The Honourable James Carr
Minister of Natural Resources
21st Floor 580 Booth Street, Room C7-1
Ottawa Ontario K1A 0E4

September 14, 2016

Dear Minister Carr,

On February 15, 2016, you received a memo[1] on the *"Economic Benefits of Oil Pipelines"* from former Deputy Minister, Bob Hamilton. The memo was released under Freedom of Information (FOI) and posted on CBC's website in July. I have had an opportunity to review the memo.

You have been dangerously misled about an urgent need for pipeline takeaway capacity from Western Canada. The memo is riddled with factual and analytical mistakes and displays a lack of attention to detail. The memo's conclusions are unreliable and yet, based on recent public statements[2], you have adopted them to conclude new pipelines, such as Trans Mountain's expansion, are necessary.[3]

The fact that these errors made their way to your office undetected suggests a lack of professional understanding at NRCan of the relationships that drive the need for pipeline capacity. This is regrettable.

On the Summary page the memo states that:

- Despite the recent decline in oil prices, Canada's oil production is forecast to grow from 3.9 million barrels per day in 2014 to 4.9 million barrels per day in 2020, and 6 million barrels per day by 2040. Production capacity growth during this timeframe is primarily from projects already under construction.

- Canadian pipeline infrastructure is already operating at its fullest potential. As such, approximately 1 million barrels per day of new pipeline capacity will be required by 2020 to reduce the reliance on rail.

In the Background to the memo it states that, "In the National Energy Board's Report on Canada's Energy Future 2016, the Board's Reference case forecasts oil production to grow from 3.9 million barrels per day in 2014 to 4.9 million barrels per day in 2020, 5.8 million barrels per day in 2030 and just over 6 million barrels per day in 2040…To keep up with production, approximately 1 million barrels per day of new pipeline capacity would be required by 2020 and 2 million barrels per day by 2030."

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[1] Memorandum to the Minister, Economic Benefits of Oil Pipelines, CBC, Document.

[2] Bloomberg, Trans Mountain Process Lends "Credibility" to Final Decision, August 29, 2016

[3] Keynote Speech,The Honourable Jim Carr, Minister of Natural Resources, Energy Mines Ministers Conference, Winnipeg, Manitoba, August 22, 2016

The statements and conclusions are wrong:

a) not all crude produced in Canada is physically able to be shipped by pipeline for export;
b) crude oil produced in Western Canada makes its way to local refineries;
c) pipeline infrastructure was not "already operating at its fullest potential" in 2014; and
d) the vast majority of production growth from 2020 - 2040 comes from projects that have not commenced construction or received regulatory approval.

I will deal with each of the factual errors and provide correct figures. The facts show that instead of a requirement for a million barrels a day of new capacity by 2020, there exists sufficient oil export capacity on existing transportation infrastructure for Western Canadian crude until at least 2025, and likely beyond.

First, Alberta and Saskatchewan's oil production is significant within the Canadian oil sector, but these jurisdictions are not the only ones in Canada that produce oil. Canada's crude production in 2014 included approximately 100 thousand barrels a day in provinces that did not require pipeline access to foreign markets and about 220 thousand barrels a day of crude produced off the coast in Atlantic Canada has waterborne access.

Unless Ottawa has a secret plan to ship Atlantic crude from Edmonton, it is unreasonable to include Atlantic Canada's crude oil production figures when estimating pipeline capacity need out of Western Canada. But thats what NRCan staff have done.

The memo says the numbers are from Canada's Energy Future 2016.[4] A quick check of the data in the appendices reveals the error. Crude oil produced in Alberta, Saskatchewan and the Northwest Territories shipped through Alberta, was 3.57 million barrels a day in 2014 and is forecast to grow to 4.5 million by 2020. This is oil that might require pipeline capacity originating in Alberta.

Second, the memo fails to acknowledge local refinery demand. Crude oil demand from refineries in Alberta and Saskatchewan like Suncor, Imperial, Shell, Husky, and Regina Co-op, located within the region, means the need for pipeline export capacity is further reduced as their feedstock demand is met.

