



Margin Methodology Guide

Version 1.3

TABLE OF CONTENTS

TABLE OF CONTENTS	2
1) INTRODUCTION	3
Natural Gas Exchange Inc.	3
Disclaimer	3
Legal	3
2) CLEARING OPERATIONS	4
Introduction	4
CCP Clearing Benefits	4
Performance Risks	5
Clearing Capital and Settlement Structure	6
3) COLLATERAL PROVISIONS	8
Collateral Policy	8
Forms of Collateral	8
Request for Collateral by Exchange	8
Margin Triggers	8
Return of Collateral	9
4) MARGIN REQUIREMENT	10
Margin Requirement	10
Calculating Accounts Receivable Risk	10
Calculating Variation Margin (mark-to-market)	13
Calculating Initial Margin (Liquidation Risk)	14
Margin Example 1 (Natural Gas)	15
Margin Example 2 (Crude Oil)	17
FURTHER INFORMATION	19
Clearing Contact Information	19
General Contact Information	19

Natural Gas Exchange Inc.

Natural Gas Exchange Inc. ("NGX" or the "Exchange") is Canada's leading energy exchange and North America's largest physical clearing and settlement facility. Since 1994, NGX's unique market model has provided traders with one of the most highly liquid, secure and efficient environments available for trading and clearing natural gas and electricity contracts. Beginning in 2009, through the acquisition of NetThruPut (NTP), NGX added crude oil to its suite of physically and financially cleared products. NGX is based in Calgary and wholly owned by TMX Group Inc.

NGX formed a technology and physical clearing alliance with the InterContinental Exchange (ICE), to better serve the North American natural gas and Canadian electricity markets. Under the arrangement, the cleared and bilateral markets for North American physical natural gas and Canadian electricity operated by NGX and ICE are offered together on ICE's electronic commodities trading platform (the "ICE Trading Platform"). NGX also uses the ICEBlock system to electronically accept for clearing off-exchange transactions in financial gas and other energy products. In turn, NGX serves as the clearinghouse for cleared and off-exchange transactions.

Disclaimer

This document is intended for information purposes only to provide background on NGX and its clearing and settlement operations. This document does not outline, indicate, suggest or form part of, and should in no way be construed to outline, indicate, suggest or form part of, the terms and conditions under which NGX and Contracting Parties agree to conduct business. For such information, parties should refer to the NGX Contracting Party's Agreement.

Legal

NGX utilizes a standardized legal agreement with all the participating firms that transact through the Exchange. This agreement, called the NGX Contracting Party's Agreement ("CPA"), outlines the terms and conditions for conducting business with NGX. Both the trading and the clearing components of NGX are governed by the provisions of the CPA. The agreement has currently been executed by over 220 participating firms ("Contracting Parties") that comprise a cross-section of the North American energy industry, including producers, electricity generators, storage facility operators, industrial consumers, utilities, pipelines, aggregators, marketing firms, hedge funds and financial institutions.

2) CLEARING OPERATIONS

Introduction

NGX is the exclusive clearing house for cleared North American physical and financial natural gas and Canadian electricity transactions on the ICE Trading Platform (“Cleared Transactions”). In this role, NGX must maintain a secure and efficient clearing operation, managing various risks across many diverse market participants and products.

NGX acts as the Central Counter Party (“CCP”) for all cleared transactions. This makes NGX the buyer to every seller, and the seller to every buyer. This provides for full cycle anonymity on every transaction, and introduces a third party into the transaction that is neutral and obligated to ensure the performance of the transaction.



As each Contracting Party agrees to make NGX the CCP to all cleared transactions, the Contracting Parties must collectively look to NGX to manage any risks to the ongoing operation of the clearing house.

NGX manages clearing risks using a combination of the following items which are explored in further detail in this document:

- Standardized Rules - All Contracting Parties are subject to the same rules under the CPA.
- Settlement Bank - NGX's settlement bank provides daylight and overdraft facilities to support monthly financial settlement.
- Emergency Fund - NGX provides a trust fund for Contracting Parties to access in the event of an exchange default, backed by a parental guarantee from TSX Group Inc.
- Backstopping - Physical delivery risks are mitigated through the use of backstopping services.
- Collateral Provisions - Margin Requirements are covered by liquid collateral.
- Liquidation Rights - NGX has liquidation/acceleration rights if a Contracting Party default occurs.

NGX is committed to ensuring the security and integrity of the clearing operation. NGX and its subsidiaries do not enter into transactions nor take positions in energy products for any reason other than to provide clearing services.

CCP Clearing Benefits

CCP clearing facilitates anonymous trading by placing NGX between the buyers and sellers as a common counter party. In addition to anonymity, CCP clearing affords the following key benefits:

Neutral, Independent Risk Management

NGX is impartial and the nature of the clearing business provides a strong incentive to maintain a default-free clearing operation. Furthermore, NGX is not a market participant, does not take a market view, and earnings are not directed by commodity prices.

Centralized Collateral Requirements

Concentration of capital with NGX affords the most efficient allocation of collateral by providing single point access to a large number of counterparties.

Counterparty Netting Facilities

CCP clearing and standardized netting rules create an environment to net physical and financial exposures across multiple counter parties and locations/instruments.

