

June 29, 2006

INFORMATION BULLETIN 2006-02

Subject: Oil Royalty – The basics

The current formulae used to calculate oil royalty were published in Information Letter 93-09 effective January 1, 1993. There have been no changes to the formulae since that time. This Information Bulletin is being issued as a refresher to the original Information Letter and to provide assistance to people trying to understand oil royalty calculations. This Information Bulletin also coincides with a Basic Oil Royalty Calculator tool available on the Alberta Energy website at www.gov.ab.ca. If you wish to become familiar with the oil royalty calculation, we encourage you to access this on-line calculator in conjunction with this Information Bulletin.

Oil royalty is sensitive to both the rate of production for a well and the price established for that month. These two components are specific to vintage (old, new or third tier). The price sensitivity is further determined by the density of the oil. Each month the Alberta Energy provides an information letter that provides price information to allow each operator to calculate their royalty in either a long version formula or short version formula. Either version will provide you with the same result. An example of each is provided below.

For further information please contact:

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Step One: Calculate 'S'

Both the long and short formulae require you to calculate a crown production volume for the month in cubic metres. This is the **production sensitivity** of the formulae and is expressed as 'S' in the formulae. The 'Schedule A' document showing the correct 'S' amount for production from .1 m³ to 2000.0 m³ is available on the Alberta Energy website at www.gov.ab.ca.

Table One – (Use for Old and New Oil)

Monthly Production in m ³	Crown royalty for the month in m ³
If production is less than 190.7m ³	The number of m ³ is determined by dividing the square of m ³ produced by 2755.04
<p>Example: production = 93.7m³</p> $S = (93.7)^2 \div 2755.04$ $= 8,779.69 \div 2755.04$ $= 3.18677$	
If production is equal to 190.7m ³ or greater.	13.2m ³ plus the number of m ³ produced in excess of 190.7 multiplied by 0.115385
<p>Example: production = 213.4 m³</p> $S = 13.2 + [(213.4 - 190.7) \times 0.115385]^*$ $= 13.2 + [22.7 \times 0.115385]$ $= 13.2 + 2.61924$ $= 15.81924 \quad \text{*}(Always work from inside brackets out)$	

Table Two – (Use for Third Tier)

Monthly Production in m ³	Crown royalty for the month in m ³
If production is less than 20m ³	No royalty payable
If production is greater than or equal to 20m ³ but less than 190.7m ³	The number of m ³ is determined by squaring the number of m ³ produced in excess of 20m ³ and dividing by 2207.46
<p>Example: production = 93.7m³</p> $S = (93.7-20.0)^2 \div 2207.46$ $= (73.7)^2 \div 2207.46$ $= 5431.69 \div 2207.46$ $= 2.46061$	
If production is equal to 190.7m ³ or greater	The number of m ³ is determined by adding 13.2 m ³ to the product of 0.115385 multiplied by the number of m ³ produced in excess of 190.7m ³ .
<p>Example: production = 213.4 m³</p> $S = 13.2 + [(213.4 - 190.7) \times 0.115385]^*$ $= 13.2 + [22.7 \times 0.115385]$ $= 15.81924 \quad \text{*}(Always work from inside brackets out)$	

('S' is always calculated to five decimal points)

Royalty Formulae:

The oil royalty formulae are both price and production sensitive. These examples are for Old Non-Heavy.

