

6 April 2016

## 293% Increase in HRZ Recoverable Liquids Resource

88 Energy Limited ("88 Energy", "the Company", "Operator") (ASX, AIM: 88E) is pleased to provide an update on Project Icewine, located onshore North Slope of Alaska.

## Highlights

- Independent Resource Estimate for HRZ Increased to 1.4 Billion Barrels Oil Equivalent\*
  - Probability of Geologic Chance of Success Increased from 40% to 60%
  - Estimated Productive Acres 42% of Project Icewine Total (for Mean Case)
- Internal Resource Estimate for HRZ Increased to 3.6 Billion Barrels Oil Equivalent<sup>#</sup>
  - Estimated Productive Acres 70% of Project Icewine Total (for Mean Case)

\*Prospective unrisked mean recoverable, calculated using probabilistic methods, 100% basis, gas converted to oil equivalent on a 6:1 ratio, see attached report for full details #Prospective unrisked mean recoverable, calculated using deterministic and probabilistic methods, 100% basis, gas converted to oil equivalent on a 6:1 ratio

Cautionary Statement: The estimated quantities of petroleum that may be potentially recovered by the application of a future development project relate to undiscovered accumulations. These estimates have both an associated risk of discovery and a risk of development. Further exploration, appraisal and evaluation are required to determine the existence of a significant quantity of potentially movable hydrocarbons.

## Overview

Independent resource estimator, DeGolyer & MacNaughton ("D&M"), have updated the prospective resource estimates for the HRZ shale at Project Icewine based on the recent results from the Icewine#1 well and the additional acres won in the November 2015 bid round. The summary of the recoverable liquids from these results is included below:

	P90	P50	P10	Mean	Pg <sup>#</sup>
Gross Wet Gas / Condensate Window (mmbbl)	210.5	623.2	1,524.0	787.4	60%
Gross Volatile Oil Window (mmbbl)	45.2	149.6	401.4	197.9	60%
Gross Total Liquids (mmbbl)				985.3	
Net Attributable to 88 Energy (mmbbl)				763.1	

## Fig. 1 D&M Project Icewine Prospective Recoverable Resource from HRZ - Liquids Only

#Estimated Probability of Geologic Success

The assumptions used by D&M are largely consistent with the internal Joint Venture view, with the main difference related to how much of the total acreage position is likely to be productive, in the success case. The Joint Venture view is based on years of hands-on experience with developing the Eagle Ford shale and confirmation of the thermal maturity model by the Icewine#1 exploration well. D&M's assumption is largely driven by statistical analysis over a larger selection of global shale plays at a similar stage of life cycle. The internal resource estimate is summarised below:

## Fig. 2 Internal Project Icewine Prospective Recoverable Resource from HRZ - Liquids Only

	P90	P50	P10	Mean	Pc <sup>#</sup>
Gross Volatile Oil Window (mmbbl)	1,594	2,471	3,830	2,602	50%
Net Attributable to 88 Energy (mmbbl)	1,234	1,913	2,965	2,014	50%
	1,234	1,915	2,303	2,014	J070

#Estimated Probability of Commercial Success



Managing Director of 88 Energy Limited, Dave Wall commented: "The large upgrade to the resource potential at Project Icewine highlights the unique leverage that a project with this possible magnitude provides to investors.

We look forward to providing additional information related to the project as we continue to complete the current 2D seismic acquisition and mature plans for the Icewine#2H well."

Yours faithfully

Dave Wall Managing Director 88 Energy Ltd

Pursuant to the requirements of the ASX Listing Rules Chapter 5 and the AIM Rules for Companies, the technical information and resource reporting contained in this announcement was prepared by, or under the supervision of, Mr Brent Villemarette, who is a Non Executive Director of the Company. Mr Villemarette has more than 30 years' experience in the petroleum industry and is a qualified Reservoir Engineer who has sufficient experience that is relevant to the style and nature of the oil prospects under consideration and to the activities discussed in this document. His academic qualifications and industry memberships appear on the Company's website and both comply with the criteria for "Competence" under clauses 18-21 of the Valmin Code 2005. Terminology and standards adopted by the Society of Petroleum Engineers "Petroleum Resources Management System" have been applied in producing this document.

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## **Project Icewine Highlights**

In November 2014, the Company entered into a binding agreement with Burgundy Xploration (**BEX**) to acquire a significant working interest (87.5%, reducing to 78% on spud of the first well on the project) in a large acreage position on a multiple objective, liquids rich exploration opportunity onshore Alaska, North America, referred to as Project Icewine. In November 2015, the gross acreage position was expanded by 174,240 acres (to be awarded in due process by the State of Alaska).

Subject to final payment on the expanded acreage, 88 Energy will have a 272,422 gross contiguous acre position with 212,489 acres net to the Company. The Project is located on an all year operational access road with both conventional and unconventional oil potential. The primary term for the State leases is 10 years with no mandatory relinquishment and a low 16.5% royalty.

The HRZ liquids-rich resource play has been successfully evaluated based on core obtained in the recently completed (December 2015) Icewine #1 exploration well, marking the completion of Phase I of Project Icewine. Phase II has now commenced, with planning for a horizontal multi-stage fracture stimulated well, Icewine#2H, currently underway.



Generous exploration incentives are provided by the State of Alaska with up to 85% of exploration expenditure in 2015 cash refundable, dropping to 75% until mid 2016 and thereafter 35%.

The primary objective is an untested, unconventional liquids-rich shale play in a prolific source rock, the HRZ shale (Brookian Sequence), that co-sourced the largest oil field in North America; the giant Prudhoe Bay Oil Field Complex. Internal modelling and analysis indicates that Project Icewine is located in a high liquids vapour phase sweetspot analogous to those encountered in other Tier 1 shale plays e.g. the Eagle Ford, Texas.

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Conventional play potential can be found at Project Icewine within the same Brookian petroleum system and shallow to the HRZ shale and includes high porosity channel and deep water turbiditic sands. The Brookian conventional play is proven on the North Slope; the USGS (2013) estimate the remaining oil potential to be 2.1 billion barrels just within the Brookian sequence. Additional conventional potential exists in the deeper Kuparuk sands and the Ivashuk Formation.

Drilling in (2012), on the adjacent acreage to the north, confirmed that the HRZ shales, along with the underlying Kingak & Shublik shales, were all within the oil window which is extremely encouraging for the unconventional potential at Project Icewine. In addition, a conventional oil discovery was reported in the Kuparuk sandstones.

A Prospective Resources Report by DeGolyer and MacNaughton, was commissioned by 88 Energy to evaluate the unconventional resource potential of Project Icewine in February 2016 and was released to the market on 6<sup>th</sup> April 2016.

**About 88 Energy**: 88 Energy has a 78% working interest and operatorship in ~272,000 acres (~174,000 acres subject to formal award) onshore the prolific North Slope of Alaska ("Project Icewine"). The North Slope is the host for the 15 billion barrel Prudhoe Bay oilfield complex, the largest conventional oil pool in North America. The Company, with its Joint Venture partner Burgundy Xploration, has identified three highly prospective play types that are likely to exist on the Project Icewine acreage – two conventional and one unconventional. The large resource potential of Project Icewine was independently verified by leading international petroleum resource consultant DeGolyer and MacNaughton. In addition to the interpreted high prospectivity, the project is strategically located on a year-round operational access road and only 35 miles south of Pump Station 1 where Prudhoe Bay feeds into the TransAlaska Pipeline System. The Company is currently acquiring seismic to take advantage of the globally unique fiscal system in Alaska, which allows for up to 75% of 1H2016 exploration expenditure to be rebated in cash. The Company recently completed its maiden well at the project, Icewine#1, with excellent results from analysis of core obtained in the HRZ shale. A followup well with a horizontal section and multi stage frac, Icewine#2H, is planned for 1Q2017.