Close Out Procedures

NGX has embedded, and has enforced, rights of acceleration for all contracts traded through the Exchange to mitigate credit default, and delivery risks to all Contracting Parties

Performance Risks

NGX's CCP clearing and risk management structure exists to assure the continued performance of all contractual obligations in the event of a Contracting Party performance default. Contractual defaults are detailed in the CPA, with the key performance risks summarized as follows:

Failure to Make/Take Delivery

For physical natural gas contracts the failure by a Contracting Party to deliver natural gas sold, or the failure to take natural gas bought, results in an NGX imbalance with the pipeline or hub operator. In this event NGX is responsible for procuring alternate gas supplies or alternate gas markets to rectify such an imbalance and prevent the default from affecting any other Contracting Parties.

For physical crude oil contracts the failure by a Contracting Party to deliver crude oil sold, or the failure to take crude oil bought, results in an imbalance with another Contracting Party. In this event NGX will assess a financial penalty to the failing Contracting Party, which will in turn be used to compensate the affected Contracting Party.

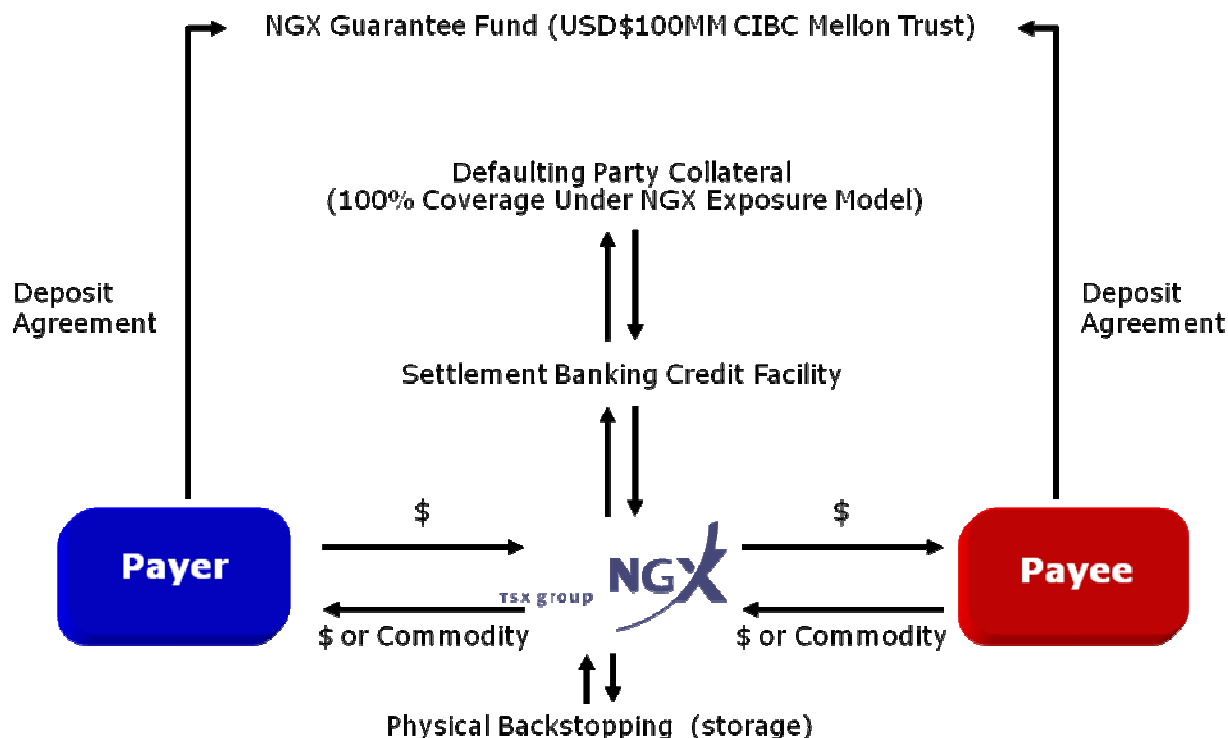
Failure to Pay

The failure by a Contracting Party to pay for natural gas or crude oil purchased or for an out-of-the-money financial contract at the time of settlement would result in an NGX imbalance with its settlement bank. In this event, NGX is responsible for utilizing the collateral provided by the defaulting party to rectify such an imbalance and prevent the default from affecting the settlement bank or any other Contracting Parties.

Failure to Deposit Collateral

The failure by a Contracting Party to deposit collateral with NGX, in the form prescribed by, and acceptable to, NGX, sufficient to ensure that their margin requirement remains below 80% of their collateral balance. In this event, NGX is responsible for ensuring that the defaulting party is unable to increase their risk position to the point where they bring unsecured risk to the clearing operation. This can be rectified through trading restrictions or through liquidation of the Contracting Party's portfolio, where necessary.

Clearing Capital and Settlement Structure



In order to assure Contracting Parties that the clearing operation can withstand a Contracting Party default, NGX has established the non-mutualized clearing capital structure illustrated above. This clearing capital mechanism is in place to provide lines of defense against the default of a Contracting Party or multiple defaults of Contracting Parties. NGX has the following lines of defense against a payment default by a Contracting Party:

Settlement Banking Credit Facility

NGX currently utilizes the services of Toronto Dominion Bank (“TD”) to act as its settlement bank. The role of the settlement bank is to assist NGX with the management of collateral in segregated accounts, to act as custodian over such collateral, to assist in the cash management required for financial settlement of contracts, and to provide overdraft protection against fluctuations in NGX’s settlement account.

