THE ECONOMICS OF FINANCIAL SECURITIES FOR ENVIRONMENTAL OBLIGATIONS AND THEIR IMPACT IN ROYALTY REVENUES FROM ALBERTA OIL SANDS IN NORTH AMERICA

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Abstract

The use of natural resources comes with dramatic responsibilities for producers and resource owners. According to Alberta Environment and Sustainable Resources Development mining companies must plan for suspension, abandonment, remediation and surface reclamation of the territory they utilise. These companies, also known as Approval Holders, have choices as to which security types to use in order to satisfy their environmental liabilities. These choices have material impact in determining annual royalty and tax revenues collected by the government.

Royalty regulation in Alberta allows Approval Holders to deduct their annual costs from revenues. QETs (Qualifying Environmental Trusts), unlike Letters of Credit, are allowed for such deductions. As a result, when used by Approval Holders QETs shrink the royalty revenue materially, since its full value is tax and royalty deductible. However, Approval Holders cannot deduct QETs from taxable income if the mine field is no longer recoverable and the production of bitumen has stopped permanently. As time horizon of existing mine fields in Oil Sands shrinks and future commodity prices stay uncertain we expect that Approval Holders will make a quick use of QETs to reduce their taxable income in the near future. In this paper, we explain why oil sands operators have not used QETs as financial securities and which uncertainties should play critical roles in identifying

negative revenue impacts. This report gives an analysis of such differences and suggests possible ways to avoid royalty revenue reductions from Oil Sands mine fields.

Key words: the economics of financial security, qualifying environmental trust, letters of credit, royalty revenue, west texas intermediate.

JEL Classification codes: Q51, Q52, B41

1. General summary

1.1. The Financial Regulation of Mining Operations in Alberta

In Alberta, unlike in many other jurisdictions around the globe, the calculation of security deposits to enable future reclamation of mining area is made by the operators themselves. Since it is more logical that an operator would make its best estimate to commit for a successful reclamation of its used site the legislation in Alberta supports the reclamation calculations to be made by operators. This approach also helps to ease the sustainable development of the Oil Sands mineable areas by creating a clear yet favourable regulatory environment for national and international operators without compromising the environmental challenges left to the government by the industry. Until the September of 1993 security deposits under previous legislation were calculated on an acre basis. With the new regulation of reclamation estimation at full cost the previous per acre rate ($250 per acre) of calculation was grandfathered.

The Mine Financial Security Program, as stated in the MFSP Guide 2011 of Alberta Environment, is a comprehensive program which manages all qualitative and quantitative aspects of coal, sand and gravel and oil sands mine operations which includes:

- Quantification of liabilities incurred for mine operations and potential assets matching offsetting these liabilities
- Regular and appropriate documentation and reporting of information for total liabilities arising and

- A requirement to report ongoing reclamation activities during but not after a production period.

This paper focuses on the economics of instruments used in the Oil Sands mining operations.

The Mine Financial Security Program takes an asset-to-liability approach in securing total expected reclamation liabilities. Companies must remit a base amount of security and, if needed, an additional financial security to meet their liabilities for reclamation purposes.

A general rule says that if an approval holder has:

1) MFSP assets at least three times larger than its MFSP liability, is
2) within 15 years from the end of its bitumen or coal reserves and is
3) keeping up-to-date with its reclamation schedule

Then, additional security above the base security is not required. If at least one of the three requirements above is not met, then additional financial security is required to satisfy total reclamation liability.

1.2. Types of Financial Security Deposits

Four types of financial security deposits have been adopted under MFSP.

Base Security Deposit (BSD)

BSD is paid to the government. The applicant becomes immediately liable whenever it is granted with the Approval to mine in the field. The base security deposit is $30 million for a new oil sands mine with no upgrader and $60 million with an upgrader:

Table 1. Base Security Deposit requirement with/without an upgrader

A new oil sands mine with no upgrader	$ 30,000,000
A new oil sands mine with an upgrader	$ 60,000,000

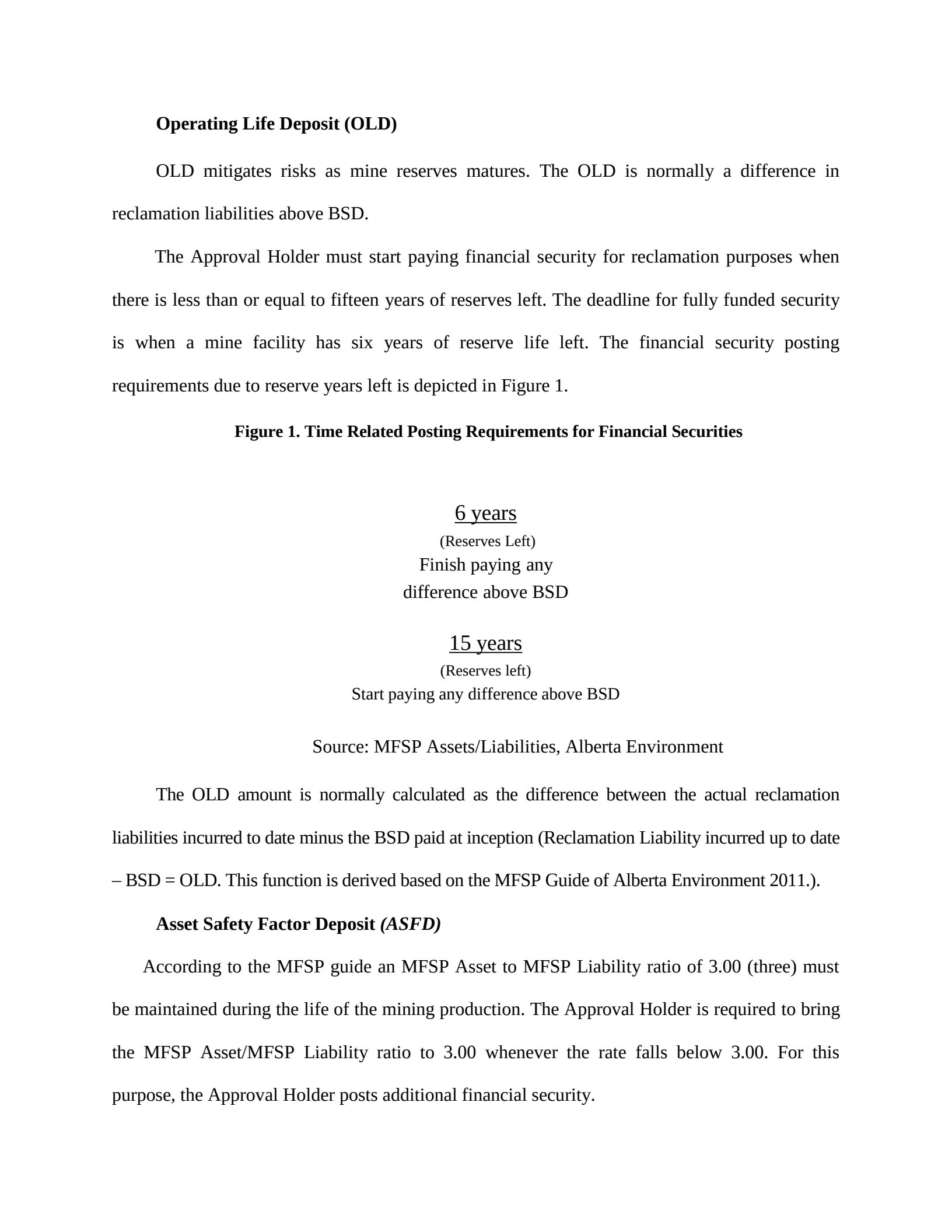
Source: imputed calculation by author and approved by Alberta Environment 2013

