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Alberta Oil Sands Bitumen Valuation Methodology

For 2013 (Updated Monthly-see page 4)

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Overview

The following table represents the application of the Alberta Department of Energy's Bitumen Valuation Methodology (BVM) to the determination of non-arm's length (NAL) royalty value for 1015 kg/m³ project bitumen at Hardisty.

The table includes the year-to-date model inputs and the respective calculated bitumen Royalty Value, (1015 kg/m³) reported in \$Cdn/ m³ and \$US/bbl. Definitions of terms are also provided.

The table will be updated on a monthly basis.

To obtain a copy of the working model, contact Martyn Griggs at martyn.griggs@capp.ca.

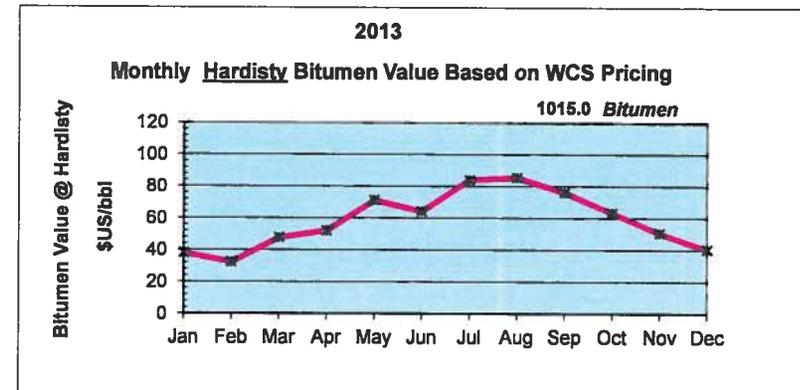
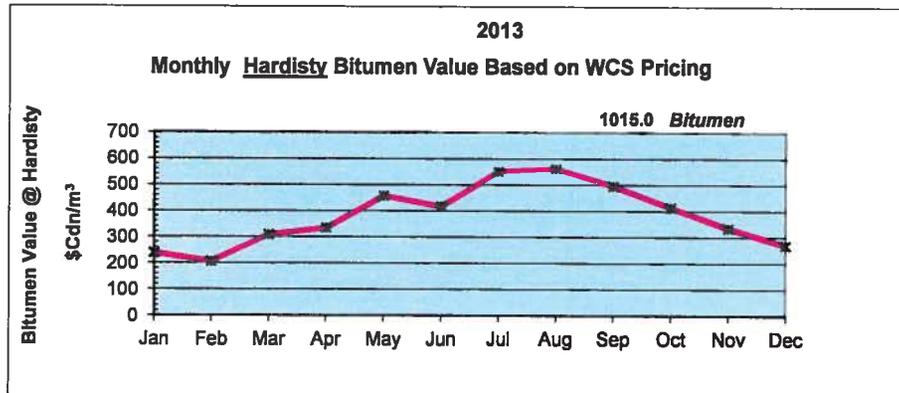
Alberta Oil Sands Bitumen Valuation Methodology

Bitumen
Density
kg/m³ @ 15°C
1015.0

12

<< (Bitumen_Synbit) - (Bitumen_Dilbit) Density Blending Difference, kg/m³

| 2013 | F/X \$Cdn/\$US | WCS ¹ | WCS ^{2,3} | WCS ^{2,3} | WCS ² | Condensate ⁴ | | Royalty Value 1015.0 Bitumen @ Hardisty | |
|------|-------------------|---------------------------------|------------------------------|---------------------------------------|--|---|---|---|----------|
| | | Settlement Price \$US/bbl | Dilbit Volume Fraction | Bitumen Synbit Premium \$US/bbl | Blend Density kg/m ³ @ 15°C | "CRW" Allowance Price \$Cdn/m ³ | Condensate ⁴ "CRW" Density kg/m ³ @ 15°C | \$Cdn/m ³ | \$US/bbl |
| Jan | 0.99213 | 62.11 | 0.98 | 3.71 | 921.2 | 685.45 | 714.2 | 237.95 | 38.12 |
| Feb | 1.00985 | 58.40 | 0.99 | 3.96 | 921.0 | 691.10 | 720.6 | 206.29 | 32.46 |
| Mar | 1.02473 | 66.72 | 0.98 | 3.88 | 921.2 | 665.40 | 719.0 | 308.32 | 47.82 |
| Apr | 1.01870 | 68.87 | 0.98 | 3.61 | 921.2 | 653.01 | 712.1 | 334.41 | 52.17 |
| May | 1.01990 | 80.93 | 0.99 | 2.81 | 924.1 | 649.65 | 698.0 | 457.37 | 71.27 |
| Jun | 1.03147 | 75.39 | 1.00 | 2.68 | 928.2 | 653.71 | 702.4 | 416.68 | 64.20 |
| Jul | 1.04032 | 90.50 | 1.00 | 2.66 | 931.0 | 692.86 | 686.7 | 549.29 | 83.91 |
| Aug | 1.04090 | 90.97 | 1.00 | 2.57 | 932.6 | 680.74 | 683.9 | 559.64 | 85.45 |
| Sep | 1.03424 | 83.56 | 1.00 | 2.74 | 932.4 | 660.74 | 690.9 | 495.42 | 76.13 |
| Oct | 1.03635 | 74.21 | 1.00 | 2.70 | 928.8 | 644.45 | 703.6 | 413.33 | 63.38 |
| Nov | 1.04923 | 62.62 | 1.00 | 3.16 | 925.7 | 579.31 | 714.5 | 334.56 | 50.67 |
| Dec | 1.06392 | 58.96 | 1.00 | 3.69 | 922.5 | 647.82 | 715.4 | 269.69 | 40.29 |