The Canadian Association of Petroleum Producers (CAPP) provides figures for refinery throughput in their annual Market Outlook. In 2014 CAPP said refinery demand in Western Canada was 577 thousand barrels a day. The Chevron refinery in Burnaby imports about 47 thousand barrels a day along the existing Trans Mountain pipeline.[5] Leaving the volume destined for Chevron in pipeline export capacity means 530 thousand barrels a day comes off the Western Canadian production total.

Thus, according to production figures for Western Canadian crude, and incorporating refinery demand, 3.0 million barrels a day of Western Canadian oil production was in search of transportation capacity for export in 2014—900 thousand barrels a day less than 3.9 million as claimed in your briefing memo.

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[4] National Energy Board, Canada's Energy Future 2016, January 2016

[5] NEB Hearing Order MH-002-2012, Transcripts Volume 1, March 26, 2013, paragraphs 312- 314

CAPP predicts Western Canadian refinery need in 2020 will grow to 671 thousand barrels a day.[6] Assuming the Chevron refinery continues to source 47 thousand barrels a day along Trans Mountain, crude oil production available for export out of Western Canada in 2020 would be **3.9** million; not **4.9** million as suggested by your officials.

One million barrels a day of additional pipeline capacity is not required by 2020 as asserted in the memo. This is consistent with the conclusion arrived at by the Alberta Energy Regulator (AER) in May 2016. Alberta's analysis shows "that Alberta exports will begin to reach pipeline capacity limits by 2021…assuming that the four proposed pipeline projects do not advance and there are no other incremental additions to pipeline capacity. However, current rail capacity is enough to provide the additional volumes needed within the forecast period (to 2025)."[7]

AER's findings are consistent with a Federal Department of Finance memo dated December 10, 2015 obtained through FOI and published by the CBC in May.[8] That memo states, "Moreover, the low price environment has led to oil production forecasts being revised downward; meaning that sufficient capacity (from both rail and pipelines) is projected to exist to transport oil until at least 2025."[9]

Moving onto additional factual errors, the first graph provided in the memo is titled "Forecast oil available for export out of Western Canada and pipeline capacity". The graph purports to support a need for one million barrels a day by 2020 by superimposing three production forecasts developed through three price scenarios—High, Reference and Low. But, the graph does not come from the Energy Future report. It appears to be a hybrid representation of two sets of data from the Energy Future report that are not comparable. These are Canadian Crude Oil Production under three price scenarios, Figure 5.6, and Pipeline Capacity from Western Canada, Figure 10.7.

The memo states, "the graph below illustrates the Board's forecast for Western Canadian oil production available for export under High, Reference, and Low price cases…" but the Board did not develop a forecast of Western Canadian oil production available for export under three price scenarios.

The memo incorrectly describes the price scenarios it has superimposed on Western Canadian pipeline capacity. The superimposed price scenarios represent forecasts of all Canadian production—not Western Canadian production—with no adjustment for regional refinery demand or supply related to condensate imports. The first graph in the memo to you is meaningless.

It is unclear how the graph was generated. I note that unlike the second graph in your memo where it says "Source: National Energy Board", there is no source identified beneath the first graph.

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[6] CAPP, 2016 Crude Oil Forecast, Markets and Transportation, Refinery Data Download.

[7] Alberta Energy Regulator, ST98, May 2016, Pipelines.

[8] CBC, Energy East pipeline benefits questioned in secret government memo, Drew Anderson, May 31, 2016, Document.

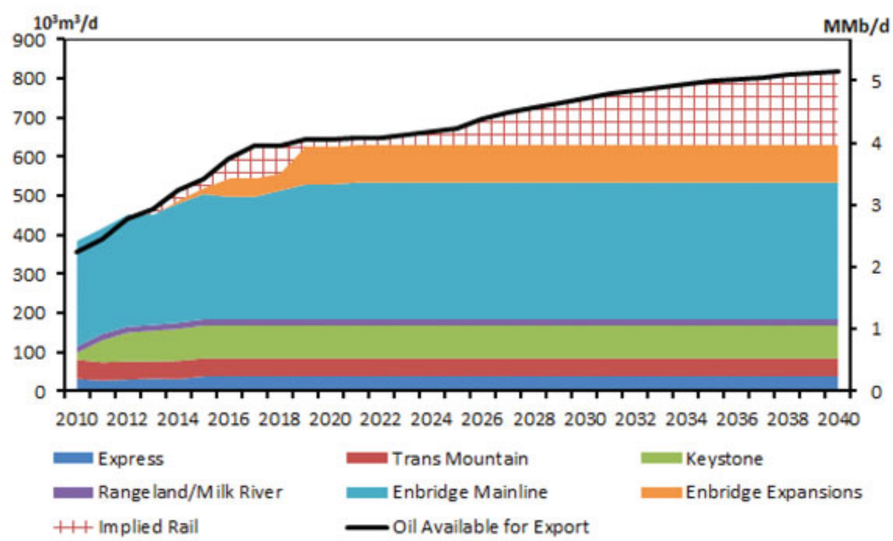
[9] Ibid, Energy-East Pipeline and Carbon Price docment, page 1.