TD Bank has authorized a daylight overdraft facility for the NGX settlement account of CAD \$300MM. This overdraft protection allows for variable timing throughout a business day on the deposit of NGX receivables from Contracting Parties and the payment of payables to Contracting Parties. In the event that the facility is overdrawn at the close of business, the overdraft will be paid using the defaulting party’s collateral.

Defaulting Party Collateral

TD administers the collateral that is deposited by Contracting Parties and provides oversight of the disbursements of such collateral. In the event of a shortfall in the NGX settlement account, NGX would instruct TD to disburse the collateral of the defaulting party sufficient to rectify the default. The amount of collateral held by TD Bank on behalf of NGX Contracting Parties generally ranges between CAD \$2.0 Billion and CAD \$4.0 Billion, depending primarily on the prevailing price of natural gas and crude oil.

NGX Cash Reserves

In the event that there is a smaller amount overdrawn from the NGX settlement account, NGX maintains its own cash on hand to temporarily rectify the imbalance until such time as the collateral can be disbursed to make up the imbalance.

NGX Emergency Fund

The NGX Emergency Fund is a separate pool of clearing capital that is backed by TMX Group Inc., however is only accessible by Contracting Parties. The Emergency Fund is in the form of a letter of credit held by CIBC Mellon Trust Company and accessible to Contracting Parties through the CPA and the Deposit Agreement, which was entered into between NGX and CIBC Mellon Trust Company. In the event of an NGX default, affected Contracting Parties may make a claim on the Emergency Fund. The fund is currently capitalized at USD \$100 Million.

In the case of a failure to make/take delivery of natural gas, NGX maintains backstopping arrangements:

Physical Backstopping

Natural gas delivery risks are mitigated through the use of backstopping services provided by various market participants, including storage facilities, large shippers, and pipeline operators. Backstopping is typically an arrangement for immediate provision of supply/market at a pre-determined price (usually based on index).

In the case of a failure to make/take delivery of crude oil, NGX will utilize financial backstopping:

Financial Backstopping

Crude oil delivery risks are mitigated through the use of financial penalties imposed on the defaulting Contracting Party, which is in turn used to compensate the affected Contracting Party.

NGX performs risk management activities to ensure the Emergency Fund is sufficient and the margin model is functioning as expected:

Stresstesting

Stresstesting consists of manipulating hypothetical market conditions to determine results of extreme price movements. Should results yield cumulative uncovered losses in excess of the Emergency Fund (USD \$100MM) NGX must take one of the following actions:

- a) Raise initial margin rates;
- b) Enforce position limits;
- c) Increase the Emergency Fund.

Backtesting

A third party compares initial margins against changes in historical settlement prices. If backtesting yields unexpected or negative results initial margin rates may be adjusted or the model may be modified.

3) COLLATERAL PROVISIONS

Collateral Policy

NGX's risk management policy requires that each Contracting Party post sufficient collateral to cover its Margin Requirement utilizing any combination of the acceptable forms of collateral and offsets. It is important to note that collateral is held to support a specific Contracting Party's traded positions and can only be used to remedy a performance failure by the Contracting Party itself.

Please refer to section 4) for a complete breakdown of the components that make up the Margin Requirement.

Forms of Collateral

The Collateral posted with NGX may take the form of:

- 1) An irrevocable letter of credit issued by a Bank acceptable to NGX, typically a bank rated A or better;
- 2) A cash amount held in a segregated account by NGX's Settlement Bank, Toronto Dominion Bank;
- 3) A previous month account payable by NGX to the Contracting Party, provided that such previous month account payable will only constitute collateral until the 20th day of the settlement month for physical contracts, and the 1st day of the settlement month for financial contracts;
- 4) A current month accounts payable by NGX to the Contracting Party;
- 5) A positive variation margin amount (i.e. in the money position), until such time as the variation margin is no longer positive, or until the position converts from a variation margin amount to an A/P or A/R.

Request for Collateral by Exchange

Given that the margin requirement changes dynamically as market prices change and additional trades are consummated, NGX manages the collateral requirements of each Contracting Party on a portfolio basis in real time. There are 5 key triggers that NGX uses to manage a Contracting Party's collateral position:

Margin Triggers

- 1) If the Margin Requirement for a Contracting Party reaches 80% of collateral held (i.e. margin requirement / collateral held \geq 80%), NGX will request additional collateral.
- 2) If the Margin Requirement for a Contracting Party reaches 90% of collateral held, NGX may restrict the Contracting Party's trading capabilities until the Contracting Party deposits additional collateral, and/or the margin requirement falls below 80% of collateral held.
- 3) If the Margin Requirement for a Contracting Party reaches 95% of collateral held, and sufficient collateral has not been received, NGX is entitled to invoke the liquidation procedure under the CPA.
- 4) If the Available Margin falls below the minimum \$500 thousand required for gas, \$1 million required for power/ crude oil, or \$2 million required for Option products, NGX will request additional collateral to ensure requirements are upheld.
- 5) If a Contracting Party has an account payable by NGX which no longer constitutes collateral, NGX will request additional collateral.