Operating Life Deposit (OLD)

OLD mitigates risks as mine reserves matures. The OLD is normally a difference in reclamation liabilities above BSD.

The Approval Holder must start paying financial security for reclamation purposes when there is less than or equal to fifteen years of reserves left. The deadline for fully funded security is when a mine facility has six years of reserve life left. The financial security posting requirements due to reserve years left is depicted in Figure 1.

Figure 1. Time Related Posting Requirements for Financial Securities



Source: MFSP Assets/Liabilities, Alberta Environment

The OLD amount is normally calculated as the difference between the actual reclamation liabilities incurred to date minus the BSD paid at inception (Reclamation Liability incurred up to date – BSD = OLD. This function is derived based on the MFSP Guide of Alberta Environment 2011.).

Asset Safety Factor Deposit *(ASFD)*

According to the MFSP guide an MFSP Asset to MFSP Liability ratio of 3.00 (three) must be maintained during the life of the mining production. The Approval Holder is required to bring the MFSP Asset/MFSP Liability ratio to 3.00 whenever the rate falls below 3.00. For this purpose, the Approval Holder posts additional financial security.

Outstanding Reclamation Deposit *(ORD)*

The requirement for ORD is solely due to any risks that potentially defer the reclamation. The Approval Holder pays additional financial security to reduce its liability to meet reclamation.

1.3. Approval Holder's responsibility, MFSP Assets and MFSP Liabilities

Approval Holder's responsibility when the ownership is less than 100%

Under the MFSP Guide the EPEA Approval Holder is always responsible for the 100% of the MFSP assets and liabilities. In case of joint ventures, variable interest entities or participants, companies may choose to provide their own share of the required financial security. It is because the Approval Holder in reality may or may not have a 100% ownership of the mining facility. However, as it is stated in the MFSP Guide 2011 of Alberta Environment, sharing the financial security payable is a business arrangement but not the requirement of the MFSP. Thus, an Approval Holder is always responsible to arrange timely estimation, measurement and provision of financial securities to the fund.

As of 2011 Syncrude Canada Ltd has a total MFSP security of $ 205,303,024 (This information is based on the Ministry of Environment 2011 Canada and on OSRIN paper by R. Dixon, M. Maier, A. Sandilya and T. Schneider: "Qualifying Environmental Trusts as Financial Security for Oil Sands Reclamation Liabilities). This was a sum of security amounts provided as joint venture contributions. The partners of Syncrude Canada Ltd are Imperial Oil Limited, Suncor Energy Inc., Canadian Oil Sands Ltd., Nexen Oil Sands, Alberta Ltd., Murphy Oil Company Ltd., and Mocal Energy Ltd.

MFSP Assets

MFSP Assets represent the financial capability of a mine project which is operated by an Approval Holder. Satisfying the Asset Safety Factor Deposit calculation, MFSP Assets of a mine project must always be at list three times bigger than MFSP Liabilities of the same project. Note, MFSP Assets and MFSP Liabilities point to a current mine project and not to corporate-wide assets.

MFSP Assets (MFSP Asset Calculation, Description, page 13 Alberta Environment MFSP Guide 2011) are calculated by multiplying the project's gross proven and probable reserves by the three year average netback. The result is then multiplied by a forward price factor also known as projected future commodity price. The Formula given below describes the calculation.

Formula 1. MFSP Assets calculation

$$\text{MFSP Assets} = N * R * F = \\ = \frac{\text{Gross Revenue} - \text{Operating Costs}}{\text{Annual Sales}} * \text{Reserves} * \text{Forward Commodity Price}$$

Where,

- Netback means gross profit and represents a 3 year average of annual netbacks.

$$N = \text{Netback} = \frac{\text{Gross Revenue} - \text{Operating Costs}}{\text{Annual Sales}} = \frac{\text{Gross Profit}}{\text{Annual Sales}}$$

- R = Gross proven and probable reserves. Total dollar values of reserves are calculated based on current product price being sold. If the product being sold is bitumen the dollar value is per unit of bitumen. If the product being sold is synthetic crude then the dollar value is per unit of bitumen. Note that approved mine areas that are excluded from mining in either the ERCB or EPEA approval must not be included in estimating the reserves.

- F = Forward Price Factor. In Oil Sands a forward price factor is the *lesser* of

- 1.00 or

$$\frac{\text{The next three year WTI average price in \$US}/bbl,\ as of last December trade day for Reporting year}{\text{The past three year WTI average price in \$US}/bbl,\ as of last December trade day for Reporting year}$$

Future price increases are not added in determining the factor due to conservatism principle required by statements of financial accounting concepts.

MFSP Liabilities

Reclamation liabilities, just as MFSP Assets, must be measured to determine an MFSP Assets to MFSP Liabilities ratio of three in Assets Safety Factor deposits calculation. It is important to note that MFSP Liability (MFSP Liability Calculation, Page 20, Alberta Environment MFSP Guide 2011) amounts should be derived from each Approval Holder's publicly filed and audited annual financial statements or other supporting working papers. The MFSP Liability calculations include all costs of suspension, abandonment, remediation and surface reclamation of the site assuming the mining operation will run steadily as planned.