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#### DEGOLYER AND MACNAUGHTON 5001 SPRING VALLEY ROAD

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## REPORT

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as of **DECEMBER 31, 2015** on the UNCONVENTIONAL PROSPECTIVE RESOURCES attributable to the **ICEWINE PROSPECT** owned by **88 ENERGY LIMITED** NORTH SLOPE USA

DEGOLYER AND MACNAUGHTON

## TABLE of CONTENTS

### DEGOLYER AND MACNAUGHTON 5001 Spring Valley Road Suite 800 East Dallas, Texas 75244

# REPORT as of DECEMBER 31, 2015 on the UNCONVENTIONAL PROSPECTIVE RESOURCES attributable to the ICEWINE PROSPECT owned by 88 ENERGY LIMITED NORTH SLOPE USA

### FOREWORD

Scope of InvestigationThis report presents estimates, as of<br/>December 31, 2015, of the unconventional<br/>prospective petroleum resources in various state leases in the United States. This<br/>report is being prepared on behalf of 88 Energy Limited. 88 Energy Limited has<br/>represented that it has earned the exclusive right to secure the leaseholds on 99,360<br/>acres onshore Central North Slope in the Icewine prospect in Alaska. 88 Energy<br/>Limited has represented that it currently owns a 78-percent working interest in the<br/>Icewine prospect under the terms of the exploration and production licenses issued<br/>(Table 1).

A possibility exists that the prospect will not result in successful discovery and development, in which case there could be no future revenue. There is no certainty that any portion of the unconventional prospective resources estimated herein will be discovered. If discovered, there is no certainty that it will be commercially viable to produce any portion of the unconventional prospective resources evaluated.

Estimates of the unconventional prospective resources should be regarded only as estimates that may change

as additional information becomes available. Not only are such unconventional prospective resources estimates based on that information which is currently available, but such estimates are also subject to the uncertainties inherent in the application of judgmental factors in interpreting such information. Unconventional prospective resources quantities estimates should not be confused with those quantities that are associated with contingent resources or reserves due to the additional risks involved. The quantities that might actually be recovered, should they be discovered and developed, may differ significantly from the estimates presented herein.

The unconventional prospective resources estimates presented in this report have been prepared in accordance with the Petroleum Resources Management System (PRMS) approved in March 2007 by the Society of Petroleum Engineers, the World Petroleum Council, the American Association of Petroleum Geologists, and the Society of Petroleum Evaluation Engineers. These unconventional prospective resources definitions are discussed in detail in the Unconventional Definition of Prospective Resources section of this report.

The unconventional prospective resources estimated in this report are expressed as gross and working interest unconventional prospective resources. Gross unconventional prospective resources are defined as the total estimated petroleum that is potentially recoverable from undiscovered accumulations after December 31, 2015. Working interest unconventional prospective resources are defined as the product of the gross unconventional prospective resources and 88 Energy Limited's working interest.

The unconventional prospective resources estimated herein are those quantities of petroleum that are potentially recoverable from accumulations yet to be discovered. Because of the uncertainty of commerciality and the lack of sufficient exploration drilling, the unconventional prospective resources estimated herein cannot be classified as contingent resources or reserves. The unconventional prospective resources estimates in this report are not provided as a means of comparison to contingent resources or reserves. Table 1 summarizes ownership, potential hydrocarbon phase, and prospect location. Tables 2 through 9 summarize the prospective resources volumes and probability of geologic success  $(P_g)$ . Tables 10 and 11 summarize the prospective resources volumes and various potential target parameters.

### Authority

This report was authorized by Mr. Dave Wall, Managing Director, 88 Energy Limited.

## Source of Information

In the preparation of this report we have relied, without independent verification,

upon information furnished by or on behalf of 88 Energy Limited with respect to the property interests to be evaluated, subsurface data as they pertain to the target objectives and prospects, and various other information and technical data that were accepted as represented. Site visits to the prospect evaluated herein were not made by DeGolyer and MacNaughton, as this potential accumulation is undrilled and prospective; therefore, production facilities are not relevant. This report was based on data available as of December 31, 2015. DEGOLYER AND MACNAUGHTON

#### **DEFINITION of UNCONVENTIONAL PROSPECTIVE RESOURCES**

Estimates of petroleum resources included in this report are classified as unconventional prospective resources and have been prepared in accordance with the PRMS approved in March 2007 by the Society of Petroleum Engineers, the World Petroleum Council, the American Association of Petroleum Geologists, and the Society of Petroleum Evaluation Engineers. Because of the lack of commerciality or sufficient drilling, the unconventional prospective resources estimated herein cannot be classified as contingent resources or reserves. The unconventional petroleum resources are classified as follows:

Unconventional Prospective Resources – Those quantities of petroleum that are estimated, as of a given date, to be potentially recoverable from undiscovered unconventional accumulations by application of future development projects. Unconventional Prospective Resources may exist in petroleum accumulations that are pervasive throughout a large potential production area and would not be significantly affected by hydrodynamic influences (also called continuous-type deposits). Typically, such accumulations (once discovered) require specialized extraction technology (e.g., dewatering of CBM\*, massive fracturing programs for shale gas, shale oil, tight gas, steam and/or solvents to mobilize bitumen for in-situ recovery, and, in some cases, mining activities).

In contrast to conventional reservoirs, natural gas can also be found in more difficult to extract unconventional deposits, such as coal beds (coal seam gas), or in shales (shale gas), low quality reservoirs (tight gas), or as gas hydrates.

Shale Oil, Shale Gas, and Coal Seam Gas are examples where the natural gas or oil is still within the source rock, not having migrated to a porous and permeable reservoir.

*Tight Gas* occurs within low permeability reservoir rocks, which are rocks with matrix porosities of 10 per cent or less and permeabilities of 0.1 millidarcy (mD) or less, exclusive of fractures. Tight gas can be regionally

distributed (for example, basin-centered gas), rather than accumulated in a readily producible reservoir in a discrete structural closure as in a conventional gas field.

*Gas Hydrates* are naturally occurring ice-like solids (clathrates) in which water molecules trap gas molecules in deep-sea sediments and in and below the permafrost soils of the polar regions.

The estimation of resources quantities for a prospect is subject to both technical and commercial uncertainties and, in general, may be quoted as a range. The range of uncertainty reflects a reasonable range of estimated potentially recoverable quantities. In all cases, the range of uncertainty is dependent on the amount and quality of both technical and commercial data that are available and may change as more data become available.

*Low, Best, High, and Mean Estimates* – Estimates of petroleum resources in this report are expressed using the terms low estimate, best estimate, high estimate, and mean estimate to reflect the range of uncertainty.

A detailed explanation of the probabilistic terms used herein and identified with an asterisk (\*) is included in the glossary bound with this report. For probabilistic estimates of petroleum resources, the low estimate reported herein is the  $P_{90}$ \* quantity derived from probabilistic analysis. This means that there is at least a 90-percent probability that, assuming the prospect is discovered and developed, the quantities actually recovered will equal or exceed the low estimate. The best (median) estimate is the  $P_{50}$ \* quantity derived from probabilistic analysis. This means that there is at least a 50-percent probability that, assuming the prospect is discovered and developed, the quantities actually recovered will equal or exceed the best (median) estimate. The high estimate is the  $P_{10}$ \* quantity derived from probabilistic analysis. This means that there is at least a 10-percent probability that, assuming the prospect is discovered and developed, the quantities actually recovered will equal or exceed the high estimate. The expected value\* (EV), an outcome of the probabilistic analysis, is the mean estimate.

Uncertainties Related to Prospective Resources – The quantity of petroleum discovered by exploration drilling depends on the number of

prospects that are successful as well as the quantity that each success contains. Reliable forecasts of these quantities are, therefore, dependent on accurate predictions of the number of discoveries that are likely to be made if the entire portfolio of prospects is drilled. The accuracy of this forecast depends on the portfolio size, and an accurate assessment of the  $P_g$  \*.

Probability of Geologic Success – The probability of geologic success  $(P_g)$  is defined as the probability of discovering reservoirs that flow hydrocarbons at a measurable rate. The  $P_g$  is estimated by quantifying with a probability each of the following individual geologic chance factors: trap, source, reservoir, and migration. The product of the probabilities of these four chance factors is  $P_g$ .  $P_g$  is predicated and correlated to the minimum case prospective resources gross recoverable volume(s). Consequently, the  $P_g$  is not linked to economically viable volumes, economic flow rates, or economic field size assumptions.