Short Formula:

$$\text{Royalty} = S \times R \text{ Multiplier}$$

Old non-heavy oil royalty
Multiplier for the month

Long Formula:

Royalty Payable in
Cubic meters

Old non-heavy factor
for the month

Old non-heavy select
price for the month

$$\text{Royalty} = S + kS \frac{(X-D)}{X}$$

Cubic metres of royalty
Determined in accordance
To Table 1

X

Old non-heavy par price
for the month

Step Two: Gather Data Elements Required to Calculate Oil Royalty

- 1) Establish the correct crown attributes for your well. These may be confirmed for producing wells on the Petroleum Registry of Alberta (PRA). www.petroleumregistry.gov.ab.ca
 - a. Crown Percentage *
 - b. Density (non-heavy or heavy) *
 - c. Vintage (Old, New or Third Tier) *

- 2) Decide which royalty formula format you would like to use. The resulting royalty will be the same whichever you choose.
 - a. Long formula – requires the Par Price*, Select Price* and Crown Royalty factors*.
 - b. Short formula – requires the Royalty Multipliers*.
 - c. The formula format will apply to one of the six categories of basic oil royalty. (Determined in Step One.)

Non Heavy

Old Non-Heavy
New Non-Heavy
Third Tier Non-Heavy

Heavy

Old Heavy
New Heavy
Third Tier Heavy

- 3) Identify the prices and factors/multipliers that apply to the production (calculation) month. The Department of Energy (DOE) publishes these in Information Letters available at our website www.energy.gov.ab.ca.

Par price is the representation of the price an average producer would receive for their conventional crude oil at the wellhead. There is both a non-heavy par price and heavy par price, and both are based on market prices.

Select price is a base price that is used to determine where the price sensitive portion of the royalty curve starts and ends. It is different for each of the three royalty tiers (i.e. old, new and third tier) and is indexed to inflation annually.

Par price in conjunction with the select price are used in the calculation of royalty by forming the basis of the price sensitive portion of the royalty formula.

* See definitions in Appendix

Old Non-Heavy:

Example: Production month January 2005 – Volume produced 65.0m³

Crown - 100%	$S = (65.0)^2 \div 2755.04$ (Using Table One)	k = Old-Non-Heavy Royalty Factor
Density - Non-Heavy	= 4,225 ÷ 2755.04	A = Non-Heavy Par Price
Vintage - 100% new	= 1.53355	B = Old Non-Heavy Select Price

Short Formula	Long Formula
<p>Royalty = Production x Price Royalty = S x R-Multiplier</p> <p>= 1.53355 x 3.500000</p> <p>= 5.36742</p> <p>* = 5.4 m³</p> <p><i>* If you want to confirm your answer please use the 'Basic Oil Calculator' available on the Department website.</i></p>	<p>Royalty = Production x Price Royalty = S + kS $\frac{(A-B)}{A}$</p> <p>= 1.53355 + (2.730852 x 1.53355) $\left[\frac{(359.97-30.43)}{359.97} \right]$</p> <p>= 1.53355 + (2.730852 x 1.53355) $\left[\frac{329.54}{359.97} \right]$</p> <p>= 1.53355 + (2.730852 x 1.53355) $[0.915465]$</p> <p>= 1.53355 + [4.187898 x 0.915465]</p> <p>= 1.53355 + 3.833874</p> <p>= 5.367424</p> <p>* = 5.4m³</p>

Old Heavy:

Royalty for a month on **Old Heavy** oil will be calculated as shown above except 'k' will be the **Old Heavy Royalty factor/R-Multiplier**, 'A' is the **Old Heavy Par Price** for the month and 'B' is the **Old Heavy Oil Select Price** for the month.

New Non Heavy:

Example: Production month January 2005 – Volume Produced 65.0m³

Crown - 100%	S = (65.0) ² ÷ 2755.04 (Using Table One)	y = New Non-Heavy Royalty Factor
Density - Non-Heavy	= 4,225 ÷ 2755.04	X = Non-Heavy Par Price
Vintage - New	= 1.53355	D = New Non-Heavy Select Price