Formula 2. MFSP Liability calculation

$$\text{MFSP Liability} = \text{Asset Retirement Obligation (ARO) Liability} + \text{Other Liability}$$

Where,

- Asset Retirement Obligation is an undiscounted (When discounted a nominal dollar amount stated at a future time becomes a smaller amount in current period. Because current balance sheet includes an undiscounted future dollar amount today, it is acceptable to keep this undiscounted obligation as it is in current balance sheets.) sum of suspension, abandonment, remediation, and reclamation costs of the MFSP site. Since the sum of these costs is not discounted, their actual present value today is lower than ARO number in the Balance Sheet. MFSP Liability estimates and calculations include all the possible costs to reclaim the site. It is assumed that reclamation operations are carried out during and after the mine ceases to operate.

- Continuous reclamation process is important in obtaining a final reclamation certificate (The MFSP Liability calculations represent the third party costs to suspend, abandon, remediate and surface reclaim the site based on the assumption the operation will continue to run in normal fashion until the final reclamation certificate is received). In 2011, Canada has adopted new

accounting standards under IFRS to account for liability provisions. Stemming from new adoption the Other Liability provision encapsulates any inconsistencies between the two standards.

Table 2. Differences between financial security deposits (The table is initially provided at page 24 (Alberta Environment MFSP Guide 2011)

	Base Security Deposit - BSD	**Asset Safety Factor Deposit – ASFD**	**Operating Life Deposit - OLD**	**Outstanding Reclamation Deposit – ORD**
Risk addressed	Approval Holder unexpectedly defaults.	Approval Holder`s MFSP Asset value falls below 3 times their MFSP Liability.	Approval Holder`s resource base is nearing the end of its life.	Approval Holder is not progressively reclaiming land that has been scheduled for reclamation.
Main Factor	Complexity of the sector	MFSP Asset, MFSP Liability and any BSD and OLD	Reserves and sales rate represented by Reserve Life Index (RLI) for sites with both AENV and ERCB approvals	Reclamation performance based on Current Mine Reclamation Plan
Deposit calculation basis	On the basis of each EPEA approval	On the basis of each EPEA approval	On the basis of each EPEA approval	On the basis of each EPEA approval
Deposit payment	Lump Sum	Lump Sum for the shortfall	Phased-in over 10 years, adjusted for BSD	Lump Sum for un-reclaimed land
Deposit reduced when…	Amount does not decrease until the MFSP Liability falls below the BSD	The Adjusted Asset Safety Factor is equal to or greater than 3.00. This factor is calculated each year.	MFSP Liability is reduced OR Reserves added to bring the reserve life equal to or greater than 6.00 (partial recovery) or equal to or greater than 15.00 (full return).	When the Approval Holder reduces the Cumulative Reclamation Balance.

Source: Alberta Environment 2011

As it was initially described in section 1.2 (Types of Financial Security Deposits) requirements for additional security deposits describe certain triggers about the nature of such payments:

Base Security Deposit (BSD)

Oil sands mines are required to provide a Base Security Deposit in accordance with the following table:

Table 3. BSD held by Alberta Environment, as of December 31, 2010

Approval Holder/Project Name/EPEA Approval Number	Base Security Deposit
Canadian Natural, Horizon, 149968	$ 61,200,000.00
Imperial, Kearl, 46586	$ 64,655,000.00
Shell Albian, Jackpine, 153125	$72,361,895.00
Shell Albian, Muskeg River, 20809	$111,277,441.29
Suncor, Base Mine, 94	$359,096,654.00
Suncor, Fort Hills, 151469	$38,958,605.00
Syncrude, Mildred Lake and Aurora North, 26	$205,303,024.00
Total	**$912,852,619.29**

Source: Alberta Environment 2011

Asset Safety Factor Deposit *(ASFD)*

The table below provides an example for Asset Safety Factor calculation.

Table 4. Assets Safety Factor Deposit

MFSP Assets	MFSP Liability-OLD-BSD	AASF	Asset Safety Factor Deposit (ASFD)	Liability net of Deposits	Resultant ASF
$ 61,000,000	$20,000,000	3.05	$0	$20,000,000	3.05
$57,500,000	$20,000,000	2.88	$833,333	$19,166,667	3.00
$54,000,000	$20,000,000	2.70	$2,000,000	$18,000,000	3.00
$50,500,000	$20,000,000	2.53	$3,166,667	$16,833,333	3.00

Source: Alberta Environment 2011

Sample calculation for the second raw from Table 4 where MFSP Assets are equal to $ 57,500,000

1. MFSP Liability-OLD-BSD = Liability Net of Deposits = $20,000,000

2. Resultant Asset Safety Factor = MFSP Assets/Liability Net of Deposits = $57,500,000/$20,000,000 = 2.88

3. Asset Safety Factor Deposit = MFSP Liability – OLD – BSD – (MFSP Assets/3) = $20,000,000 - $57,500,000/3 = $19,166,667

Operating Life Deposit *(OLD)*

As noted in section 1.2 (Types of Financial Security Deposits) Operating Life Deposit is required as Approval Holder's reserves have less than 15 years of lifetime.

Calculation for OLD begins when the Reserve Life Index (RLI) becomes lower than 15 years:

0% of the MFSP Liability when RLI >= 15.00

10% of the MFSP Liability when RLI < 15.00

20% of the MFSP Liability when RLI < 14.00

30% of the MFSP Liability when RLI < 13.00

The calculation reaches a 100% of the MFSP Liability when reserve life becomes less than six years (The calculation for Operating Life Deposit is based on Alberta Environment MFSP Guide 2011).