In this report estimates of prospective resources are presented both before and after adjustment for  $P_g$ . Total prospective resources estimates are based on the probabilistic summation (statistical aggregate) of the quantities for the total inventory of prospects. The statistical aggregate  $P_g$ -adjusted mean estimate, or "aggregated geologic chance-adjusted mean estimate," is a probability-weighted average geologic success case expectation (average) of the hydrocarbon quantities potentially recoverable if all of the prospects in a portfolio were drilled. The  $P_g$ -adjusted mean estimate is a "blended" quantity; it is a product of the statistically aggregated mean volume estimate and the portfolio's probability of geologic success. This statistical measure considers and stochastically quantifies the geological success and geological failure outcomes. Consequently, it represents the average or mean "geologic success case" volume outcome of drilling all of the prospects in the exploration program.

Application of  $P_g$  to estimate the  $P_g$ -adjusted prospective resources quantities does not equate prospective resources with reserves or contingent resources.  $P_g$ -adjusted prospective resources quantities cannot be compared directly to or aggregated with either reserves or contingent resources. Estimates of  $P_g$  are interpretive and are dependent on the quality and quantity of data currently made available. Future data acquisition, such as additional drilling or seismic acquisition, can have a significant effect on  $P_g$  estimation. These additional data are not confined to the study area, but also include data from similar geologic settings or technological advancements that could affect the estimation of  $P_g$ .

Predictability versus Portfolio Size - The accuracy of forecasts of the number of discoveries that are likely to be made is constrained by the number of prospects in the exploration portfolio. The size of the portfolio and  $P_g$  together are helpful in gauging the limits on the reliability of these forecasts. A high Pg, which indicates a high chance of discovering measurable petroleum, may not require a large portfolio to ensure that at least one discovery will be made (assuming the  $P_g$  does not change during drilling of some of the prospects). By contrast, a low Pg, which indicates a low chance of discovering measurable petroleum, could require a large number of prospects to ensure a high confidence level of making even a single discovery. The relationship between portfolio size, Pg, and the probability of a fully unsuccessful drilling program that results in a series of wells not encountering measurable hydrocarbons is referred to herein as the predictability versus portfolio size (PPS) relationship\*. It is critical to be aware of PPS, because an unsuccessful drilling program, which results in a series of wells that do not encounter measurable hydrocarbons, can adversely affect any exploration effort, resulting in a negative present worth.

For a large prospect portfolio, the  $P_g$ -adjusted mean (statistical aggregate) estimate of the prospective resources quantity should be a reasonable estimate of the recoverable petroleum quantities found if all prospects are drilled. When the number of prospects in the portfolio is small and the  $P_g$  is low, the recoverable petroleum actually found may be considerably smaller than the statistical aggregate  $P_g$ -adjusted mean estimate would indicate. It follows that the probability that all of the prospects will be unsuccessful is smaller when a large inventory of prospects exist.

*Prospect Technical Evaluation Stage* – A prospect can often be subcategorized based on its current stage of technical evaluation. The different stages of technical evaluation relate to the amount of geologic, geophysical, engineering, and petrophysical data as well as the quality of available data.

*Prospect* – A prospect is a potential accumulation that is sufficiently well defined to be a viable drilling target. For a prospect, sufficient data and analyses exist to identify and quantify the technical uncertainties, to determine reasonable ranges of geologic chance factors and engineering and petrophysical parameters, and to estimate prospective resources.

Lead - A lead is less well defined and requires additional data and/or evaluation to be classified as a prospect. An example would be a poorly defined closure mapped using sparse regional seismic data in a basin containing favorable source and reservoir(s). A lead may or may not be elevated to prospect status depending on the results of additional technical work. A lead must have a  $P_g$  equal to or less than 0.05 to reflect the inherent technical uncertainty.

*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.

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#### ESTIMATION of UNCONVENTIONAL PROSPECTIVE RESOURCES

Estimates of unconventional prospective resources were prepared by the use of standard geological and engineering methods generally accepted by the petroleum industry. The method or combination of methods used in the analysis of the reservoirs was tempered by experience with similar reservoirs, stage of development, and quality and completeness of basic data.

The probabilistic analysis of the unconventional prospective resources in this study considered the uncertainty in the amount of petroleum that may be discovered and the  $P_g$ . The uncertainty analysis addresses the range of possibilities for any given volumetric parameter. Minimum, maximum, low, best, high, and mean estimates of unconventional prospective resources were estimated to address this uncertainty. The  $P_g$  analysis addresses the probability that the identified prospect will contain petroleum that flows at a measurable rate.

Estimates of recovery efficiency presented in this report are based on analog data and global experience and reflect the potential range in recovery for the potential reservoirs considered. Recovery efficiency estimates do not incorporate development or economic input and are subject to change upon selection of specific development options and costs, economic parameters, and product price scenarios.

The distributions for the variables were derived from (1) scenario-based interpretations, (2) the geologic, geophysical, petrophysical, and engineering data available, (3) local, regional, and global knowledge, and (4) field and case studies in the literature. The parameters used to model the recoverable quantities were potential productive area, net hydrocarbon thickness, geometric correction factor, porosity, hydrocarbon saturation, formation volume factor, and recovery efficiency. Minimum, mean, and maximum representations were used to statistically model and shape the input  $P_{90}$ ,  $P_{50}$ , and  $P_{10}$  parameters. Potential productive area, net hydrocarbon thickness, and recovery efficiency were modeled using truncated lognormal distributions. Truncated normal distributions were used to model geometric correction factor, formation volume factor, porosity, and hydrocarbon saturation. Latin hypercube sampling was used to better represent the tails of the distributions.

Each individual volumetric parameter was investigated using a probabilistic approach with attention to variability. Deterministic data were used to anchor and shape the various distributions. The rock volume parameters had the greatest range of variability, and therefore had the greatest impact on the uncertainty of the simulation. The volumetric parameter variability was based on the structural and stratigraphic uncertainties due to the depositional environment and quality of the seismic data. Analog field data were statistically incorporated to derive uncertainty limits and constraints on the net hydrocarbon thickness pore volume. Uncertainty associated with the depth conversion, seismic interpretation, gross sand thickness mapping, and net hydrocarbon thickness assumptions were also derived from studies of analogous reservoirs, multiple interpretative scenarios, and sensitivity analyses.

A  $P_g$  analysis was applied to estimate the quantities that may actually result from drilling this unconventional prospect. In the  $P_g$  analysis, the  $P_g$  estimates were made from the product of the probabilities of the four geologic chance factors: trap, reservoir, migration, and source. The  $P_g$  is predicated and correlated to the minimum case prospective resources gross recoverable volume(s). The  $P_g$  is not linked to economically viable volumes, economic flow rates, or economic field size assumptions. The  $P_g$  is predicated and correlated to the minimum case prospective resources gross recoverable volume(s).

The following equations were used in the

probabilistic volumetric model:

For Oil Shales:

 $PGUR = 7758 \times A \times h \times \phi \times (1/B_o) \times S_o \times R_f$ 

where:	PGUR	= Prospective gross ultimate recovery (bbl)
	Α	= Productive area (acres)
	h	= Net hydrocarbon thickness (feet)
	φ	= Porosity (decimal)
	Bo	= Formation volume factor (rb/stb)
	$S_o$	= Oil saturation (decimal)
	$R_{f}$	= Recovery efficiency (decimal)

For Retrograde Gas Shale:

 $PGUR = 43560 \times A \times h \times \phi \times E_g \times S_g \times R_f$ 

where:	PGUR	= Prospective gross ultimate recovery (scf)
	Α	= Productive area (acres)
	h	= Net hydrocarbon thickness (feet)
	φ	= Porosity (fraction)
	$\mathbf{E}_{\mathbf{g}}$	= Gas expansion factor (scf/rcf)
	$S_g$	= Gas saturation (fraction)
	$R_{f}$	= Recovery efficiency (decimal)

### $PRCND = PGUR \times CY_A$

where: PRCND = Prospective gross recoverable condensate (bbl) PGUR = Prospective gross ultimate recovery (scf) $CY_A = Average condensate yield (bbls/scf)$ 

Estimates of gross and working interest unconventional prospective resources and the  $P_g$  estimates, as of December 31, 2015, evaluated herein are shown in Tables 2 through 9. The  $P_g$ -adjusted mean estimate of the unconventional prospective resources was then made by the probabilistic product of  $P_g$  and the resources distributions for the prospect. These results were then stochastically summed (zero dependency) to produce the statistical aggregate  $P_g$ -adjusted mean estimate unconventional prospective resources. The range in probability of the mean occurrence  $(P_{MEAN})^*$  for the prospective resources volumes were estimated as defined in the glossary of this report. The range in  $P_{\text{MEAN}}$  for the statistical aggregate  $P_{g}$ -adjusted mean oil estimate is 0.18 to 0.27. The range in  $P_{\text{MEAN}}$  for the statistical aggregate  $P_{g}$ -adjusted mean gas estimate is 0.18 to 0.27.