When requesting additional collateral, NGX will typically recommend a collateral amount which will reduce the Contracting Party's position below 80% of collateral held, and will provide room for further trading activity. The Contracting Party is required to provide additional collateral by the next business day or, if the next business day is a banking holiday that is recognized by major Canadian and/or United States banks, on the first business day that is not a recognized banking holiday following any such request.

Return of Collateral

A Contracting Party may request a return of some or all of its collateral if its Margin Requirement is less than 80% of collateral held. NGX agrees to return any such excess collateral on the next business day or, if the next business day is a recognized banking holiday, as defined above, on the first business day that is not a recognized banking holiday following any such request.

4) MARGIN REQUIREMENT

Margin Requirement

NGX's risk measurement model is based on quantifying the default risk of a Contracting Party as a monetary value. This monetary value is known as the Margin Requirement, which represents a measurement of: *the probable exposure that a Contracting Party's portfolio might bring to the clearing operation in the event of a default by the Contracting Party.*

The Margin Requirement is made up of the sum of the following three components:

1. **Accounts Receivable ("A/R") Risk** - the value of gas/crude already delivered that generates a net amount owing to NGX;
2. **Variation Margin (mark-to-market)** - a calculation of the price at which an open position could be instantaneously liquidated given current market prices;
3. **Initial Margin (liquidation risk)** - a buffer charged to account for potential adverse changes in market prices (i.e. variation margin) during a liquidation scenario.

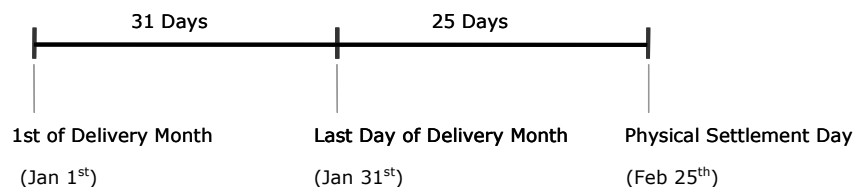
Calculating Accounts Receivable Risk

While many NGX products involve physical delivery as a component of settlement, all of the products offered by NGX through the clearing operation culminate in a financial settlement. The financial component of settlement requires the clearing operation to transmit the net settlement payments between Contracting Parties. In the process of this transmission, there is risk that monies owed by any Contracting Party (i.e. A/R) are not paid in full and/or on-time. Measuring the A/R risk resulting from settlement requires isolating the different cycles during which the risk exists.

NGX currently maintains six A/R cycles for which it measures exposures to the payment from Contracting Parties. These cycles are differentiated by the duration of time for which the receivable is a known value.

1. Physical Natural Gas A/R Cycle

The first cycle applies to the payment for purchases on all physical natural gas products. The Physical Natural Gas A/R Cycle begins at the first of a calendar month and continues until settlement day of the following month (which, by NGX rules, occurs on the 25th of the month following the delivery month, unless the 25th falls on a weekend or Canadian statutory holiday, in which case the date is either moved forward to the 24th or back to the 26th).



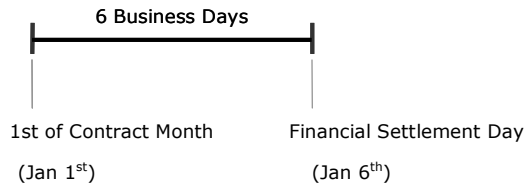
Total Physical Natural Gas A/R

The Total Physical Natural Gas A/R for physical natural gas products is the total value of the gas purchases taken over the course of the Physical Natural Gas A/R Cycle, less the total value of the net sales delivered over the same cycle for each Contracting Party. This is mathematically represented as follows:

$$\text{Total Physical Natural Gas A/R} = (\text{Purchase Quantity} - \text{Sales Quantity}) \times \text{Weighted Average Price} \times \text{Duration (\# days)}$$

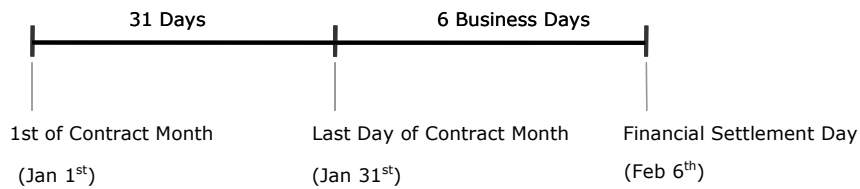
2. Financial Monthly Index A/R Cycle

The second cycle applies to the payment for financial contracts that are settled against a monthly index. These contracts settle in the same month for which they were traded (i.e. a June contract would settle in June). The Financial Monthly Index A/R Cycle begins at the first of a calendar month (or upon publication of the relevant monthly index) and continues until settlement day of that month (which, by NGX rules, occurs on the sixth Canadian business day of the month).



3. Financial Daily Index A/R Cycle

The third cycle applies to the payment for financial contracts that are settled against a daily index. These contracts settle in the month following the month for which they were traded (i.e. a June contract would settle in July). The Financial Daily Index A/R Cycle begins at the first of a calendar month and continues until settlement day of the following month (which, contractually, occurs on the sixth Canadian business day of the following month).