Link to official Crown Site <http://www.energy.alberta.ca/OilSands/1542.asp>

Sources:

- 1: Effective Sep 09, calculated using the volume weighted average of the "NGX WCS WTI" and "NEI WCS" indices (for "NGX WCS WTI" details contact Natural Gas Exchange Inc. at www.netthrput.com) (for "NEI WCS" details contact Net Energy Inc. at www.ne2.ca)
- 2: WCS Stream Founder's Representative - CNRL
- 3: Four month rolling average
- 4: Enbridge, distributed by Equalization Steering Committee

Definitions relating to the density-based Bitumen Valuation Methodology

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|--|---|
| API 12.3 Shrinkage Calculation | A method for calculating the non-ideal volume of mixing adjustment (volumetric shrinkage) resulting from the blending of two hydrocarbons with disparate densities. |
| Bitumen Density, kg/m^3 | Density of project's royalty bitumen as determined by the operator using ERCB approved sampling and measurement practices, and as accepted by the Minister. |
| Bitumen Synbit/ Dilbit Blending Differential, kg/m^3 | Average density difference between bitumen blends blended to the same viscosity specification using a synthetic crude oil and a condensate "CRW" type diluent. |
| Bitumen Value at Hardisty ($\\$/m^3$) | The value obtained by multiplying a project's BVM Blend Volume by the BVM Dilbit Value, and then subtracting the Condensate Allowance Price multiplied by the BVM Diluent Volume. |
| BVM Blend Volume | Volume of blend generated by blending one m^3 of project royalty bitumen and the BVM Diluent Volume, calculated in accordance with API method 12.3. |
| BVM Dilbit Density, kg/m^3 | The density calculated by correcting the reported WCS density to a 100% dilbit basis. This is done by adding the Dilbit Density Adjustment to the WCS Density. |
| BVM Dilbit Value | The value for dilbit calculated by adding the BVM Dilbit Value Adjustment to the WCS Settlement Price. |
| BVM Dilbit Value Adjustment | The $\$/bbl$ adjustment required to correct the WCS Settlement Price to a 100% dilbit basis. This is calculated by multiplying the Bitumen Synbit Premium by (1-Dilbit Fraction). |
| BVM Diluent Volume | Volume of condensate (CRW) required per m^3 of project royalty bitumen to blend it to equal the BVM Dilbit Density, calculated in accordance with the API method 12.3, at the condensate density for that month. |
| Condensate (CRW) Density kg/m^3 | The volume weighted monthly average density of the condensate streams delivered into Enbridge's Condensate "CRW" common stream, as calculated by Enbridge and reported by the Equalization Steering Committee in the monthly Condensate Equalization Data report. |
| Condensate Allowance Price, $\\$/m^3$ | Monthly condensate price calculated by Enbridge and utilized and included in the monthly Condensate Equalization Data as reported by the Equalization Steering Committee |

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|--|---|
| Dilbit Blends | Blends made from heavy crudes and/or bitumens and a diluent usually condensate, for the purpose of meeting pipeline viscosity and density specifications, where the density of the diluent included in the blend is less than 800 kg/m ³ . |
| Dilbit Density Adjustment, kg/m³ | The density adjustment required to correct the reported WCS density to a 100% dilbit basis, calculated by multiplying the Bitumen Synbit/ Dilbit Blending Differential by the (1 - Dilbit fraction). |
| Diluent | Hydrocarbon blended with heavy crudes and or bitumens to enable the meeting of pipeline viscosity and density targets. |
| F/X, \$Cdn/\$US | For each month, the simple average of the published Bank of Canada daily noon exchange rates, rounded to 5 decimal places. |
| Synbit Blends | Blends made from heavy crudes and/or bitumens and a diluent usually synthetic crude oil, for the purpose of meeting pipeline viscosity and density specifications, where the density of the diluent included in the blend is greater than or equal to 800 kg/m ³ . |
| WCS | Western Canadian Select, a blended crude oil comprised mostly of bitumens and diluents, produced and traded at Hardisty, Alberta. |
| WCS Bitumen Synbit Premium, \$US/bbl | The 4-month rolling average of the monthly WCS Equalization bitumen Synbit to Dilbit premium, as provided by the WCS Founder's representative. |
| WCS Density kg/m³ | The monthly volume weighted average density of all the WCS batches delivered to pipelines from the WCS blending facility at Hardisty, Alberta. |
| WCS Dilbit Fraction | The 4-month rolling average of the monthly WCS dilbit fraction, as provided by the WCS Founder's representative. |
| WCS Settlement Price, \$US/bbl | The \$US/bbl price of WCS at Hardisty is calculated by adding the volume weighted average of the Natural Gas Exchange and the Net Energy WCS Indices for a given delivery month to the simple average of the daily settlement price for the prompt month NYMEX Light Sweet Crude Oil Contract for the given delivery month. |