1.4. Current Status of Reclamation Activities in Alberta Oil Sands

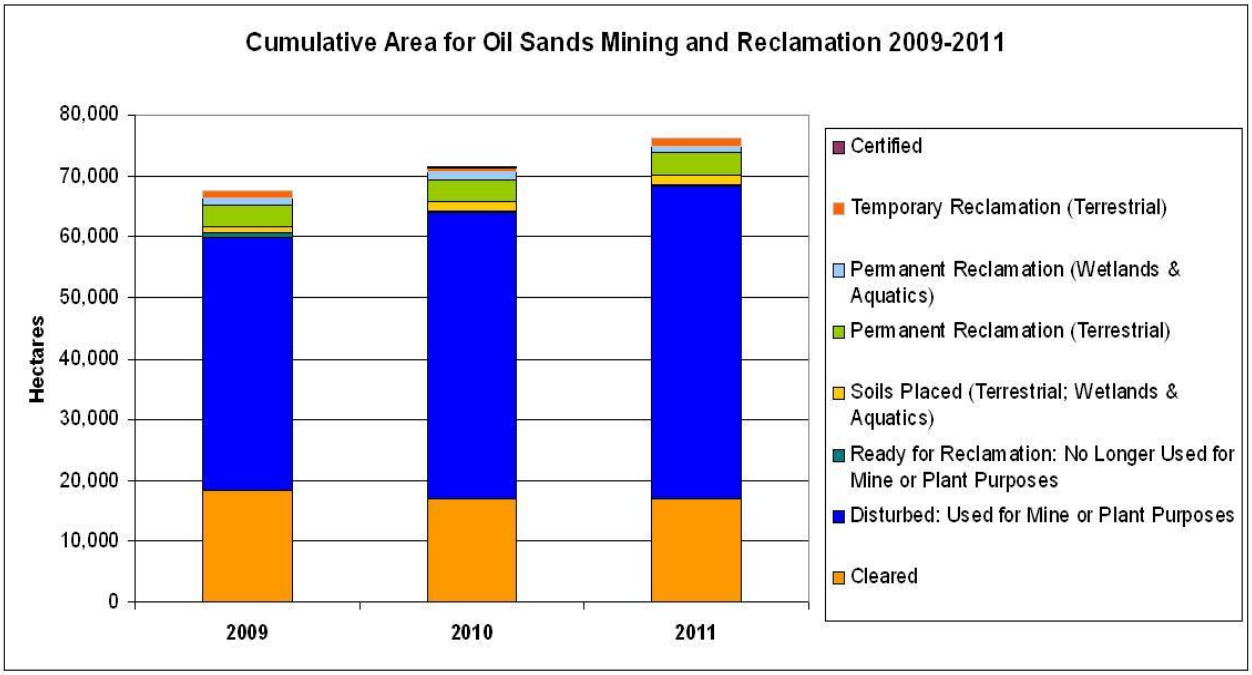
Generally, mine land areas can either be temporarily or permanently reclaimed. Alberta Environment provides that official trend for disturbed land has increased between 2009 and 2011. The figure below describes the cumulative area for oil sands mining and reclamation activities during 2009-2011. We could see that areas ready for reclamation have decreased from 2009 to 2011. This is because these lands are being either actively used or reclaimed. The fact that temporary reclamation activities have broadened may explain the decrease of areas ready for reclamation.

As the figure provides below, the disturbed areas of land have been increasing for the last three years.

Today, Canada exports more than two million barrels of oil to US and other international markets. It is forecasted that export potential will even double before 2021. Such an extensive increase in crude export cannot be pictured without bigger disturbed land areas. MFSP Liabilities of Approval Holders will also extend with the increased number of land disturbances that will cost billions of dollars per reclamation area. It is expected that operators will continue using financial securities to keep their asset to liability balances on accepted levels for the Director of Alberta Environment and Sustainable Resource Development.

We assume that the dollar amounts of financial securities will grow such hat any Approval Holders will change forms of reclamation securities available to them. Due to differences in tax and royalty revenue treatments of reclamation securities a change from one type of security to another will

Figure 2. Areal breakdown of Oil Sands Mining and Reclamation



Source: Provided by Alberta Environment

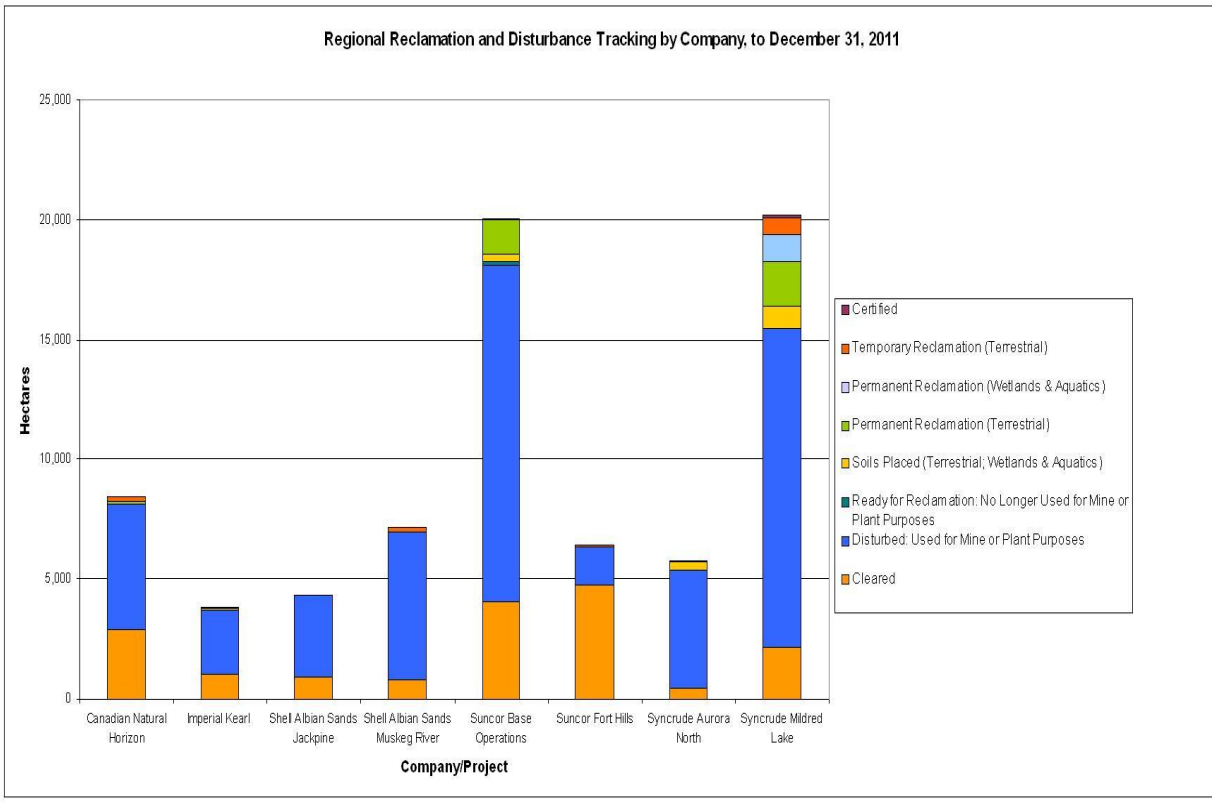
create substantial fluctuations in royalty revenues. For example: Qualifying Environmental Trusts are deductible for both, tax and accounting purposes. When QETs are used by Approval Holders

they deduct their QET amounts as allowed costs the end result of which is reduced royalty payments. Whereas, Letters of Credit are not tax deductible which means there is no disadvantage for the government when LOCs are used by Approval Holders. However, companies have choice as to which security to use. By exercising it they can plan their costs and have impact on annual budget commitments of the government. The paper discusses these nuances in detail in section 3.2.