Presenting the graph with production figures from all of Canada superimposed on Western Canadian pipeline capacity is an error, but what is more distressing is that it belies an apparent lack of understanding at NRCan about the difference between oil production and oil supply available for export.

Bitumen is dense and cannot flow through a pipeline unassisted. The diluent of choice is condensate, but since there is insufficient condensate produced domestically, Canada began importing condensate in 2005 for diluent blending purposes. The blending ratio is generally 30/70 so for each barrel of oil sands heavy transported by pipeline, 30 percent is condensate. Therefore, a barrel of bitumen **produced** and then diluted with imported condensate becomes 1.3 barrels of diluted bitumen (dilbit) **supply**.

The second graph in the memo to you is effectively from the Energy Future report, Figure 10.7. It is reproduced below.

Figure 10.7 - Canadian Oil Export Pipeline Capacity and Oil Exports



Source: Canada's Energy Future 2016

The graph shows NEB forecast **oil supply** available for export from Western Canada (black line) compared to existing capacity and approved system expansions. It also includes Enbridge's Line 3 expansion which is not yet approved. Enbridge's Lines 3 and 67 (Alberta Clipper) expansions are included in the orange block.[10] Line 67 was expanded earlier than depicted in the graph increasing available pipeline capacity earlier than illustrated therefore implied need for rail has proven to be lower than suggested on the graph.

Crude oil supply not transported by pipeline is considered to be "implied rail" (as represented by the red boxes). Implied rail is modest for 2020 - 2025 (and given current market conditions will

[10] If Line 3 does not proceed, Energy Future data suggests that 370 kb/d of capacity would be removed from the graph. The existing Line 3 would continue to operate at 390 thousand barrels a day, which is assumed in the light blue box.

end up being well below the volumes depicted in the graph for 2016 - 2019). In 2020 implied rail is about 100 thousand barrels a day, which is roughly the volume currently transported by rail for export.

What the memo neglects to mention is that the graph contradicts the notion that 1 million barrels a day of pipeline capacity is required by 2020.

Investment in rail has generated effective rail loading capacity in excess of 800 thousand barrels a day in Alberta and Saskatchewan.[11] Even if Enbridge's Line 3 Replacement were not approved by Cabinet in November and/or by Minnesota State authorities in the US, there is still no new transportation infrastructure needed until at least 2025. This is consistent with AER and Department of Finance conclusions. But this is not the advice the memo gives.

The memo suggests that pipeline capacity was operating at its "fullest potential" in 2014. It was not. Potential throughput was compromised by pressure restrictions placed on aging pipelines because of safety concerns.

The graph illustrates there was sufficient pipeline capacity until 2012 when rail begins to fill the gap. Between mid-2010 to 2014 the Kalamazoo River tragedy, along with related pipeline integrity concerns on other aging Enbridge and Kinder Morgan lines, saw the introduction of pressure restrictions by regulatory authorities. A number of Enbridge lines, including Line 2, 14, 21, and 6A were under capacity limitations at various times because of spill experience. Enbridge placed Line 3 under pressure restrictions in 2008 removing 390 thousand barrels a day of capacity from its system which it plans to return to market if Line 3 is replaced.[12] During the entire period from mid-2014 to October 2014, Line 6B was restricted because of Kalamazoo.