Application of the  $P_g$  factor to estimate the  $P_g$ -adjusted prospective resources quantities does not equate prospective resources with reserves or contingent resources. The  $P_g$ -adjusted estimates of prospective resources quantities cannot be compared directly to or aggregated with either reserves or contingent resources. Estimates of  $P_g$  are interpretive and are dependent on the quality and quantity of data currently available. Future data acquisition, such as additional drilling or seismic acquisition, can have a significant effect on  $P_g$  estimation. These additional data are not confined to the area of study, but also include data from similar geologic settings or from technological advancements that could affect the estimation of  $P_g$  or impact the interpretation of the petroleum system.

Nonassociated gas is gas at initial reservoir conditions with no crude oil present in the reservoir. Gas-cap gas is gas at initial reservoir conditions and is in communication with an underlying oil zone. Solution gas is gas dissolved in crude oil at initial reservoir conditions. In known accumulations, solution gas and gas-cap gas are sometimes produced together and, as a whole, referred to as associated gas. Prospective raw natural gas quantities (nonassociated and associated) included herein are defined as the total gas potentially producible from the prospective reservoirs before any reduction for shrinkage for potential field and/or platform handling, separation, processing, fuel usage, flaring, reinjection, and/or pipeline losses. It is not certain whether prospective reservoirs will be gas bearing, oil bearing, or water bearing. Hydrocarbon phase determination is based on the phase chance of occurrence per the present interpretation of the petroleum system. In this report, one potential accumulation (Icewine) is interpreted to have a potential oil phase and a potential gas phase to reflect the current stage of technical evaluation.

Assumed recovery of the potential prospective oil resources estimated herein would be by normal separation in the field. Estimates of prospective oil resources are expressed herein in thousands of barrels  $(10^3 \text{ bbl})$ . In this estimate, 1 barrel equals 42 United States gallons. In this report, gas quantities are expressed in English units at a temperature base of 60 degrees Fahrenheit (°F) and at a pressure base of 14.7 pounds per square inch absolute (psia).

The application of any geologic or economic chance factor to these unconventional prospective resources quantities does not equate them with reserves or contingent resources. Chance factor-adjusted estimates (geological or economic) of unconventional prospective resources quantities cannot be compared directly to or aggregated with contingent resources or reserves.

There is no certainty that any portion of the unconventional prospective resources estimated herein will be discovered. If discovered, there is no certainty that it will be commercially viable to produce any portion of the unconventional prospective resources evaluated. DEGOLYER AND MACNAUGHTON

### SUMMARY and CONCLUSIONS

Prospective resources in the Icewine prospect have been evaluated in various state leases in the United States. The unconventional prospective resources estimates presented below are based on the statistical aggregation method. Estimates of the gross and working interest unconventional prospective oil, raw natural gas, solution gas, and condensate resources, as of December 31, 2015, are summarized as follows, expressed in English units in thousands of barrels ( $10^3$ bbl) and millions of cubic feet ( $10^6$ ft<sup>3</sup>):

$\max_{\mathbf{x} \in \mathcal{X}} \sum_{i=1}^{N} \sum_{j=1}^{N} \sum_{i=1}^{N} $	Low Estimate	Best Estimate	High Estimate	Mean Estimate
Gross				
Gross Unconventional Prospective				
Oil Resources, 10 <sup>3</sup> bbl	45,175	149,576	401.358	197.859
Gross Unconventional Prospective			,	
Raw Natural Gas Resources, 10 <sup>6</sup> ft <sup>3</sup>	526,208	1,558,058	3,809,952	1.968.525
Gross Unconventional Prospective				, ,
Condensate Resources, 10 <sup>3</sup> bbl	210,483	623,223	1,523,981	787,410
Gross Unconventional Prospective				
Solution Gas Resources, 10 <sup>6</sup> ft <sup>3</sup>	57,381	206,141	577,873	274,973
Working Interest				
Working Interest Unconventional Prospective				
Oil Resources, 10 <sup>3</sup> bbl	35,236	116.669	313.059	154,330
Working Interest Unconventional Prospective	Loop 1411		,	,
Raw Natural Gas Resources, 10 <sup>6</sup> ft <sup>3</sup>	410,442	1,215,285	2,971,763	1.535.450
Working Interest Unconventional Prospective			, ,	_,,
Condensate Resources, 10 <sup>3</sup> bbl	164,177	486,114	1,188,705	614,180
Working Interest Unconventional Prospective				
Solution Gas Resources, 10 <sup>6</sup> ft <sup>3</sup>	44,757	160,790	450,741	214,479

#### Notes:

1. Low, best, high, and mean estimates in this table are P<sub>90</sub>, P<sub>50</sub>, P<sub>10</sub>, and mean, respectively.

2. Pg has not been applied to the volumes in this table.

- 3. Application of any geological and economic chance factor does not equate unconventional prospective resources to contingent resources or reserves.
- 4. Recovery efficiency is applied to unconventional prospective resources in this table.
- 5. The unconventional prospective resources presented above are based on the statistical aggregation method.
- 6. There is no certainty that any portion of the unconventional prospective resources estimated herein will be discovered. If discovered, there is no certainty that it will be commercially viable to produce any portion of the unconventional prospective resources evaluated.

The gross and working interest statistical aggregate  $P_g$ -adjusted mean estimate unconventional prospective oil, raw natural gas, solution gas, and condensate resources, as of December 31, 2015, are summarized as follows, expressed in English units in  $10^3$ bbl and  $10^6$ ft<sup>3</sup>:

		Mean Estimate
5.0	<b>Gross</b> Gross Pg-Adjusted Unconventional Prospective Oil Resources, $10^3$ bbl Gross Pg-Adjusted Unconventional Prospective Raw Natural Gas Resources, $10^6$ ft <sup>3</sup> Gross Pg-Adjusted Unconventional Prospective Condensate Resources, $10^3$ bbl Gross Pg-Adjusted Unconventional Prospective Solution Gas Resources, $10^6$ ft <sup>3</sup>	118,715 1,181,115 472,446 164,984
	Working Interest Working Interest Pg-Adjusted Unconventional Prospective Oil Resources, $10^3$ bbl Working Interest Pg-Adjusted Unconventional Prospective Raw Natural Gas Resources, $10^6$ ft <sup>3</sup> Working Interest Pg-Adjusted Unconventional Prospective Condensate Resources, $10^3$ bbl Working Interest Pg-Adjusted Unconventional Prospective Solution Gas Resources, $10^6$ ft <sup>3</sup>	92,598 921,270 368,508 128,687
	<ol> <li>Notes:         <ol> <li>Application of any geological and economic chance factor does not equate unconventional prospective resources to contingent resources or reserves.</li> <li>Recovery efficiency is applied to unconventional prospective resources in this table.</li> <li>The unconventional prospective resources presented above are based on the statistical aggregation method.</li> <li>P<sub>g</sub> is predicated and correlated to the minimum case prospective resources gross recoverable volume(s). The P<sub>g</sub> is not linked to economically viable volumes, economic flow rates, or economic field size assumptions.</li> <li>The range in probability of occurrence for the statistical aggregate P<sub>g</sub>-adjusted mean oil estimate is 0.18 to 0.27. The range in probability of occurrence for the statistical aggregate P<sub>g</sub>-adjusted mean gas estimate is 0.18 to 0.27.</li> <li>There is no certainty that any portion of the prospective resources estimated herein will be discovered. If discovered, there is no certainty that it will be commercially viable to produce any portion of the prospective resources evaluated.</li> </ol> </li> </ol>	

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The arithmetic summation method was used to aggregate resources quantities above the field, property, or project level. The prospective resources quantities aggregated by the arithmetic summation method for the unconventional prospect evaluated in this report are presented in the prospective resources tables bound with this report.