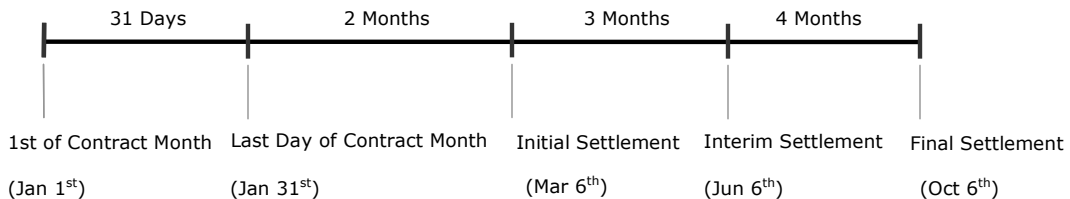
4. Regulated Rate Option ("RRO") A/R Cycle

The fourth settlement cycle applies to RRO products. These contracts are unique from other financial products, as there are three settlement periods (initial, interim, final).

The initial RRO settlement period begins on the first of a calendar month, and continues until settlement day two months later (i.e. a January position would have an initial settlement on the sixth business day in March). This settlement, however, is only a close estimate as to the final contract value, which is why there are two subsequent settlement periods. As there is always a risk to NGX that the initial settlement amount may be insufficient, 5% of the settlement value is held against a customer's position (as current month A/R) until the final settlement period.

The second (interim) RRO settlement period begins on the first of the month, three months following the initial settlement. Any discrepancies between the initial and interim settlement amounts are settled on the sixth business day of the third month following the initial settlement (i.e. a January position would have an interim settlement on the sixth business day in June).

The third (final) RRO settlement period begins on the first of the month, four months following the interim settlement. At this point, power usage data is finalized and any discrepancies are settled on the sixth business day of the fourth month following the interim settlement (i.e. a January position would have a final settlement on the sixth business day in October).



Total Financial A/R

Determining the Total Financial A/R for financial products requires the calculation of the Swap Clearing Amount, which results when the fixed amount of the financial contract is subtracted from the floating amount:

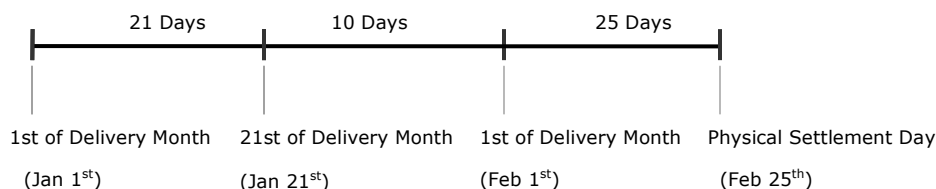
$$\text{Swap Clearing Amount} = \text{Floating Amount} - \text{Fixed Amount.}$$

A positive Swap Clearing Amount is paid by the buyer and conversely a negative Swap Clearing Amount is paid by the seller. The Total Financial A/R is then:

$$\text{Total Financial A/R} = \text{Financial Monthly Index Swap Clearing Amount} + \text{Financial Daily Index Swap Clearing Amount} + \text{RRO Swap Clearing Amount}$$

5. Canadian Physical Crude Oil A/R Cycle

The Canadian Physical Crude Oil A/R cycle applies to the payment for purchases on all Canadian physical crude oil products. The Canadian Physical Crude Oil A/R Cycle begins at the first of a calendar month and continues until settlement day of the following month (which, by NGX rules, occurs on the 25th of the month following the delivery month, unless the 25th falls on a weekend or Canadian statutory holiday, in which case the date is either moved forward to the 24th or back to the 26th).



Total Canadian Physical Crude Oil A/R

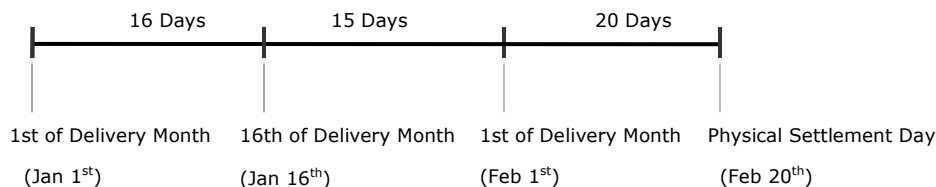
The Total Canadian Physical Crude Oil A/R for Canadian physical crude oil products is the total value of the oil purchases taken over the course of the Canadian Physical Crude Oil A/R Cycle, less the total value of the net sales delivered over the same cycle, recognizing sales that are covered by the Discretionary Oil Delivery Credit (“DODC”) on the 1st of the month and the remaining sales on the first day of the month following delivery for each Contracting Party. This is mathematically represented as follows:

On the 1st of the delivery Month:

$$\text{Total Physical Crude Oil A/R} = (\text{Purchase Quantity}_{\text{Previous Delivery Month}} - \text{Sales Quantity}_{\text{Previous Delivery Month}}) \times \text{Weighted Average Price}_{\text{Previous Delivery Month}} + (\text{Purchase Quantity}_{\text{Current Delivery Month}} - \text{Sales Quantity}_{\text{Current Delivery Month Covered by DODC}}) \times \text{Weighted Average Price}_{\text{Current Delivery Month}}$$

6. US Physical Crude Oil A/R Cycle

The US Physical Crude Oil A/R cycle applies to the payment for purchases on all US physical crude oil products. The US Physical Crude Oil A/R Cycle begins at the first of a calendar month and continues until settlement day of the following month (which, by NGX rules, occurs on the 20th of the month following the delivery month, unless the 20th falls on a weekend or Canadian statutory holiday, in which case the date is either moved forward to the 21st or back to the 19th).