In March 2013 a group of shippers on Enbrdige's Mainline system explained under oath to the US Federal Energy Regulatory Commission (FERC) how the Kalamazoo spill had compromised system capacity. Shippers documented how apportionment constraints on Enbridge's Mainline System (called Lakehead in the US) were due to the shut down of Line 6B following the rupture at Marshall, Michigan. They confirmed that apportionment continued because pressure restrictions were imposed once the pipeline was restarted.[13]

Enbridge elected to replace Line 6B with wider pipe. It became operational in October 2014 returning the restricted capacity to market as well as increasing the line's capacity by 200 thousand barrels a day.

Pressure restrictions on Trans Mountain have also been a factor in reduced pipeline export capacity. The NEB imposed restrictions in 2011, lifted and reimposed them in 2013 and then lifted them again in February 2014. About 75 thousand barrels a day of capacity was returned to

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[11] Environment and Climate Change Canada, Enbridge Pipelines Inc. - Line 3 Replacement Program, Review of Related Upstream Greenhouse Gas Emissions Estimates, Draft for Public Comments, April 25, 2016, page 17.

[12] Enbridge, Line 3 Replacement Summary.

[13] 144 FERC ¶ 61,035 UNITED STATES OF AMERICA FEDERAL ENERGY REGULATORY COMMISSION,Order Following Technical Conference, July 18, 2013, footnote 2, page 1 and United States of America Before the Federal Energy Regulatory Commission, Docket No. IS13-1700, Post-Technical Conference Comments of Flint Hills Resources Canada, LP, and Affidavit Joseph Beattie, March 7, 2013 accessed on FERC website.

market. ExxonMobile's Pegasus Line sprung a leak in March 2013 taking 95 thousand barrels a day of heavy oil capacity offline.

With the majority of pressure restrictions removed, Line 6B replaced in late 2014, and other capacity expansion initiatives completed on the Enbridge Mainline system, demand for rail began to fall. Exports of Canadian crude by rail averaged 111 thousand barrels a day for 2015 compared with 161 thousand barrels a day in 2014.[14] Year to date, rail export has averaged 95 thousand barrels a day. It is important to recognize that since rail infrastructure has been built, when excess pipeline capacity exists, reliance on some rail volumes will continue for sound business reasons.

In the memo you should have been advised by NRCan staff why the Energy Future 2016 Oil Available for Export projections are overly ambitious.

The Energy Future report was released in January 2016 with stale-dated projections. Energy Future 2016 is based on forecasts finalized in the summer of 2015 under the policies of the previous federal government. Historically, this biennial Energy Future publication is released in early November. For unexplained reasons the release of the report was delayed by more than two months.

The NEB production figures do not take into account delayed or cancelled projects announced within the past year. Some notable announcements have taken place since then. Shell's Carmon Creek Phase 1- 4 was abandoned when it was announced in October 2015 that construction on Phase 1 would stop. This means 160 thousand barrels a day has been removed from the forecast time horizon. When Energy Future 2016 was prepared, 40 thousand barrels a day of that production (52 thousand barrels a day of supply) was expected in 2017.

PetroChina's Brion Energy placed Dover and MacKay River projects on hold this spring due to low commodity prices. Combined, these projects represent 365 thousand barrels a day of deferred production—when diluted with imported condensate this represents 475 thousand barrels a day of supply.

Since the Energy Future outlook was developed more than a year ago it does not sufficiently reflect expectations that oil prices will be lower for longer. Apporximately 2.7 million barrels a day oil sands production has been deferred or cancelled over the past two years. Production intentions are sensitive to a low oil price environment. Energy Future's "Constrained Case" is based on the notion that crude oil prices are higher than they have been. Any supply constrained in the outlook is due to a low price environment, not a lack of pipeline capacity.

Appendix 1 provides a detailed list of the 2.7 million barrels a day in deferred or cancelled projects announced between January 2014 and September 2016.

The second major reason the Energy Future 2016 projections are overly aggressive is that they do not acknowledge the Liberal government's commitment to the Paris Agreement entered into at COP21 last December, other policy directions related to a sustainable future, or the Alberta government's climate change initiatives including its cap on GHG emissions in the oil sands.

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[14] NEB, Canadian Crude Oil Exports by Rail—Monthly Data

The Energy Future report explains that, “Only policies and programs that are law at the time of writing are included in the projections. As a result, any policies under consideration, or new policies developed after the projections were completed in the summer of 2015, are not included in this analysis.”