A breakdown by operators in Oil Sands mine areas is provided in Figure3. As depicted in Figure3, Suncor and Syncrude has put in place a huge reclamation work. Let us note that reclamation certificate is not granted to Approval Holders immediately. Certain period must pass before a reclamation certificate is finally granted. Syncrude Canada has been issued a reclamation certificate for 104 hectares of reclaimed land. Such practice is ongoing and will continue in the future too. However, there are huge areas that are disturbed at present and will need to be reclaimed and returned to the province.

At present, reclamation technology is inefficient and costly to operators. It is mainly mechanical and some chemical processes that requires strict commitments from Approval Holders. For example, it takes around 20-30 years to place soils, neutralize sulfur content and re-vegetate the mine area as per approved plans. Despite all these difficulties extensive research and development activity is taking place for mine reclaimable sites. Newly created corporative efforts are aimed at addressing these issues. Canadian Oil Sands Network for Research and Development (CONRAD) and Cumulative Environmental Management Association (CEMA) are good examples. CEMA defines criteria for Approval Holders to meet the reclamation requirement set by the government. Although efforts to create new reclamation techniques are continuously studied, the financial security cost of MFSP Liabilities are not expected to decrease in value. Hence, financial securities amount to billions of dollars in the near future.

Figure 3.Reclamation and Disturbance by Companies, December 31, 2011



Source: Provided by Alberta Environment

2. Financial securities

2.1. Financial Security Calculation Period

According to Alberta Environment MFSP Guide security is calculated annually. If current MFSP Assets are lower than previous MFSP Assets or current MFSP Liabilities are higher than previous year MFSP Liabilities then security required will increase in the current period. In other words, required financial security will increase because less reclamation has been done than the Planned Reclamation. If current MFSP Assets are higher than previous MFSP Assets or current MFSP Liabilities are lower than previous MFSP Liabilities then less security will be provided in the current year. This may be a result of more reclamation work done than Planned Reclamation for the current year. Total amount of financial security is usually the sum of four deposits: BSD

+ OLD + ASFD + ORD. An exception occurs when the sum of four deposits exceeds the MFSP Liability amount where the deposit balance is reduced to MFSP Liability amount.

As noted above in MFSP Liabilities section, Approval Holders must provide financial securities based on two deposit types: Base Security Deposit and Operating Life Deposit.

With base security the amount is $30 million for an oil sands mine. If an upgrader exists on the site then the base security is equal to $60 million as shown in table 3. Later, as an oil sands mine reaches its reserve life left by 15 years the Approval Holder must set aside an additional 10% security per year. This is process of security buildup is shown under Operating Life Deposit sub-heading at the end of the previous page. With less than six years left before the end of the mine life a full amount of financial security is posted.

2.2. Types of Financial Securities

Forms of financial securities for MFSP can include(Forms of financial securities mentioned in the paper is based on Section 21 of the Conservation and Reclamation Regulation) cash, cheques to the Minister of Finance, debentures, government backed bonds, irrevocable letters of guarantee, credit, performance bonds, term deposits, investment certificates and qualifying environmental trusts. Any form of security must be accepted and approved by the Director of Alberta Environment and Sustainable Resource Development.

The most common type is known as Letter of Credit and is broadly used to offset required MFSP Liabilities. The other form of security is called Qualifying Environmental Trusts (QET). QET are more complex in that their accounting and tax treatment entirely differs from that of LOC. For example: an entire amount of QET security is deductible for both financial accounting and tax purposes in the year of occurrence and there for affects total royalty revenue of the government for that same year. Whereas, with LOC security, only a transaction cost of the security is deducted as a current year expense which has immaterial impact on current year

royalty revenues of the government. No matter which form of security is chosen an Approval Holder is required to disclose its financial securities in their entirety. The paper gives a detailed analysis of such differences and derives possible ways and motives of royalty revenue disruptions later in this section (Financial Securities).

Letter of Credits (LOC)

The majority of all securities in oil sands are provided through irrevocable letters of credit. LOCs are financial instruments that allow the Director to collect cash from the bank writing the instrument in case if the Approval Holder fails to meet its reclamation deadlines. There are advantages and disadvantages of LOC for Approval Holders.

Table 5 Advantages and Disadvantages LOCs provided by Approval Holders.

Advantages to Approval Holders	**Disadvantages to Approval Holders**
Inexpensive: – It costs a few percent of the full amount stated in LOCs to create the financial instrument.	Cost of LOC, not the face amount of LOC is tax and royalty deductible. Thus, more taxes paid every year by Approval Holders.

Source: imputed calculation by author and approved by Alberta Environment 2013

As we could see from Table 5 letters of credit simply cost less to Approval Holders.

For example: $10 million LOC during Year1 would cost the Approval Holder $200K if the bank charges two percent on the face amount of LOC. This is an advantage to the Approval Holder. Because, it is not required to physically set aside an entire ($10 million) amount for the LOC. Thus, only $200K is paid to the bank to create the instrument.

On the other hand, when looked at the tax and royalty calculations we could see the disadvantage to the Approval Holder. Approval Holder would be able to deduct only $200K from its revenue as security expenses, rather than entire $10 million, during that same year. That

would leave more revenues for both tax and royalty purposes. In other words, Approval Holder would pay more cash for tax and royalty remittances at Year1.

Qualifying Environmental Trust (QET)

Qualifying Environmental Trusts are more costly to Approval Holders but leaves considerably less royalty and tax collections for the government at any period QETs are used. With Qualifying Environmental Trusts the entire amount of the instrument ($10 million) would be set aside by Approval Holders. This means Approval Holders must actually set aside the face amount stated as QETs. The entire QET amount is deductable for income tax purposes meaning the entire face amount are deducted from the current year revenue of an Approval Holder thus leaving less Profit available for both Tax and Royalty calculation purposes. QETs are discussed in further detail in section 3.1 and 3.2.