Total US Physical Crude Oil A/R

The Total US Physical Crude Oil A/R for US physical crude oil products is the total value of the oil purchases taken over the course of the US Physical Crude Oil A/R Cycle, less the total value of the net sales delivered over the same cycle, recognizing sales that are covered by the Discretionary Oil Delivery Credit (“DODC”) on the 1st of the month and the remaining sales on the first day of the month following delivery for each Contracting Party. This is mathematically represented as follows:

On the 1st of the delivery Month:

$$\text{Total Physical Crude Oil A/R} = (\text{Purchase Quantity}_{\text{Previous Delivery Month}} - \text{Sales Quantity}_{\text{Previous Delivery Month}}) \times \text{Weighted Average Price}_{\text{Previous Delivery Month}} + (\text{Purchase Quantity}_{\text{Current Delivery Month}} - \text{Sales Quantity}_{\text{Current Delivery Month}}) \times \text{Weighted Average Price}_{\text{Current Delivery Month}}$$

The Total A/R risk is then a sum of the receivable risk generated from each of the six A/R cycles:

$$\text{Total A/R Risk} = \text{Physical Natural Gas A/R Cycle Risk} + \text{Canadian Physical Crude Oil A/R Cycle Risk} + \text{US Physical Crude Oil A/R Cycle Risk} + \text{Financial Monthly Index A/R Cycle Risk} + \text{Financial Daily Index A/R Cycle Risk} + \text{RRO A/R Cycle Risk}$$

Calculating Variation Margin (mark-to-market)

All products listed on NGX or that are cleared through NGX, contain forward instruments through which buyers and sellers may enter into forward *purchase* positions (“long positions”) or forward *sale* positions (“short positions”) for a particular time period in the future.

For every forward trade, there is a cost of liquidating such trade that is based on the prevailing market price at the time of liquidation (commonly referred to as mark-to-market). NGX accounts for this mark-to-market risk by calculating variation margin. NGX’s variation margin is: *a measurement of the price at which a forward position could be instantaneously liquidated given current market prices.*

NGX calculates variation margin on crude oil sales during the month of delivery. The calculation is applied to the entire volume of the contract, and will remain in effect until the first day of the month following delivery. As such, crude oil sales are considered to be open positions until the first day following the delivery month.

NGX settles all variation margin on financial power products each business day on a T+2 basis.

Variation margin includes two components:

1. Offset Gain/Loss

Any long/short positions that are offset by the opposite short/long position in an equivalent contract for a given day in the future comprise the *offset position*.

Offset positions result in a known (crystallized) gain or loss being applied to the margin requirement for each Contracting Party. If a Contracting Party purchased forward contracts at a price lower than they sold the equivalent contracts, they are marked with a gain in the amount of the difference between the two values. Conversely, if a Contracting Party purchased forward contracts at a price higher than they sold the equivalent contracts, they are marked with a loss in the amount of the difference between the two values. This difference comprises the offset gain/loss portion of the variation margin.

$$\text{Offset Gain/Loss} = \text{Min}(\text{Purchase Quantity}, \text{Sale Quantity}) \times (\text{Selling Price} - \text{Purchase Price}) \times \text{Duration (\# days)}$$

2. Open Variation Margin

The net of the long and short positions for a Contracting Party for a particular day comprises the *net open position* of that Contracting Party for that day.

The exposure to net open positions held by a Contracting Party is calculated by determining the difference between the value of the net open position at the time it was consummated, and its estimated value in the current market (mark-to-market), as follows:

$$\text{Open Variation Margin} - \text{Net Buyer} = (\text{Market Price} - \text{Purchase Price}) \times \text{Quantity} \times \text{Duration (\# days)}$$

$$\text{Open Variation Margin} - \text{Net Seller} = (\text{Sale Price} - \text{Market Price}) \times \text{Quantity} \times \text{Duration (\# days)}$$

Note: For electricity contracts the duration is given in hours.

Net Buyers

If the net open position of a Contracting Party is comprised of purchases, and those purchases were consummated at a price lower than the current market price for that position, the Contracting Party is marked with a gain in the amount of the difference between the two values. A loss will be marked if the net open purchase position is priced higher than the current market price.

Net Sellers

If the net open position of a Contracting Party is comprised of sales, the converse of the above is true; a gain is marked when the sale price is higher than the current market price, and a loss is marked where the sales price is lower than the market price.

Market Prices

The calculation of variation margin requires the establishment of a market price. NGX determines market prices in real-time as instruments are traded through its trading system, or through the establishment of closing (settlement) prices. It is important to note that net open position mark-to-market is an *estimate* of the value of the net open position in the current market, relying on the most current information available as the basis for the estimate.

Calculating Initial Margin (Liquidation Risk)

In the event of a performance failure by a Contracting Party, it may be necessary for NGX to liquidate the portfolio of the failing party. The liquidation process removes the market price risk from the failing party's portfolio of open positions and quantifies the risk into an offset gain or loss.

It is possible that the price at which liquidation trades are made may vary from the estimated current market price that is used in the variation margin calculation. This can be defined as the liquidation risk, or market price risk, that NGX faces during the liquidation of a position. The mechanism used to mitigate this risk is the calculation of initial margin as part of the margin requirement. The initial margin acts as a buffer to account for changes in market prices during a liquidation scenario.