The NEB is currently undertaking a redo of its report. NRCan staff failed to mention to you that in the introduction to the Energy Future report Board Chair, Peter Watson, says that “the Board will complete an update to EF 2016 this coming autumn to incorporate recent developments.”

Having erroneously claimed that 1 million barrels of new pipeline capacity is needed by 2020, the memo moves on to discuss economic benefits from new pipeline infrastructure projects. A table purports to represent results from studies prepared by the Conference Board on Trans Mountain and Energy East. There are numerous errors of fact in this table. Without correct facts, conclusions arising from the discussion are without merit.

Economic Benefits of Proposed Oil Pipeline Projects

	Capital Investment	GDP	Government Revenues, Taxes (federal and provincial)	Employment (person-years)
Trans Mountain Expansion (Combined construction, 20 years operations) (2012$ millions)	$6,800	22,126	$28,229	123,221

Column 1, row 2, reads “Trans Mountain Expansion (Combined construction, 20 years operations)”. “Combined construction, 20 years operations” is only for GDP and Employment, not for Government Revenues, Taxes, as suggested.

When you reviewed the brief you may have wondered how government revenues from construction and operations could be higher than the impact on GDP—$28,229 compared to $22,126. They cannot. The government revenues figure is overstated by more than 500 percent from what is reported in the Conference Board document.[15]

The second column incorrectly cites the capital investment at $6,800 (2012$millions). The Conference Board did not rely on a capital cost of $6,800 (2012$millions) as input into its Input-Output model. It relied on $4.6 (2012$billion).[16]

What is also important for you to know is that although it is common knowledge that the capital cost of Trans Mountain’s expansion is currently $6.8 billion, the NEB Report on Trans Mountain’s Expansion submitted to you in May erroneously indicates that the capital cost of the

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[15] Conference Board, The Trans Mountain Expansion Project: Understanding the Economic Benefits for Canada and its Regions, Table 1, Page 8.

[16] Ibid., page 6. Kinder Morgan’s earlier budget was $5.4 billion because it excludes the Firm Service Fee approved by the Board during the Firm 50 Application. The Board’s $5.5 billion figure does not exclude the Firm Service Fee.

project is $5.5 billion.[17] This is because the Board never asked Trans Mountain to file an updated capital cost even though Kinder Morgan told its shareholders in October 2015 that the budget had been revised upwards to $6.8 billion.[18]

Intervenors at the Hearing alerted the Board to the revised capital cost, but the Board ignored them. Thus the Board in its report draws conclusions about the need for, and economic viability of, the project that are false.

I am sure you are aware that capital cost drives toll rates, and higher toll rates reduce producer netbacks by the same amount. The Board relied on the toll rates imbedded in a $5.5 billion project budget. The Board did not consider much higher rates related to a capital cost of $6.8 billion. The Board's claim that Trans Mountain's expansion will lead to a reduction in Canadian discounts is compromised accordingly. When more accurate transportation costs by pipeline and marine are considered, there are no reduction in crude discounts to be found. However, the Board's report tells you a reduction in crude discounts is a major reason for recommending approval of the project.

Finally, the memo suggests that a "lack of infrastructure to access global markets led to a significant differential between North American and global prices from 2011-2013." The memo references a Department of Finance estimate of $7.3 billion as the annual loss in value over this period. I have not seen the Department of Finance memo and would welcome the opportunity to review it. However, to suggest there was a lack of infrastructure to access global markets from 2011 - 2013 is not consistent with the facts.

Crude oil production in Atlantic Canada has marine access to global markets. Western Canadian crude oil has access to global markets by way of Trans Mountain to the Westridge marine terminal. This access has existed since 1956.

There was nothing stopping Trans Mountain or its shippers from securing significant access to Westridge to reach global markets in 2011 - 2013. In fact, in 2010 Trans Mountain submitted an application to the NEB to secure 79 thousand barrels a day of guaranteed access to the dock.[19] The application is referred to as the Firm 50 because it not only guaranteed 79 thousand barrels a day of dock access, 50 thousand barrels a day was granted to shippers under a ten year take or pay contract. The Board approved the application in late 2011.