3. Impacts of qualifying environmental trusts (QETs)

3.1. Royalty Revenue impact of QETS

Royalty revenues comprise a great portion of the Alberta Government Revenue. Royalty revenues are calculated based on the market price of the product being produced(In accordance with Oil Sands Royalty Regulation, 2009 Government of Alberta 2009 the product can be many forms of crude: synthetic crude, bitumen, blended bitumen etc. For a complete list refer to this source.). IN accordance with the Mine and Minerals Act of the Government of Alberta royalty is paid after a difference between revenues and allowed costs. QETs fall into the category where Approval Holders can deduct the full face amount of QETs as allowed costs to determine the royalty revenue for the government. Unlike LOC where the establishment cost deductible for income tax purposes is 1%-2% of the face amount, QETs are fully deductible meaning it results in huge amount royalty reduction as a bottom line.

The advantage of full QET deduction from revenues as an allowed cost is enabled by the Income Tax Act of the Government of Canada. QETs are created as a response to an unfair tax positions faced by medium-to-small size mining companies. Before QETs, all the mining companies were not allowed to deduct the full amount of their reclamation securities set aside for reclamation purposes. As a result, these smaller companies had to pay materially higher tax money. The importance of establishing QETs is that it creates a choice for Approval Holders from the tax point of view. With the establishment of the QET, Approval holders can choose to either pay more tax and royalty revenues by using LOC as an instrument or they may want to use QET to considerably reduce their tax and royalty payments for a single fiscal period.

In addition, during the periods with rising commodity prices the government may choose to review its royalty policy and excessively charge the Approval Holders on top of current economic rent. In response to such potential reviews by government the Approval Holders may contribute to QETs during the same fiscal year by decreasing their taxable income for that period. Moreover, companies can withdraw from QETs when royalty rates become lower as a result of decreasing market prices.

With this choice in mind we assume that companies would prefer QETs to LOC towards the end of their reserve life. The assumption of increasing importance on QETs instruments demonstrates once more that the Government of Alberta should take a thorough look at royalty sensitive parts of its provincial budget.

3.2. Uncertainties and limitations on Approval Holders` use of QETs

Although it seems that Approval Holders can impose as much QET as possible for their tax purposes Alberta Environment would presumably limit voluntary QETs. Thus, voluntary contributions, unlike mandatory QETs, would not qualify for tax deductions. This would have a positive impact on the total amount of royalty collection. Another uncertainty would be a

hypothetical situation where the bitumen production ends whereas the Approval Holder has substantial amounts of QET funded. Any subsequent withdrawal of QETs after the depletion of mine reserves are not depicted anywhere in the current tax regulation.

Why Approval Holders would use QETs during periods with high oil prices?

The paper assumes that Approval Holders would use QETs to deduct costs and reduce royalty revenues during prevailing crude prices. This is because royalty revenues increase as WTI crude price goes up and Approval Holders would be willing to offset this increase by reducing their taxable income together with their net royalty revenue. The paper has chosen the year of 2011 to calculate royalty revenues for post payout projects of Alberta Energy in 2011:

The Crown`s royalty share of an oil sands product during a period is the greater of the Gross Royalty Rate and the Net Royalty Rate (See Alberta Oil Sands Royalty Guidelines, Principles and Procedures (October 11, 2012). Three separate formulas exist for different price relationships for both Net and Gross methods of royalty calculation. For a Low<WTI<High relationship we must use the formulas as they are given in the section above.).

Formula 3. Gross Royalty Rate

$$\text{Grossb Royalty Rate} = \ \mathrm{R}_{\mathrm{Gross\%}} \ = \left(1\% + (\mathrm{WTI} - \mathrm{Low}) * \frac{8\%}{\$65}\right)$$

Formula 4. Net Royalty Rate

$$\text{Net Royalty Rate} = \ \mathrm{R}_{\mathrm{Net\,\%}} = \left(25\% + (\mathrm{WTI} - \mathrm{Low}) * \frac{15\%}{\$65}\right) * \frac{\text{Net Revenue}}{\text{Gross Revenue}}$$

$$\text{where } \mathrm{Low}(\$55) < \mathrm{WTI} < \mathrm{High}(\$120)$$

Table6. 2011 annual WTI price calculation

DATE	WTI (USD) Month Average	USD/CAD Exchange Rate	WTI (CAD)Month Average	WTI (CAD) Annual
January	95.74	0.965	99.15	
February	97.41	0.988	98.59	
March	102.86	0.991	103.75	
April	106.98	0.996	107.37	
May	100.47	1.000	100.42	
June	96.81	1.003	96.44	
July	96.84	1.009	95.97	
August	94.20	1.025	91.84	
September	92.25	1.023	90.14	
October	94.01	1.019	92.20	
November	94.34	1.013	93.06	
December	94.34	1.011	93.28	
ANNUAL				**96.85**

Source: imputed calculation by author and approved by Alberta Environment 2013

During 2011 the average WTI price of crude was calculated to be CAD 96.85 which falls between low and high ends. Low and high ends are determined by Alberta Energy to be $55, $120 respectively. All the data was collected from oil sands monthly royalty rates of Alberta Energy. The average annual price is then calculated as a mathematical average of twelve monthly rates for WTI in Canadian dollars.

Having calculated the annual WTI price as CAD 96.85 the paper further adapts the Oil Sands –post payout projects of Alberta Energy as of Year 2011. The purpose is to compare our independent royalty revenue calculation with the royalty revenue number given by Alberta Energy and then assess a possible decrease in royalty revenue if a QET was introduced.

Table7. Oil Sands – Post Payout Projects 2011

Sales Revenue	**$ 34,623,100,000**
Operating Costs	$ 11,337,969,000
Diluent Costs	$ 5,933,445,000
Capital Costs	$ 6,176,089,000

Other Allowed Costs	$ 0
Net Revenue	$ 11,175,597,000
Number of Projects as of 2011	57
Royalty (as stated by Alberta Energy)	**$3,793,860,000**

The production includes bitumen, blend, SCO, WCS and other volumes.