Submitted,

ad

DeGOLYER and MacNAUGHTON Texas Registered Engineering Firm F-716

SIGNED: March 30, 2016



John W. Wallace, P.E. Chairman and CEO DeGolyer and MacNaughton

DEGOLYER AND MACNAUGHTON

## GLOSSARY

- Accumulation The term accumulation is used to identify an individual body of moveable petroleum. A known accumulation (one determined to contain reserves or contingent resources) must have been penetrated by a well. The well must have clearly demonstrated the existence of moveable petroleum by flow to the surface or at least some recovery of a sample of petroleum through the well. However, log and/or core data from the well may establish an accumulation, provided there is a good analogy to a nearby and geologically comparable known accumulation.
- Arithmetic Summation The process of adding a set of numbers that represent estimates of resources quantities at the reservoir, prospect, or portfolio level and estimates of  $PPW_{10}$  at the prospect or portfolio level. Statistical aggregation yields different results.
- Best (Median) Estimate The best (median) estimate is the  $P_{50}$  quantity.  $P_{50}$  means that there is a 50-percent chance that an estimated quantity, such as a prospective resources volume or associated quantity, will be equaled or exceeded.
- Barrel of Oil Equivalent Gas quantities are converted to barrels of oil equivalent (BOE) using 6,000 cubic feet of gas per barrel.
- *Coal Bed Methane* Coal bed methane (CBM) is a form of natural gas extracted from coal beds. Coals are unconventional reservoirs characterzied by more than 50 percent by weight and more than 70 percent by volume of carbonaceous material formed from compaction and induration of variously altered plant remains similar to those in peaty deposits. Gas is generated as a result of the coalification of the organic matter, and is generally 85 to 99 percent methane. Gas is held to the coal matrix by sorption. CBM is also known as coal seam gas.
- *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.
- *Geometric Correction Factor* The geometric correction factor (GCF) is a geometry adjustment correction that takes into account the relationship of the potential fluid contact to the geometry of the reservoir and trap. Input parameters used to estimate the geometric correction factor include trap shape, length-to-width ratio, potential reservoir thickness, and the height of the potential trapping closure (potential hydrocarbon column height).

- High Estimate The high estimate is the  $P_{10}$  quantity.  $P_{10}$  means there is a 10-percent chance that an estimated quantity, such as a prospective resources volume or associated quantity, will be equaled or exceeded.
- Lead A lead is less well defined and requires additional data and/or evaluation to be classified as a prospect. An example would be a poorly defined closure mapped using sparse regional seismic data in a basin containing favorable source and reservoir(s). A lead may or may not be elevated to prospect status depending on the results of additional technical work. A lead must have a P<sub>g</sub> equal to or less than 0.05 to reflect the inherent technical uncertainty.
- Low Estimate The low estimate is the  $P_{90}$  quantity.  $P_{90}$  means there is a 90-percent chance that an estimated quantity, such as a prospective resources volume or associated quantity, will be equaled or exceeded.
- Mean Estimate In accordance with petroleum industry standards, the mean estimate is the probability-weighted average (expected value), which typically has a probability in the  $P_{45}$  to  $P_{15}$  range, depending on the variance of prospective resources volume or associated quantity. Therefore, the probability of a prospect or accumulation containing the probability-weighted average volume or greater is usually between 45 and 15 percent. The mean estimate is the preferred probabilistic estimate of resources volumes.
- Median Median is the  $P_{50}$  quantity, where the  $P_{50}$  means there is a 50-percent chance that a given variable (such as prospective resources, porosity, or water saturation) is equaled or exceeded. The median of a data set is a number such that half the measurements are below the median and half are above.

The median is the best estimate in probabilistic estimations of prospective resources, as required by the PRMS guidelines.

- Migration Chance Factor Migration chance factor ( $P_{migration}$ ) is defined as the probability that a trap either predates or is coincident with petroleum migration and that there exists vertical and/or lateral migration pathways linking the source to the trap.
- *Mode* The mode is the quantity that occurs with the greatest frequency in the data set and therefore is the quantity that has the greatest probability of occurrence. However, the mode may not be uniquely defined, as is the case in multimodal distributions.
- $P_{g}$ -adjusted Mean Estimate, statistical aggregate The statistical aggregate  $P_{g}$ -adjusted mean estimate, or "aggregated geologic chance-adjusted mean

estimate," is a probability-weighted average geologic success case expectation (average) of the hydrocarbon quantities potentially discovered if all of the prospects in a portfolio were drilled. The  $P_g$ -adjusted mean estimate is a "blended" quantity; it is a product of the statistically aggregated mean volume estimate and the portfolio's probability of geologic success. This statistical measure considers and stochastically quantifies the geological success and geological failure outcomes. Consequently, it represents the average or mean "geologic success case" volume outcome of drilling all of the prospects in the exploration portfolio. The  $P_g$ -adjusted mean volume estimate for a single prospect is calculated as follows:

$$P_{g}$$
-adjusted mean estimate =  $P_{g} \times$  mean estimate (1)  
(mean geological success case volumes)

The probability of the statistical aggregate  $P_g$ -adjusted mean estimate is estimated by the product of the portfolio  $P_g$  and the probability of the mean volume occurrence for the entire prospect portfolio. The equation is as follows:

Statistical aggregate  $P_g$ -adjusted mean estimate, probability of (2) occurrence = Portfolio  $P_g \times$  mean volume probability estimate for the portfolio

- $P_n$  Nomenclature This report uses the convention of denoting probability with a subscript representing the greater than cumulative probability distribution. As such, the notation  $P_n$  indicates the probability that there is an n-percent chance that a specific input or output quantity will be equaled or exceeded. For example,  $P_{90}$  means that there is a 90-percent chance that a variable (such as prospective resources, porosity, or water saturation) is equaled or exceeded.
- *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.
- *Predictability versus Portfolio Size* The number of prospects in a prospect portfolio influences the reliability of the forecast of drilling results. The relationship between predictability versus portfolio size (PPS) is also known in the petroleum industry literature as "Gambler's Ruin." The relationship of probability to portfolio size is described by the binomial probability equation given as follows:

$$P_{x^n} = (C_{x^n})(p)^x (1-p)^{n-x}$$
(3)

where:  $P_{x^n}$  = the probability of x successes in n trials

- $C_{\boldsymbol{x}^n}$  = the number of mutually exclusive ways that  $\boldsymbol{x}$  successes can be arranged in n trials
- $p = the probability of success for a given trial (for petroleum exploration, this is <math>P_g$ )
- x = the number of successes (e.g., the number of discoveries)
- n = the number of trials (e.g., the number of wells to be drilled)

Note: For the case of n successive dry holes,  $C_{x^n}$  and p each equals 1, so the probability of failure is the quantity (1-p) raised to the number of trials.

Probability of Geologic Success – The probability of geologic success  $(P_g)$  is defined as the probability of discovering reservoirs that flow hydrocarbons at a measurable rate. The  $P_g$  is estimated by quantifying with a probability each of the following individual geologic chance factors: trap, source, reservoir, and migration. The product of the probabilities of these four chance factors is  $P_g$ .  $P_g$  is predicated and correlated to the minimum case prospective resources gross recoverable volume(s). Consequently, the  $P_g$  is not linked to economically viable volumes, economic flow rates, or economic field size assumptions.

- Probability of the Mean Occurrence The probability of the mean occurrence  $P_{\text{MEAN}}$  is defined as the probability of occurrence of the mean quantity as defined by the distribution(s) in the Monte Carlo simulation. The probability associated with the mean is dependent on the variance of the distribution, and type of distribution from which the mean is estimated. Typically, the range in probability of occurrence for the statistical mean estimate is 0.45 to 0.15 for lognormal (positively skewed) distributions. The statistical mean has a probability of occurrence of 0.50 for normal (symmetric) distributions.
- Prospect A prospect is a potential accumulation that is sufficiently well defined to be a viable drilling target. For a prospect, sufficient data and analyses exist to identify and quantify the technical uncertainties, to determine reasonable ranges of geologic chance factors and engineering and petrophysical parameters, and to estimate prospective resources. In addition, a viable drilling target requires that 70 percent of the median potential production area be located within the block or license area of interest.

