more contingencies.

Unless otherwise stated, all petroleum resource estimates are quoted at standard oilfield conditions of 14.696 psi (101.325 kPa) and 60 degrees Fahrenheit (15.56 deg Celsius).

Carnarvon uses probabilistic methods for estimation of petroleum resources at the field and project levels. Unless otherwise stated, all petroleum estimates reported at the company level are aggregated by arithmetic summation by category.

MMBOE means millions of barrels of oil equivalent. Dry gas volumes, defined as 'C4 minus' hydrocarbon components and non-hydrocarbon volumes that are present in sales product, are converted to oil equivalent volumes via a constant conversion factor, which for Carnarvon is 5.7 Bcf of dry gas per 1 MMboe. Volumes of oil and condensate, defined as 'C5 plus' petroleum components, are converted from MMbbls (million stock tank barrels) to MMboe on a 1:1 ratio.

There are numerous uncertainties inherent in estimating reserves and resources, and in projecting future production, development expenditures, operating expenses and cash flows. Oil and gas reserve engineering and resource assessment must be recognised as a subjective process of estimating subsurface accumulations of oil and gas that cannot be measured in an exact way.

The estimates of prospective and contingent resources included in this report have been prepared in accordance with the definitions and guidelines set forth in the SPE-PRMS.

### **Competent Person Statement Information**

The resource estimates outlined in this report were reviewed by the Company's Chief Operating Officer, Mr Philip Huizenga, who is a full-time employee of the Company. Mr Huizenga has over 25 years' experience in petroleum exploration and engineering. Mr Huizenga holds a Bachelor Degree in Engineering and a Masters Degree in Petroleum Engineering. Mr Huizenga is qualified in accordance with ASX Listing Rules and has consented to the form and context in which this statement appears.

## Forward Looking Statements

This document may contain forward-looking information. Forward-looking information is generally identifiable by the terminology used, such as "expect", "believe", "estimate", "should", "anticipate" and "potential" or other similar wording. Forward-looking information in this document includes, but is not limited to, references to: well drilling programs and drilling plans, estimates of reserves and potentially recoverable resources, and information on future production and project start-ups. By their very nature, the forward-looking statements contained in this news release require Carnarvon and its management to make assumptions that may not materialize or that may not be accurate. The forward-looking information contained in this news release is subject to known and unknown risks and uncertainties and other factors, which could cause actual results, expectations, achievements or performance to differ materially, including without limitation: imprecision of reserve estimates and estimates of recoverable quantities of oil, changes in project schedules, operating and reservoir performance, the effects of weather and climate change, the results of exploration and development drilling and related activities, demand for oil and gas, commercial negotiations, other technical and economic factors or revisions and other factors, many of which are beyond the control of Carnarvon. Although Carnarvon believes that the expectations reflected in its forward-looking statements are reasonable, it can give no assurances that the expectations of any forward-looking statements will prove to be correct.