Now, let us calculate royalty revenue independently:

$$\text{Gross Royalty Rate} = R_{Gross\%} = \left(1\% + (\text{WTI} - \text{Low}) * \frac{8\%}{\$65}\right)$$

$$= (1\% + (96.85 - 55) * \frac{8\%}{\$65}) = 0.062 = 6.2\%$$

Now, let us multiply the gross rate to the gross revenue which is provided in Table7:

Gross Method Royalty = $ 34,623,100,000*6.2% = $ 2,146,632,200.

$$\text{Net Royalty Rate} = R_{Net\%} = \left(25\% + (\text{WTI} - \text{Low}) * \frac{15\%}{\$65}\right) * \frac{\text{Net Revenue}}{\text{Gross Revenue}} =$$

(25%+(96.85-55)*(15%/65)*11,175,597,000/34,623,100,000 = 28%

Now, let us multiply the net royalty rate to the net revenue which is provided in Table7.

Net Method Royalty = 28%*$ 11,175,597,000 = $ 3,129,167,160.

Since the greater of the two is considered as royalty revenue we can choose Net Method Royalty amount of $ 3,129,167,160.This is a little different than the number stated by Alberta Energy. The difference is due to return allowances, other net proceeds and tax differences. For simplicity these differences have not been included in calculations.

If total royalty revenues earned by the government of Alberta in 2011 on post payout projects were divided to the number of active projects in 2011 ($3,793,860,000/57) we could get a royalty revenue per project of $ 66 million. Considering an average mine field with a minimum facility to have a market value of $ 100 million, it would not be hard to find a 15% tax deduction for any QET amount. If 100% funded by QET, the 15% tax deduction on a $100 million project would equal to $15 million, making 22% of $66 million royalty revenue assumed above on

average. A 22% hypothetical change in royalty revenue could have a substantial impact on budgeting decisions during any period QETs funded.

Use of QETs during times with high risen crude prices would not have a sensitive impact on government`s budget planning. This is because increased crude prices would offset tax gains of the Approval Holders. However, it would be beneficial if the government ruled out a new law against the use of QETs during low crude prices. If we consider the fact that Supported Infrastructure Organizations in Alberta (SIOs) are funded by the provincial budget then the importance of putting limitation on QETs during times with low oil prices would avoid possible financial distress.

3.3. Tax impact of QETS

Generally, amounts paid and accrued for reclamation obligations before actual reclamation expenditures incurred are not tax deductible for income tax purposes. Although statutory regulations puts constraints on tax deductibility of the allowed costs for tax purposes it is allowed to deduct both, current and estimated future reclamations costs for financial reporting purposes under current financial reporting standards. To offset this mismatch, qualifying environmental trusts paid by taxpayers are allowed as tax deductible. Moreover, the QET given to the trust can earn income during a year. Such income made on QET is taxed first. However, that same after-tax income is taxed for the second time at a corporate tax rate (15% in 2012) in the year it is removed from the QET resulting in an element of double taxation. Also, when the QET is withdrawn by the Approval Holder the taxable income is increased by the exact QET amount subject to corporate tax rate. In addition to mine operations QET rules of the Income Tax Act are also inherent for pipeline abandonment trusts.

As stated in section 2.1 the Approval Holder calculates its MFSP Asset and Liability balance once at the end of each year. If the Approval Holder decides to withdraw all or a portion

of its QET amount from the trust it is expected that the trustee would return the cash amount to the Approval Holder. Such a practice with mine Approval Holders was not observed before.

4. Tax and royalty regimes in other jurisdictions

Royalty Regimes

Governments have variety of methods to impose royalty on Approval Holders. These can be unit based, value based also known as ad valorem, or profit and income based. In Canada, most jurisdictions (British Columbia, Northwest Territories) tend to have profit based royalty, Saskatchewan having both, profit based and ad valorem(Ad valorem royalty is based on the production volume rather than gross profit based.) type royalty regimes. Appendix 1 provides the royalty practices, types and rates across other jurisdictions.

Tax Regimes

In general, tax regimes are structured progressively. When a project becomes more profitable their tax burdens increase too. Canada has a taxation system with a slight increase in tax burdens as projects become more profitable due to commodity price increase. Appendix 2 describes increase in average effective tax rates with rising internal rate of returns for mining projects. A study conducted by Natural Resources Canada suggests that Canada, Chile and United States have more tolerant mining taxation regime when Approval Holders project profitability increase. However, all other international jurisdictions tend to penalize their mine projects as internal rate of project returns go up.

In searching around many jurisdictions it was observed that most governments accept only cash, bonds and bank guarantees. Few jurisdictions allow third party trusts as financial security for reclamation purposes. Despite all the similarities in tax rates (Appendix 3), tax rules and allowances established by various governments around the world, it was found that most jurisdictions would not allow for tax deductions on reclamation securities.

5. Conclusions

Unlike many other jurisdictions around the globe, Canada's tolerant tax regime allows the companies to keep almost a 100% of marginal increases in their internal rate of returns. Moreover, Approval Holders have a free choice to choose QETs at their discretion by avoiding regular tax and royalty payments otherwise they would have incurred. The major caveat mentioned by this report is the uncertainty of a potential use of QETs and future prices of WTI crude. QETs are deductible for both, royalty and tax purposes and we expect Approval Holders to take a complete advantage of this financial security created by the Income Tax Act of Canada. Although the use of QETs may not have dramatic impact on royalty revenues when crude prices are high I believe suggestions should be made to freeze tax and royalty deductibility provisions of QETs at times with declined commodity prices. It is suggested that the Government of Alberta reach a consensus with Approval Holders by putting certain rules in place including:

1. Ruling out a new law against the use of QETs during low crude prices. If we consider the fact that Supported Infrastructure Organizations in Alberta (SIOs) are funded by the provincial budget then the limitation on QETs during down times would avoid any financial stress.

2. If new ruling does not seem to be realistic, then communicating with Approval Holders and operators on their expected choices of security types and factoring those results in to medium term budgeting decisions.

3. Determine the list of near end of life reserve mines and impose specific limitations on the use of QETs for such mine projects.

As commodity prices fluctuate unstably and current mine reserves become less recoverable sharp decreases in royalty reductions may turn out to be unavoidable in near time horizon.

6. References

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7. Glossary of terms and acronyms

7.1. Terms

Approval Holder

An entity that has been granted an Approval for oil sands mining and processing under the Environmental Protection and Enhancement Act (EPEA)

Director

The Director of the Alberta Environment and Sustainable Resource Development designated under EPEA who issues approvals for mine or production facility.

Financial Security

A reclamation liability security provided by Approval Holders as cash or financial instrument.