Initial margin is calculated by assessing the actual price movements that have occurred in recent history of each product, then applying a Value at Risk ("VAR") model to determine the probability of those price movements occurring during a liquidation period. Initial margin is the result of applying this probability to the current market price of each product for each forward date, and is an estimate of the risk within a certain confidence level.

VAR Model Parameters

NGX's initial margin VAR model uses the following parameters when calculating the initial margin rate:

- Standard Deviation = 2.7, equivalent to a 99.7% confidence interval.
- Hold Period = 2 or 5 days (Depending on market liquidity).
- Number of Days History = 2 years.

Initial Margin Rate

From the statistical calculations, an initial margin rate is calculated for each product and each date range. This rate is then applied to the contract quantity of the net open position of each Contracting Party, irrespective of whether the position is a purchase or sale, to determine the initial margin component of the margin requirement:

$$\text{Initial Margin Requirement} = \text{Initial Margin Rate} \times \text{Quantity} \times \text{Duration}$$

Margin Example 1 (Natural Gas)

The following example illustrates how NGX's margin model applies to a specific set of trades.

Example Trade

- On Tuesday, December 27th, BUYCO (buyer) purchases 5,000 GJ/Day of the NGX Intra-Alberta month of January 2006 physical contract from SELCO (seller) at a price of CAD \$14.000/GJ.

Position Management

- As soon as the transaction is matched, BUYCO shows a net long position of 5,000 GJ a day from January 1 to January 31, thus a total net long position of 155,000 GJ (5,000 GJ/Day x 31 days).
- Conversely, SELCO shows a net short position of 5,000 GJ a day from January 1 to January 31, thus a total net short position of 155,000 GJ (5,000 GJ/Day x 31 days).

Initial Margin

- Immediately following the creation of the long and short positions, initial margin is applied. The initial margin rate for January is currently CAD \$2.300/GJ (17% of price), as statistically generated by NGX.
- Both BUYCO and SELCO have initial margin added to their margin requirement in the amount of CAD \$356,500 (155,000 GJ multiplied by \$2.300/GJ).
- The initial margin requirement will remain in place, unchanged, until one of the following events occurs:
 - Either BUYCO or SELCO offset all or part of their open long/short position, thus reducing their initial margin requirement, or;
 - The January long/short position becomes a current month position on January 1st, or;
 - Initial margin rates change (typically once a month).

December 27th to December 31st - Margin Requirements

- The following table illustrates the margin requirements for the January position through each remaining day in December:

DATE	Settlement Price	BUYCO Initial Margin	BUYCO MTM	SELCO MTM	SELCO Initial Margin
Dec 27 th	14.100	(\$356,500)	\$15,500	(\$15,500)	(\$356,500)
Dec 28 th	13.600	(\$356,500)	(\$62,000)	\$62,000	(\$356,500)
Dec 29 th	14.000	(\$356,500)	Nil	Nil	(\$356,500)
Dec 30 th	14.200	(\$356,500)	\$31,000	(\$31,000)	(\$356,500)
Dec 31 st	14.200	(\$356,500)	\$31,000	(\$31,000)	(\$356,500)

January 1st to January 31st - BUYCO's Margin Requirements

- The following table illustrates BUYCO's margin requirements for the January position through each remaining day in January:

DATE	RM – Jan Settlement Price	BUYCO AP / AR	BUYCO RM Initial Margin*	BUYCO Variation Margin	BUYCO Total Margin
Jan 1 st	14.300	(\$70,000)	(\$390,000)	\$45,000	(\$415,000)
Jan 2 nd	14.200	(\$140,000)	(\$377,000)	\$29,000	(\$488,000)
Jan 3 rd	15.00	(\$210,000)	(\$364,000)	\$140,000	(\$434,000)
Jan 4 th	15.500	(\$280,000)	(\$351,000)	\$202,500	(\$428,500)
Jan 5 th	14.500	(\$350,000)	(\$338,000)	\$65,000	(\$623,000)
▼ CONTINUE ▼					
Jan 31 st	15.000	(\$2,170,000)	Nil	Nil	(\$2,170,000)

* Initial margin rate for the rest of January changes from \$2.300/GJ to \$2.600/GJ on January 1st to reflect higher spot market volatility.

January 1st to January 31st – SELCO's Margin Requirements

- The following table illustrates SELCO's margin requirements for the January position through each remaining day in January:

DATE	RM – Jan Settlement Price	SELCO AP / AR	SELCO RM Initial Margin*	SELCO Variation Margin	SELCO Total Margin
Jan 1 st	14.300	\$70,000	(\$390,000)	(\$45,000)	(\$365,000)
Jan 2 nd	14.200	\$140,000	(\$377,000)	(\$29,000)	(\$266,000)
Jan 3 rd	15.00	\$210,000	(\$364,000)	(\$140,000)	(\$294,000)
Jan 4 th	15.500	\$280,000	(\$351,000)	(\$202,500)	(\$273,500)
Jan 5 th	14.500	\$350,000	(\$338,000)	(\$65,000)	(\$53,000)
▼ CONTINUE ▼					
Jan 31 st	15.000	\$2,170,000	Nil	Nil	\$2,170,000

* Initial margin rate for the rest of January changes from \$2.300/GJ to \$2.600/GJ on January 1st to reflect higher spot market volatility.