- *Prospective Resources* Those quantities of petroleum that are estimated, as of a given date, to be potentially recoverable from undiscovered accumulations by application of future development projects.
- *Raw Natural Gas* Raw natural gas is the total gas produced from the reservoir prior to processing or separation and includes all nonhydrocarbon components as well as any gas equivalent of condensate.
- Reservoir Chance Factor The reservoir chance factor ( $P_{reservoir}$ ) is defined as the probability associated with the presence of porous and permeable reservoir quality rock.
- Source Chance Factor The source chance factor  $(P_{source})$  is defined as the probability associated with the presence of a hydrocarbon source rock rich enough, of sufficient volume, and in the proper spatial position to charge the prospective area or areas.
- Standard Deviation Standard deviation (SD) is a measure of distribution spread. It is the positive square root of the variance. The variance is the summation of the squared distance from the mean of all possible values. Since the units of standard deviation are the same as those of the sample set, it is the most practical measure of population spread.

$$\sigma = \sqrt{\sigma^2} = \sqrt{\frac{\sum\limits_{i=1}^{n} (x_i - \mu)^2}{n - 1}}$$
(4)

where:  $\sigma$  = standard deviation

 $\sigma^2$  = variance

n = sample size

 $x_i$  = value in data set

 $\mu$  = sample set mean

Statistical Aggregation – The process of probabilistically aggregating distributions that represent estimates of resources quantities at the reservoir, prospect, or portfolio level and estimates of  $PPW_{10}$  at the prospect or portfolio level. Arithmetic summation yields different results, except for the mean estimate.

Trap Chance Factor – The trap chance factor  $(P_{trap})$  is defined as the probability associated with the presence of a structural closure and/or a stratigraphic trapping configuration with competent vertical and lateral seals, and the lack of any post migration seal integrity events or breaches.

Unconventional Prospective Resources – Those quantities of petroleum that are estimated, as of a given date, to be potentially recoverable from undiscovered unconventional accumulations by application of future development projects. Unconventional prospective resources may exist in petroleum accumulations that are pervasive throughout a large potential production area and would not be significantly affected by hydrodynamic influences (also called "continuous-type deposits"). Typically, such accumulations (once discovered) require specialized extraction technology (e.g., dewatering of CBM, massive fracturing programs for shale gas, shale oil, tight gas, steam and/or solvents to mobilize bitumen for in-situ recovery, and, in some cases, mining activities).

Variance – The variance  $(\sigma^2)$  is a measure of how much the distribution is spread from the mean. The variance sums up the squared distance from the mean of all possible values of x. The variance has units that are the squared units of x. The use of these units limits the intuitive value of variance.

$$\sigma^{2} = \frac{\sum_{i=1}^{n} (x_{i} - \mu)}{n - 1}$$
(5)

where:  $\sigma^2$  = variance

n = sample size

 $x_i$  = value in data set

 $\mu$  = sample set mean

Working Interest – Working interest prospective resources are that portion of the gross prospective resources to be potentially produced from the properties attributable to the interests owned by "Company" before deduction of any associated royalty burdens, net profits payable or government profit share. Working interest is a percentage of ownership in an oil and gas lease granting its owner the right to explore, drill and produce oil and gas from a tract of property. Working interest owners are obligated to pay a corresponding percentage of the cost of leasing, drilling, producing and operating a well or unit. The working interest also entitles its owner to share in production revenues with other working interest owners, based on the percentage of working interest owned.



TABLE 1 PROSPECT PORTFOLIO SUMMARY as of DECEMBER 31, 2015 for 88 ENERGY LIMITED in the ICEWINE PROSPECT NORTH SLOPE USA

						Working Interest	Potential Hydrocarbon	
Prospect		Country		Area/Basin	License/Block	(decimal)	Phase	
Icewine		USA	1971 1972	North Slope	Various	0.780	Oil/Gas	



TABLE 2 ESTIMATE of the GROSS PROSPECTIVE OIL RESOURCES as of DECEMBER 31, 2015 for 88 ENERGY LIMITED in the ICEWINE PROSPECT NORTH SLOPE USA

Gross Prospective Oil Resources Summary Probability Low Best High Mean of Geologic P<sub>g</sub>-Adjusted Estimate Success, P. Estimate Estimate Fetimate Mean Estimate License/Block (10<sup>3</sup>bbl) (10<sup>3</sup>bbl) (10<sup>3</sup>bbl) Prospect Country Area/Basin (10<sup>3</sup>bbl) (decimal) (10<sup>3</sup>bbl) Icewine USA North Slope Various 45.175 149,576 401,358 197,859 0.600 118,715 Statistical Aggregate 45.175 149.576 401,358 197.859 0.600 118,715 Arithmetic Summation 45,175 149,576 401,358 197,859 0.600 118,715

Notes:

1. Low, best, high, and mean estimates follow the PRMS guidelines for prospective resources.

2. Low, best, high, and mean estimates in this table are P<sub>90</sub>, P<sub>50</sub>, P<sub>10</sub>, and mean respectively.

3. Pg is defined as the probability of discovering reservoirs which flow petroleum at a measurable rate.

4. Pg has been rounded for presentation purposes. Multiplication using this presented Pg may yield imprecise results. Dividing the Pg adjusted mean estimate by the mean estimate yields the precise Pg.

5. Application of any geological and economic chance factor does not equate prospective resources to contingent resources or reserves.

6. Recovery efficiency is applied to prospective resources in this table.

7. Arithmetic summation of probabilistic estimates produces invalid results except for the mean estimate.

Arithmetic summation of probabilistic estimates is presented in this table in compliance with PRMS guidelines.

8. Summations may vary from those shown here due to rounding.

9. There is no certainty that any portion of the prospective resources estimated herein will be discovered.

If discovered, there is no certainty that it will be commercially viable to produce any portion of the prospective resources evaluated.

10. The range in P<sub>mean</sub> for the statistical aggregate P<sub>g</sub>-adjusted mean estimate is 0.18 to 0.27.



TABLE 3 ESTIMATE of the WORKING INTEREST PROSPECTIVE OIL RESOURCES as of DECEMBER 31, 2015 for 88 ENERGY LIMITED in the ICEWINE PROSPECT NORTH SLOPE USA

### Working Interest Prospective Oil Resources Summary

Prospect	Country	Area/Basin	License/Block	Low Estimate (10 <sup>3</sup> bbl)	Best Estimate (10 <sup>3</sup> bbl)	High Estimate (10 <sup>3</sup> bbl)	Mean Estimate (10 <sup>3</sup> bbl)	of Geologic Success, P <sub>g</sub> (decimal)	P <sub>g</sub> -Adjusted Mean Estimate (10 <sup>3</sup> bbl)
Icewine	USA	North Slope	Various	35,236	116,669	313,059	154,330	0.600	92.598
Statistical Aggregate				35,236	116,669	313,059	154,330	0.600	92,598
Arithmetic Summation				35,236	116,669	313,059	154,330	0.600	92,598

Notes:

1. Low, best, high, and mean estimates follow the PRMS guidelines for prospective resources.

2. Low, best, high, and mean estimates in this table are  $P_{90},\,P_{50},\,P_{10},$  and mean respectively.

3.  $P_g$  is defined as the probability of discovering reservoirs which flow petroleum at a measurable rate.

4. Pg has been rounded for presentation purposes. Multiplication using this presented Pg may yield

imprecise results. Dividing the P<sub>g</sub>-adjusted mean estimate by the mean estimate yields the precise P<sub>g</sub>.
 Application of any geological and economic chance factor does not equate prospective resources to contingent resources or reserves.

6. Recovery efficiency is applied to prospective resources in this table.

7. Arithmetic summation of probabilistic estimates produces invalid results except for the mean estimate.

Arithmetic summation of probabilistic estimates is presented in this table in compliance with PRMS guidelines.

8. Summations may vary from those shown here due to rounding.

There is no certainty that any portion of the prospective resources estimated herein will be discovered.
 If discovered, there is no certainty that it will be commercially viable to produce any portion of the prospective resources evaluated.