Qualifying Environmental Trust

As per Income Tax Act (ITA) of Government of Canada 1985, section 28:

A" qualifying environmental trust" refers to a trust resident in a province and maintained at that time for the sole purpose of funding the reclamation of a site in the province that had been used primarily for, or for any combination of, the operation of a mine, or the deposit of waste, where the maintenance of the trust is or may become required under the terms of a contract entered into with Canada or the province. It does not include a trust that relates to the reclamation of a well.

Upgrader

An upgrader is a production facility that uses heat and pressure to change the extracted bitumen into liquid hydrocarbons and saturates with hydrogen to produce synthetic crude oil. An upgrader has by-products during processing.

7.2. Acronyms

ASFD	Asset Safety Factor Deposit
BSD	Base Security Deposit
CABREE	Centre for Applied Research on Energy and the Environment
ITA	Income Tax Act of Canada
ICMM	International Council on Mining and Metals
LOC	Letter of Credit
MFSP	Mine Financial Security Program
OLD	Operating Life Deposit
ORD	Outstanding Reclamation Deposit
QET	Qualifying Environmental Trust

APPENDIX 1: Summary of Royalty Practices

Selected North American Jurisdictions

	Arizona (US)	**British Columbia (Canada)**	**Michigan (US)**	**Nevada (US)**	**Northwest (Canada)**	**Ontario (Canada)**	**Saskat Chewan (Canada)**
Law	Provincial	Provincial	Provincial	Provincial	Provincial	Provincial	Provincial
Royalty Type	Ad valorem	Profit based (net revenue) and ad valorem (net proceeds)	Ad valorem	Profit based	Profit based	Profit based	Profit based (net revenue) and ad valorem (net proceeds)
Royalty Rate	At least 2%	13% net revenue or 2% net proceeds	2-7%	2-5%	5-14%	10%	5% of net profit increases to 10% with life time thresholds

Source: adapted from The World Bank – Mining Royalties, a global study of their impact on investors, government, and civil society

Selected Latin American Countries

	Argentina	**Bolivia**	**Brazil**	**Chile**	**Dominican Republic**	**Mexi co**	**Peru**
Law	Provincial	National	National	None	National	None	National
Royalty Type	Ad valorem	Ad valorem	Ad valorem	n.a.	Ad valorem, creditable against income tax	n.a.	Ad valorem, based on cumulative sales
Royalty Rate	0-3%	1-6%, based on sales price position	0.2-3%	n.a.	5% FOB export	n.a.	0-3%

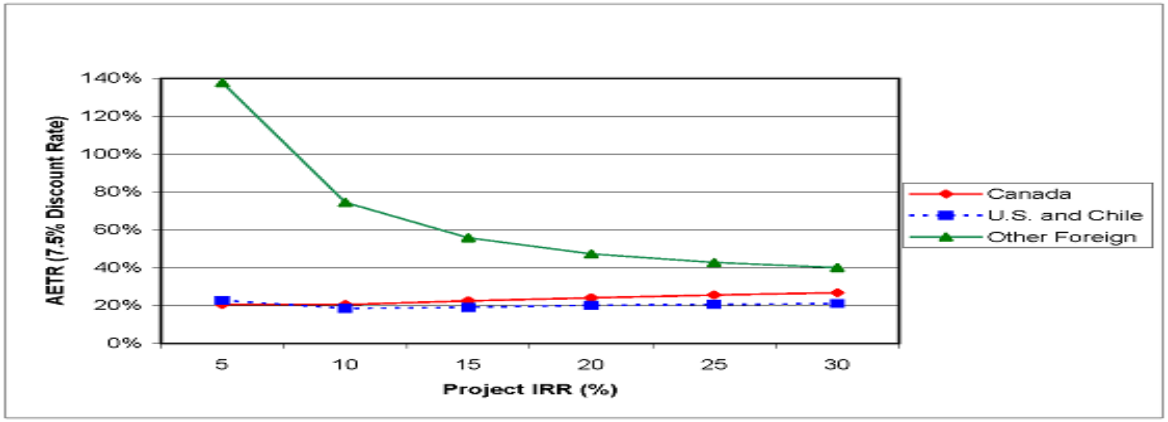
Source: adapted from The World Bank – Mining Royalties, a global study of their impact on investors, government, and civil society

Selected Australian Jurisdictions

	New South Wales	**Northern Territory**	**Queensland**	**Western Australia**
Law	Provincial	Provincial	Provincial	Provincial or negotiated agreement
Royalty Type	Ad valorem, profit based in the Broken Hill District	Profit Based (% of netback value)	Ad valorem or unit based	Ad valorem, unit and profit based
Royalty Rate	4-7%	18%	2.7% of value or variable royalty rate	2.5-7.5% ad valorem

Source: adapted from The World Bank – Mining Royalties, a global study of their impact on investors, government, and civil society

Appendix 2: Average effective tax rates across a range of profitability



Source: adapted from Natural Resources Canada, Information Bulletin, June 2011

APPENDIX 3: Comparative royalty and tax rates across jurisdictions

	2003	**2003**	**2012**	**2012**
Jurisdiction	Combined Corporate Income Tax Rate	Mining Royalty Rate	Combined Corporate Income Tax Rate	Mining Royalty Rate
British Columbia	42.62%	13% (profit base)	25%	13% (profit base)
Manitoba	45.62%	16% (profit base)	27%	10-17% (profit)
New Brunswick	45.12%	16% (profit base)	25%	16% (profit base)
Northwest Territories	43.12%	13% (profit base)	26.5%	13% (profit base)
Nunavut	43.12%	13% (profit base)	27%	13% (profit base)
Ontario	40.12%	12% (profit base)	25%	10% (profit base)
Quebec	38.02%	12% (profit base)	26.9%	16% (profit base)
Yukon	44.12%	13% (profit base)	30%	12% (profit base)
Australia (South)	30%	3.5% (ad valorem)	30% (29% from 2013)	3.5% (ad valorem)
Australia (West)	30%	5% (ad valorem)	30% (29% from 2013)	5% (ad valorem)
Chile	16.5%	n.a.	20% (17% from 2013)	9% (ad valorem varies due to gross margin)
Indonesia	30%	4% (ad valorem)	25%	4% (ad valorem)
Mexico	34%+10% profit sharing	n.a.	34% +10% profit sharing	n.a.
South African Republic	30%	2% (ad valorem)	28%	2% (ad valorem)
USA (Alaska)	44.4%	10% (profit base)	44.4%	10% (profit base)
USA (Nevada)	35%	n.a.	35%	n.a.

Source: adapted from Natural Resources Canada, Information Bulletin, June 2011