Margin Example 2 (Crude Oil)

The following example illustrates how NGX's margin model applies to a specific set of trades.

Example Trade

- On Tuesday, December 27th, BUYCO (buyer) purchases 31,000 bbl of the Husky Hardisty WCS WTI month of January 2009 physical contract from SELCO (seller) at a price of USD (\$10.00)/bbl.

Position Management

- As soon as the transaction is matched, BUYCO shows a net long position of 31,000 bbl from January 1 to January 31.
- Conversely, SELCO shows a net short position of 31,000 bbl from January 1 to January 31.

Initial Margin

- Immediately following the creation of the long and short positions, initial margin is applied. The initial margin rate for January is set at USD \$2.00/bbl (20% of price).
- Both BUYCO and SELCO have initial margin added to their margin requirement in the amount of USD \$62,000 (31,000 bbl multiplied by \$2.00/bbl).
- The initial margin requirement will remain in place, unchanged, until one of the following events occurs:
 - Either BUYCO or SELCO offset all or part of their open long/short position, thus reducing their initial margin requirement, or;
 - The January long position becomes a current month position on January 1st (at which point the full notional value of the contract is charged to the buyer, and an initial margin charge is no longer needed), or;
 - Initial margin rates change (typically once a month).

December 27th to December 31st - Margin Requirements

- The following table illustrates the margin requirements for the January position through each remaining day in December:

DATE	Settlement Price	BUYCO Initial Margin	BUYCO MTM	SELCO MTM	SELCO Initial Margin
Dec 27 th	(\$10.50)	(\$62,000)	(\$15,500)	\$15,500	(\$62,000)
Dec 28 th	(\$10.75)	(\$62,000)	(\$23,250)	\$23,250	(\$62,000)
Dec 29 th	(\$10.00)	(\$62,000)	Nil	Nil	(\$62,000)
Dec 30 th	(\$9.75)	(\$62,000)	\$7,750	(\$7,750)	(\$62,000)
Dec 31 st	(\$10.25)	(\$62,000)	(\$7,750)	\$7,750	(\$62,000)

January 1st to January 31st - BUYCO's Margin Requirements

- The following table illustrates BUYCO's margin requirements for the January position through each remaining day in January. Assume the WTI index settled at USD \$50.00 for January:

DATE	RM – Jan Settlement Price	BUYCO AP / AR	BUYCO RM Initial Margin*	BUYCO Variation Margin	BUYCO Total Margin
Jan 1 st	(\$11.00)	(\$1,240,000)	Nil	Nil	(\$1,240,000)
Jan 2 nd	(\$10.75)	(\$1,240,000)	Nil	Nil	(\$1,240,000)
Jan 3 rd	(\$10.50)	(\$1,240,000)	Nil	Nil	(\$1,240,000)
Jan 4 th	(\$10.25)	(\$1,240,000)	Nil	Nil	(\$1,240,000)
Jan 5 th	(\$9.75)	(\$1,240,000)	Nil	Nil	(\$1,240,000)
▼ CONTINUE ▼					

DATE	RM – Jan Settlement Price	BUYCO AP / AR	BUYCO RM Initial Margin*	BUYCO Variation Margin	BUYCO Total Margin
Jan 21 st	(\$9.50)	(\$1,240,000)	Nil	Nil	(\$1,240,000)
▼ CONTINUE ▼					
Jan 31 st	(\$10.00)	(\$1,240,000)	Nil	Nil	(\$1,240,000)

* Initial margin rate for the rest of January changes from \$2.00/bbl to \$5.00/bbl on January 1st to reflect higher market volatility.

January 1st to January 31st – SELCO's Margin Requirements

- The following table illustrates SELCO's margin requirements for the January position through each remaining day in January. Sales credits are provided in full, which assumes that SELCO has a Discretionary Oil Delivery Credit in excess of total sales. Initial margin and Variation margin continue to be calculated on sales until after the delivery month.

DATE	RM – Jan Settlement Price	SELCO AP / AR	SELCO RM Initial Margin*	SELCO Variation Margin	SELCO Total Margin
Jan 1 st	(\$11.00)	\$1,240,000	(\$155,000)	\$31,000	(\$124,000)
Jan 2 nd	(\$10.75)	\$1,240,000	(\$155,000)	\$23,250	(\$131,750)
Jan 3 rd	(\$10.50)	\$1,240,000	(\$155,000)	\$15,500	(\$139,500)
Jan 4 th	(\$10.25)	\$1,240,000	(\$155,000)	\$7,750	(\$147,250)
Jan 5 th	(\$9.75)	\$1,240,000	(\$155,000)	(\$7,750)	(\$162,750)
▼ CONTINUE ▼					
Jan 31 st	(\$9.50)	\$1,240,000	(\$155,000)	(\$15,500)	(\$139,500)
▼ CONTINUE ▼					
Feb 1 st	(\$12.00)	\$1,240,000	Nil	Nil	(\$1,240,000)

* Initial margin rate for the rest of January changes from \$2.00/bbl to \$5.00/bbl on January 1st to reflect higher market volatility.

Clearing Contact Information

For Clearing related questions please email Clearing@ngx.com.

General Contact Information

For further information, please contact the NGX Help Desk at (403) 974-4357, or see the NGX website at <http://www.ngx.com/contactus.html> for specific contact information.