If there was a so-called "lack of infrastructure to access to global markets (that) led to a significant differential between North American and global prices from 2011 - 2013" you would expect that the increased access the Board afforded crude oil shippers when it approved the Firm 50 application would have been fully utilized. It was not.

In fact, fewer barrels of heavy crude oil were delivered to global markets in each year between 2011 - 2013 than in 2010 when a so-called "significant differential" did not exist. The NEB guaranteed oil sands shippers waterborne access for oil sands crude but they barely used it.

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[17] NEB Report, Trans Mountain Expansion Project, May 2016, page 305.

[18] Robyn Allan, National Observer, Cost of Kinder Morgan's Trans Mountain Expansion quietly rises to $6.8 billion, November 17, 2015.

[19] NEB, Reasons For Decision, RH-2-2011, Firm Service to Westridge Marine Terminal, December 2011.

According to NEB commodity statistics of crude oil exports, an average of 9.5 thousand barrels a day of diluted bitumen was exported to non-US markets in 2012 and an average of 7.5 thousand barrels a day in 2013.[20] In 2010, 9.6 thousand barrels a day of diluted bitumen was exported to non-US markets.

It should be noted that Kinder Morgan testified before the Board that if guaranteed access to Westridge were granted, selling into a global market would have a material impact on narrowing crude discounts for all Canadian producers. Clearly that did not occur.

The notion that the differential between Brent and Canadian crude prices would have narrowed with access to global markets is without merit as proven by actual events and yet huge estimates of lost value continue to be generated. There is no evidence that if wider price discounts were to return, pipeline capacity to waterborne access on the west or east coast would narrow them.

NRCan staff should have been aware of the issues to provide you with a much more sober assessment of the impact of Trans Mountain's expansion on the Canadian economy. Instead, you were given egregiously overstated conclusions that there is an urgent need for 1 million barrels a day of new pipeline capacity.

The memo confirms that your actions since you were elected are not focussed on getting the facts right or ensuring that Cabinet makes an informed decision in December. You are focussed on "facilitating (pipeline) development".

A decision on Trans Mountain's expansion does not need to be made for at least five years. Plenty of time to deliver on Mr. Trudeau's promised do-over of Trans Mountain's review and make sure Cabinet has the facts it needs in order to make an informed decision.

I am willing to make myself available to discuss any of the points raised in this letter or the related documents.

Sincerely,

(original signed by Robyn Allan)

Robyn Allan
Independent Economist
9294 Emerald Drive
Whistler BC V0N 1B9

cc Prime Minister Trudeau
Minister Environment and Climate Change Catherine McKenna

Attachments: Appendix 1

[20] NEB, Commodity Statistics, Crude Oil Exports - Summary by Type and Destination 2010 - 2013.

Appendix 1 Oil Sands Projects Cancelled or Deferred Announced 2014 - 2016

Company	Project	Capacity (thousand b/d)
Shell	Carmon Creek Phase 1-4	160
Shell	Pierre River Phase 1-2	200
Statoil	Corner	80
Total	Joslyn Phase 1	100
Cenovus	Christina Lake G&H	100
Cenovus	Foster Creek H, J & Future	130
Cenovus	Telephone Lake Phase A&B	90
Cenovus	Grand Rapids Phase A-C	180
Cenovus	Narrows Lake Phase A-C	130
Husky	Sunrise 2A&B and future	140
Suncor	Mackay River MR2	20
Pengrowth	Lindberg Phase 2&3	37
CNRL	Kirby North 1-2	100
Imperial	Kearl North 3-4	125
Harvest Operations	BlackGold Phase 1&2	30
Grizzly	Algar Lake, May River, Thickwood	36
Devon (JV with BP)	Pike Phase C	35
Ivanhoe	Tamarack Phase 1-2	40
Koch Exploration	Dunkirk	62
Japan Canada	Hangingstone Pilot	11
Laricina	Germain, Saleski	435
Brion Energy	Dover North 1-2 & South 3-5	250
Brion Energy	MacKay River Phase 2-4	115
Marathon	Birchwood	12
Southern Pacific	STP MacKay Phase 1, 2A & 2B	36
Total		**2,654**

Source: NEB Market Snapshots, Alberta Oil Sands Quarterly, Company Reports, News Reports, Compiled R. Allan