<i>Short Formula</i>	<i>Long Formula</i>
<p><i>Royalty = Production x Price</i> Royalty = S x R-Multiplier</p> <p>= 1.53355 x 3.000000</p> <p>= 4.60065</p> <p>* = 4.6 m³</p> <p><i>* If you want to confirm your answer please use the 'Basic Oil Calculator' available on the Department website.</i></p>	<p><i>Royalty = Production x Price</i> Royalty = S + $\frac{yS(X-D)}{X}$</p> <p>= 1.53355 + (2.737206x 1.53355) $\left[\frac{359.97 - 96.95}{359.97} \right]$</p> <p>= 1.53355 + (2.737206x 1.53355) $\left[\frac{263.02}{359.97} \right]$</p> <p>= 1.53355 + (2.737206x 1.53355) $\left[0.730672 \right]$</p> <p>= 1.53355 + (4.197642x0.730672)</p> <p>= 1.53355 + 3.067099</p> <p>= 4.600649</p> <p>* = 4.6 m³</p>

New Heavy:

Royalty for a month on **New Heavy** oil will be calculated as shown above except 'y' will be the **New Heavy Royalty Factor/R-Multiplier**, 'X' is the **New Heavy** par price for the month and 'D' is **New Heavy Oil Select Price** for the month.

Third Tier Non-Heavy:

Example: Production month January, 2005 – Volume produced 65.0m³

Crown – 100%
Density – Non-Heavy
Vintage – Third Tier

$$\begin{aligned} S &= (65.0-20.0)^2 \div 2207.46 \text{ (Using Table Two)} \\ &= (45.0)^2 \div 2207.6 \\ &= 2,025 \div 2207.6 \\ &= 0.91734 \end{aligned}$$

Z = Third Tier Non-Heavy Royalty Factor
Y = Non-Heavy Par Price
E = Third Tier Non-Heavy Select Price

Short Formula	Long Formula
<p>Royalty = Production x Price</p> <p>Royalty = S x R-Multiplier</p> <p>= 0.91734 x 2.500000</p> <p>= 2.29335</p> <p>* = 2.3 m³</p> <p><i>* If you want to confirm your answer please use the 'Basic Oil Calculator' available on the Department website.</i></p>	<p>Royalty = Production x Price</p> <p>Royalty = S + zS $\frac{(Y-E)}{Y}$</p> <p>= 0.91734 + (2.445448x 0.91734) $\left[\frac{359.97-139.17}{359.97} \right]$</p> <p>= 0.91734 + (2.445448x 0.91734) $\left[\frac{220.8}{359.97} \right]$</p> <p>= 0.91734 + (2.445448 x 0.91734) (0.613384)</p> <p>= 0.91734 + (2.243307 x 0.613384)</p> <p>= 0.91734 + 1.376008</p> <p>= 2.293348</p> <p>* = 2.3 m³</p>

Third Tier Heavy:

Royalty for a month on **Third Tier Heavy** Oil will be calculated as shown above except 'z' will be the **Third Tier Heavy Royalty factor/R-Multiplier**, 'Y' is the **Third Tier Heavy par price** for the monthly and 'E' is the **Third Tier Heavy Select Price** for the month.

STEP 3: Complex Calculations for Oil Royalty

There are some **unique calculations** for Oil Royalty not shown in this Bulletin. Here is a list of them and who to contact at DOE for personal assistance.

If your well:

Is part of an Enhanced Oil Recovery (EOR) Scheme approved by DOE.	Beverley Murray , Manager, Oil Royalty & EOR – (780) 427-2193 E-mail: Beverley.Murray@gov.ab.ca
Has a Horizontal Re-entry* calculation	Karen Langpap , Senior Analyst, Royalty Calculations – (780) 422-9047 E-mail: Karen.Langpap@gov.ab.ca
Is reporting production to more than one production entity (i.e. unit)	Karen Langpap , Senior Analyst, Royalty Calculations – (780) 422-9047 E-mail: Karen.Langpap@gov.ab.ca
Is assigned a new oil coexistent factor . (Less than 100% New Oil)	Karen Langpap , Senior Analyst, Royalty Calculations – (780) 422-9047 E-mail: Karen.Langpap@gov.ab.ca
Has a Low Production* calculation.	Laurie Schneider , Team Lead, Royalty Programs – (780) 422-9039 E-mail:Laurie.Schneider@gov.ab.ca
Will reach a feature cap* during a month and not all production is eligible for the benefit.	Karen Langpap , Senior Analyst, Royalty Calculations – (780) 422-9047 E-mail: Karen.Langpap@gov.ab.ca
Is an approved DOE Experimental Conventional well and is calculating royalties under that regulation.	Beverley Murray , Manager, Oil Royalty & EOR – (780) 427-2193 E-mail: Beverley.Murray@gov.ab.ca
Is Less than 100% Crown Interest.	Karen Langpap , Senior Analyst, Royalty Calculations – (780) 422-9047 E-mail: Karen.Langpap@gov.ab.ca

*If you need to confirm a well status under any of these programs please contact Laurie Schneider at (780)422-9039.

STEP 4: Who at DOE can Help Me?

a) I don't know what my Crown Interest is.	Isabelle Warwa , Administrative Officer, Mineral Development – (780) 427-8952 E-mail: Isabelle.Warwa@gov.ab.ca
b) I don't know what Vintage (Old, New, Third Tier) my well has.	Laurie Schneider , Team Lead, Royalty Programs – (780) 422-9039 E-mail: Laurie.Schneider@gov.ab.ca
c) I don't know if my well qualifies for any of the features (Low production, Reactivated , Third Tier, Horizontal Re-entry)	Laurie Schneider , Team Lead, Royalty Programs – (780) 422-9039 E-mail: Laurie.Schneider@gov.ab.ca
d) I don't know if my well is part of Enhanced Oil Recovery scheme.	Beverley Murray , Manager, Oil Royalty & EOR – (780) 427-2193 E-mail: Beverley.Murray@gov.ab.ca
e) I don't know if my well is approved for DOE Experimental Conventional status.	Beverley Murray , Manager, Oil Royalty & EOR – (780) 427-2193 E-mail: Beverley.Murray@gov.ab.ca

STEP 5: Do you want more information on the Oil Royalty Formulae?

- a) The Legislation that applies to Oil Royalty calculation
www.energy.ab.ca
- b) Oil Royalty in other jurisdictions:
Fiscal Regimes of the Western Provinces and Territories
www.energy.ab.ca

Appendix

Common Crown Royalty Elements:

- ❖ Par Price: Par price is the representation of the price an average producer would receive for their conventional crude oil at the wellhead.
- ❖ Select Price: Select Price is a base price that is used to determine where the price sensitive portion of the royalty curve starts and ends. It is indexed to inflation annually.
- ❖ Crown Royalty Factors: Crown Royalty Factors are represented as k , y and z in the long royalty formulae. The factors are published in an Information Letter each month which is available on the DOE website. www.energy.gov.ab.ca.
- ❖ Royalty Multipliers: Royalty Multipliers are used in the short version of the royalty formulae. The factor is determined by:
 - Royalty Factor $\frac{[\text{Par Price} - \text{Select Price}]}{\text{Par Price}} + 1$
 - Represents the price sensitivity of the royalty calculation.
- ❖ Vintage: There are three vintages for oil:
 - Old Oil – Oil known to exist up to March 31, 1974.
 - New Oil – Oil pools discovered or extended after March 31, 1974, and/or any new wells drilled after October 31, 1991.
 - Third Tier Oil – Oil produced from pools discovered after September 30, 1992.
- ❖ Crown Interest: The Crown interest percentage is the Crown's ownership of crude oil produced from a well-event.
- ❖ Density: Refers to the quality of the oil. For royalty purposes, oil is classified as either **non-heavy** or **heavy**.
 - Non-heavy oil has a density of **less than 900** kg (kilograms) per cubic metre.
 - Heavy oil has a density **equal to or greater than 900** kg per cubic metre.