10. The range in  $P_{\rm mean}$  for the statistical aggregate  $P_g\mbox{-}adjusted$  mean estimate is 0.18 to 0.27.



#### TABLE 4 ESTIMATE of the GROSS PROSPECTIVE RAW NATURAL GAS RESOURCES as of DECEMBER 31, 2015 for 88 ENERGY LIMITED in the ICEWINE PROSPECT NORTH SLOPE USA

Gross Prospective Raw Natural Gas Resources Summary

								Probability	
				Low	Best	High	Mean	of Geologic	Pg-Adjusted
Prospect	Country	Area/Basin	License/Block	 Estimate (10 <sup>6</sup> ft <sup>3</sup> )	Estimate (10 <sup>6</sup> ft <sup>3</sup> )	Estimate (10 <sup>6</sup> ft <sup>3</sup> )	Estimate (10 <sup>5</sup> ft <sup>3</sup> )	Success, P <sub>g</sub> (decimal)	Mean Estimate (10 <sup>6</sup> ft <sup>3</sup> )
Icewine	USA	North Slope	Various	526,208	1,558,058	3,809,952	1,968,525	0.600	1,181,115
Statistical Aggregate				526,208	1,558,058	3,809,952	1,968,525	0.600	1,181,115
Arithmetic Summation				526,208	1,558,058	3,809,952	1,968,525	0.600	1,181,115

Notes:

1. Low, best, high, and mean estimates follow the PRMS guidelines for prospective resources.

2. Low, best, high, and mean estimates in this table are  $\rm P_{90}, \rm P_{50}, \rm P_{10},$  and mean respectively.

3. Pg is defined as the probability of discovering reservoirs which flow petroleum at a measurable rate.

4.  ${\rm P}_g$  has been rounded for presentation purposes. Multiplication using this presented  ${\rm P}_g$  may yield

imprecise results. Dividing the Pg-adjusted mean estimate by the mean estimate yields the precise Pg-

5. Application of any geological and economic chance factor does not equate prospective resources to contingent resources or reserves.

6. Recovery efficiency is applied to prospective resources in this table.

7. Arithmetic summation of probabilistic estimates produces invalid results except for the mean estimate.

Arithmetic summation of probabilistic estimates is presented in this table in compliance with PRMS guidelines.

8. Summations may vary from those shown here due to rounding.

9. There is no certainty that any portion of the prospective resources estimated herein will be discovered.

If discovered, there is no certainty that it will be commercially viable to produce any portion of the prospective resources evaluated.

10. The range in  $P_{mean}$  for the statistical aggregate  $P_{g}$ -adjusted mean estimate is 0.18 to 0.27.



# TABLE 5 ESTIMATE of the WORKING INTEREST PROSPECTIVE RAW NATURAL GAS RESOURCES as of DECEMBER 31, 2015 for 88 ENERGY LIMITED

in the ICEWINE PROSPECT NORTH SLOPE USA

Working Interest Prospective Raw Natural Gas Resources Summary

					Low	Rest	High	Moon	Probability	P Adjusted
Prospect	Country	Area/Basin	License/Block	1.1.1	Estimate (10 <sup>6</sup> ft <sup>3</sup> )	Success, P <sub>g</sub> (decimal)	Mean Estimate (10 <sup>6</sup> ft <sup>3</sup> )			
Icewine	USA	North Slope	Various		410,442	1,215,285	2,971,763	1,535,450	0.600	921,270
Statistical Aggregate					410,442	1,215,285	2,971,763	1,535,450	0.600	921,270
Arithmetic Summation					410,442	1,215,285	2,971,763	1,535,450	0.600	921,270

Notes:

1. Low, best, high, and mean estimates follow the PRMS guidelines for prospective resources.

2. Low, best, high, and mean estimates in this table are  $\mathsf{P}_{90}, \mathsf{P}_{50}, \mathsf{P}_{10},$  and mean respectively.

3. Pg is defined as the probability of discovering reservoirs which flow petroleum at a measurable rate.

4. Pg has been rounded for presentation purposes. Multiplication using this presented Pg may yield imprecise results. Dividing the  $P_g$ -adjusted mean estimate by the mean estimate yields the precise  $P_g$ .

5. Application of any geological and economic chance factor does not equate prospective resources to contingent resources or reserves.

6. Recovery efficiency is applied to prospective resources in this table.

7. Arithmetic summation of probabilistic estimates produces invalid results except for the mean estimate.

Arithmetic summation of probabilistic estimates is presented in this table in compliance with PRMS guidelines.

8. Summations may vary from those shown here due to rounding.

9. There is no certainty that any portion of the prospective resources estimated herein will be discovered.

If discovered, there is no certainty that it will be commercially viable to produce any portion of the prospective resources evaluated.

10. The range in  $P_{\text{mean}}$  for the statistical aggregate  $P_g\text{-adjusted}$  mean estimate is 0.18 to 0.27.



#### TABLE 6 ESTIMATE of the GROSS PROSPECTIVE CONDENSATE RESOURCES as of DECEMBER 31, 2015 for 88 ENERGY LIMITED in the ICEWINE PROSPECT NORTH SLOPE USA

Gross Prospective Condensate Resources Summary

Prospect	Country	Area/Basin	License/Block	Low Estimate (10 <sup>3</sup> bbl)	Best Estimate (10 <sup>3</sup> bbl)	High Estimate (10 <sup>3</sup> bbl)	Mean Estimate (10 <sup>3</sup> bbl)	Probability of Geologic Success, P <sub>g</sub> (decimal)	P <sub>g</sub> -Adjusted Mean Estimate (10 <sup>3</sup> bbl)
Icewine	USA	North Slope	Various	210,483	623,223	1,523,981	787,410	0.600	472,446
Statistical Aggregate				210,483	623,223	1,523,981	787,410	0.600	472,446
Arithmetic Summation				210,483	623,223	1,523,981	787,410	0.600	472,446

Notes:

1. Low, best, high, and mean estimates follow the PRMS guidelines for prospective resources.

2. Low, best, high, and mean estimates in this table are  $\mathsf{P}_{90},\,\mathsf{P}_{50},\,\mathsf{P}_{10},$  and mean respectively.

3. Pg is defined as the probability of discovering reservoirs which flow petroleum at a measurable rate.

4. Pg has been rounded for presentation purposes. Multiplication using this presented Pg may yield

imprecise results. Dividing the Pg-adjusted mean estimate by the mean estimate yields the precise Pg.

5. Application of any geological and economic chance factor does not equate prospective resources to contingent resources or reserves.

6. Recovery efficiency is applied to prospective resources in this table.

7. Arithmetic summation of probabilistic estimates produces invalid results except for the mean estimate.

Arithmetic summation of probabilistic estimates is presented in this table in compliance with PRMS guidelines.

8. Summations may vary from those shown here due to rounding.

9. There is no certainty that any portion of the prospective resources estimated herein will be discovered.

If discovered, there is no certainty that it will be commercially viable to produce any portion of the prospective resources evaluated.



#### TABLE 7 ESTIMATE of the WORKING INTEREST PROSPECTIVE CONDENSATE RESOURCES as of DECEMBER 31, 2015 for 88 ENERGY LIMITED in the ICEWINE PROSPECT NORTH SLOPE USA

Working Interest Prospective Condensate Resources Summary

Prospect	Country	Area/Basin	License/Block	Lov Estim (10 <sup>3</sup> b	w nate obl)	Best Estimate (10 <sup>3</sup> bbl)	High Estimate (10 <sup>3</sup> bbl)	Mean Estimate (10 <sup>3</sup> bbl)	Probability of Geologic Success, P <sub>g</sub> (decimal)	P <sub>g</sub> -Adjusted Mean Estimate (10 <sup>3</sup> bbl)
Icewine	USA	North Slope	Various	1	164,177	486,114	1,188,705	614,180	0.600	368,508
Statistical Aggregate				11	164,177	486,114	1,188,705	614,180	0.600	368,508
Arithmetic Summation					164,177	486,114	1,188,705	614,180	0.600	368,508

Notes:

1. Low, best, high, and mean estimates follow the PRMS guidelines for prospective resources.

2. Low, best, high, and mean estimates in this table are P<sub>90</sub>, P<sub>50</sub>, P<sub>10</sub>, and mean respectively.

3.  $P_g$  is defined as the probability of discovering reservoirs which flow petroleum at a measurable rate.

4. Pg has been rounded for presentation purposes. Multiplication using this presented Pg may yield

imprecise results. Dividing the Pg-adjusted mean estimate by the mean estimate yields the precise Pg.

5. Application of any geological and economic chance factor does not equate prospective resources to contingent resources or reserves.

6. Recovery efficiency is applied to prospective resources in this table.

Arithmetic summation of probabilistic estimates produces invalid results except for the mean estimate.
 Arithmetic summation of probabilistic estimates is presented in this table in compliance with PRMS guidelines.

8. Summations may vary from those shown here due to rounding.

9. There is no certainty that any portion of the prospective resources estimated herein will be discovered.

If discovered, there is no certainty that it will be commercially viable to produce any portion of the prospective resources evaluated.



#### TABLE 8 ESTIMATE of the GROSS PROSPECTIVE SOLUTION GAS RESOURCES as of DECEMBER 31, 2015 for 88 ENERGY LIMITED in the ICEWINE PROSPECT NORTH SLOPE USA

Gross Prospective Solution Gas Resources Summary

Prospect	Country	Area/Basin	License/Block	1	Low Estimate (10 <sup>6</sup> ft <sup>3</sup> )	Best Estimate (10 <sup>6</sup> ft <sup>3</sup> )	High Estimate (10 <sup>6</sup> ft <sup>3</sup> )	Mean Estimate (10 <sup>6</sup> ft <sup>3</sup> )	Probability of Geologic Success, P <sub>g</sub> (decimal)	P <sub>g</sub> -Adjusted Mean Estimate (10 <sup>6</sup> ft <sup>3</sup> )
Icewine	USA	North Slope	Various		57,38	1 206,141	577,873	274,973	0.600	164,984
Statistical Aggregate					57,38	1 206,141	577,873	274,973	0.600	164,984
Arithmetic Summation					57,38	1 206,141	577,873	274,973	0.600	164,984

#### Notes:

1. Low, best, high, and mean estimates follow the PRMS guidelines for prospective resources.

2. Low, best, high, and mean estimates in this table are  $P_{90}$ ,  $P_{50}$ ,  $P_{10}$ , and mean respectively.

3. Pg is defined as the probability of discovering reservoirs which flow petroleum at a measurable rate.

4. Pg has been rounded for presentation purposes. Multiplication using this presented Pg may yield

imprecise results. Dividing the Pg-adjusted mean estimate by the mean estimate yields the precise Pg.

5. Application of any geological and economic chance factor does not equate prospective resources to contingent resources or reserves.

6. Recovery efficiency is applied to prospective resources in this table.

7. Arithmetic summation of probabilistic estimates produces invalid results except for the mean estimate.

Arithmetic summation of probabilistic estimates is presented in this table in compliance with PRMS guidelines.

8. Summations may vary from those shown here due to rounding.

9. There is no certainty that any portion of the prospective resources estimated herein will be discovered.

If discovered, there is no certainty that it will be commercially viable to produce any portion of the prospective resources evaluated.



TABLE 9 ESTIMATE of the WORKING INTEREST PROSPECTIVE SOLUTION GAS RESOURCES as of DECEMBER 31, 2015 for 88 ENERGY LIMITED in the ICEWINE PROSPECT NORTH SLOPE

## USA

Working Interest Prospective Solution Gas Resources Sum Probability Low Best Pg-Adjusted High Mean of Geologic Estimate Estimate Success, P. Estimate Estimate Mean Estimate Prospect Country (10<sup>6</sup>ft<sup>3</sup>) (10<sup>6</sup>ft<sup>3</sup>) (10<sup>6</sup>ft<sup>3</sup>) Area/Basin License/Block (10<sup>6</sup>ft<sup>3</sup>) (10<sup>6</sup>ft<sup>3</sup>) (decimal) Icewine LISA North Slope Various 44,757 160,790 450,741 214,479 128 697 0 600

				100,100	400,741	214,475	0.000	120,087
Statistical Aggregate			44,757	160,790	450,741	214,479	0.600	128,687
Arithmetic Summation			44,757	160,790	450,741	214,479	0.600	128,687
Notes:								

1. Low, best, high, and mean estimates follow the PRMS guidelines for prospective resources.

2. Low, best, high, and mean estimates in this table are  $P_{90}$ ,  $P_{50}$ ,  $P_{10}$ , and mean respectively.

3. Pg is defined as the probability of discovering reservoirs which flow petroleum at a measurable rate.

4.  $P_g$  has been rounded for presentation purposes. Multiplication using this presented  $P_g$  may yield

imprecise results. Dividing the Pg-adjusted mean estimate by the mean estimate yields the precise Pg.

5. Application of any geological and economic chance factor does not equate prospective resources to contingent resources or reserves.

6. Recovery efficiency is applied to prospective resources in this table.

7. Arithmetic summation of probabilistic estimates produces invalid results except for the mean estimate.

Arithmetic summation of probabilistic estimates is presented in this table in compliance with PRMS guidelines.

8. Summations may vary from those shown here due to rounding.

9. There is no certainty that any portion of the prospective resources estimated herein will be discovered.

If discovered, there is no certainty that it will be commercially viable to produce any portion of the prospective resources evaluated.



TABLE 10 PROBABILITY DISTRIBUTIONS for MONTE CARLO SIMULATION as of DECEMBER 31, 2015 0 88 ENERGY LIMITED in the ICEWINE PROSPECT NORTH SLOPE USA

Prospect	Potential Oil Target	Parameter	P <sub>100</sub>	P <sub>90</sub>	P <sub>50</sub>	P <sub>10</sub>	Po	Mean
Icewine	HRZ	Productive area, acres Net hydrocarbon thickness, feet Porosity, decimal Oil saturation, decimal Formation volume factor, Bo Recovery efficiency, decimal Prospective QOIP, barrels Prospective QOIP, barrels Solution gas, cubic feet GOR, cubic feet per barrel	5,104 99 0.066 2.551 2.099 0.010 345,909,800 6,517,956 11,835,460,000 2,798	17,778 132 0.086 0.649 2.021 1.032,527,000 45,174,930 57,381,190,000 2,013	46,795 170 0.110 0.748 1.764 0.058 2.809,127,000 149,576,200 206,141,400,000 1,316	96,599 218 0.136 0.844 1.565 0.101 6.192,984,000 401,357,600 577,873,100,000 931	122.309 289 0.173 0.910 1.519 0.132 14.031.790.000 1.185.497.000 2.177.904.000.000 760	52,205 173 0.111 0.747 1.764 0.061 3,261,658,000 197,858,800 274,972,500,000 1.280



TABLE 11 PROBABILITY DISTRIBUTIONS for MONTE CARLO SIMULATION as of DECEMBER 31, 2015 for 88 ENERGY LIMITED in the ICEWINE PROSPECT NORTH SLOPE USA

Prospect	Potential Gas	Parameter	P	P.,	P.,.	P	Ρ.	Mean
Troopcor	Turget		• 100	. 90	* 50	10		mean
Icewine	HRZ	Productive area, acres	5,189	20,991	55,443	114,534	145.052	61,851
		Productive area, square kilometers	21.00	85	224	464	587	250
		Net hydrocarbon thickness, feet	99	132	170	218	289	173
		Net hydrocarbon thickness, meters	30.1	40.2	51.7	66.5	88.2	52.7
		Porosity, decimal	0.066	0.086	0.110	0.136	0.173	0.111
		Gas saturation, decimal	0.551	0.649	0.748	0.844	0.910	0.747
		Gas Expansion Factor, Eg	319	307	291	279	270	292
		Recovery efficiency, decimal	0.051	0.101	0.177	0.249	0.298	0.176
		Prospective OGIP, barrels	1,089,787,000,000	3,576,628,000,000	9,743,823,000,000	20,801,930,000,000	51.041.660.000.000	11,197,200,000,000
		Prospective gross ultimate recovery, cubic feet	104,497,800,000	526,208,200,000	1,558,058,000,000	3,809,952,000,000	10,066,720,000,000	1,968,525,000,000
		Condensate, barrels	41,799,130	210,483,300	623,223,300	1,523,981,000	4,026,689,000	787,410,000
		Condensate yield, barrels per million cubic feet	221	300	400	500	577	400