



## NOTICE TO MEMBERS

No. 2014 – 161

July 29, 2014

### REQUEST FOR COMMENTS

#### AMENDMENTS TO THE RISK MANUAL OF THE CANADIAN DERIVATIVES CLEARING CORPORATION TO ADDRESS CLOSE-OUT PERIODS IN THE MARGIN CALCULATION

##### Summary

On July 14, 2014, the Board of Directors of Canadian Derivatives Clearing Corporation (CDCC) approved amendments to the Risk Manual of CDCC. The purpose of the proposed amendment is to set appropriate minimal number of liquidation days (close-out periods) per instrument and consider the impact of concentration on such liquidation horizon.

Please find enclosed an analysis document as well as the proposed amendments.

##### Process for Changes to the Rules

CDCC is recognized as a clearing house under section 12 of the *Derivatives Act* (Québec) by the Autorité des marchés financiers (AMF) and is a recognized clearing agency under section 21.2 of the *Securities Act* (Ontario) by the Ontario Securities Commission (OSC).

The Board of Directors of CDCC has the power to approve the adoption or amendment of Rules and Operations Manual of CDCC. Amendments are submitted to the AMF in accordance with the self-certification process and the Ontario Securities Commission in accordance with the process provided in its Recognition Order.

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##### Canadian Derivatives Clearing Corporation

The Exchange Tower	800 Victoria Square
130 King Street West, 5 <sup>th</sup> Floor	3 <sup>rd</sup> Floor
Toronto, Ontario	Montréal, Québec
M5X 1J2	H4Z 1A9
Tel. : 416-367-2470	Tel. : 514-871-3545
Fax :: 416-367-2473	Fax: : 514-871-3530

[www.cdcc.ca](http://www.cdcc.ca)



Comments on the proposed amendments must be submitted within 30 days following the date of publication of the present notice. Please submit your comments to:

*Mrs. Pauline Ascoli*  
*Assistant Secretary*  
*Canadian Derivatives Clearing Corporation*  
*Tour de la Bourse*  
*P.O. Box 61, 800 Victoria Square*  
*Montréal, Québec H4Z 1A9*  
*E-mail: [legal@m-x.ca](mailto:legal@m-x.ca)*

A copy of these comments shall also be forwarded to the AMF and to the OSC to:

*Mrs. Anne-Marie Beaudoin*  
*Corporate Secretary*  
*Autorité des marchés financiers*  
*Tour de la Bourse, P.O. Box 246*  
*800 Victoria Square, 22<sup>nd</sup> Floor*  
*Montréal, Québec H4Z 1G3*  
*E-mail: [consultation-en-cours@lautorite.qc.ca](mailto:consultation-en-cours@lautorite.qc.ca)*

*Manager, Market Regulation*  
*Market Regulation Branch*  
*Ontario Securities Commission*  
*Suite 2200,*  
*20 Queen Street West*  
*Toronto, Ontario, M5H 3S8*  
*Fax: 416-595-8940*  
*email: [marketregulation@osc.gov.on.ca](mailto:marketregulation@osc.gov.on.ca)*

For any question or clarification, Clearing Members may contact CDCC's Corporate Operations.

Glenn Goucher  
President and Chief Clearing Officer

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130 King Street West, 5 <sup>th</sup> Floor	3 <sup>rd</sup> Floor
Toronto, Ontario	Montréal, Québec
M5X 1J2	H4Z 1A9
Tel. : 416-367-2470	Tel. : 514-871-3545
Fax :: 416-367-2473	Fax: : 514-871-3530

[www.cdcc.ca](http://www.cdcc.ca)



**AMENDMENTS TO THE RISK MANUAL OF THE CANADIAN DERIVATIVES CLEARING CORPORATION TO ADDRESS CLOSE-OUT PERIODS USED IN THE MARGIN CALCULATION**

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## I. SUMMARY

CDCC proposes to review the number of liquidation days considered for all cleared instruments. Indeed, CDCC has to set and document appropriate minimal number of liquidation days (close-out periods) per instrument and consider the impact of concentration on such liquidation horizon.

The proposed periods were obtained by assuming that shorter minimal close-out periods should be assigned to most liquid contracts. Following an empirical analysis, we have identified three classes of liquidity for Futures and four classes for Options on stocks and ETFs cleared at CDCC. The proposed close-out periods for all of the non OTC contracts ranges from 2 to 5 days.

## II. ANALYSIS

### a. Background

CDCC currently derives the required initial margins for Options, Futures and Fixed Income contracts from the margin intervals (MI) defined as follow:

$$MI = 3 \times \sqrt{n} \times \text{Max}[\sigma_{20\text{days}}; \sigma_{90\text{days}}; \sigma_{260\text{days}}]$$

Where “*n*” is the number of liquidation days,  $\sigma$  is the standard deviation of the daily price returns over 20, 90 and 260 days and 3 standard deviations are equivalent to 99.87% coverage under the Normal distribution assumption.

Currently, CDCC applies the following number of liquidation days:

- OTC derivatives: 5 days
- Listed Options and Futures: 2 days
- Governmental bonds: 2 days for bonds issued by the Government of Canada
- Provincial bonds: 4 days for Quebec and Ontario bonds; 5 days for bonds issued by British Columbia.

The close-out periods for provincial bonds had been reviewed recently by CDCC<sup>1</sup>. The final conclusions were originally obtained through a robust analysis of traded volumes, yield spreads and market impact costs between July 2011 and July 2013 for all eligible bonds (both Governmental and provincial bonds accepted for fixed income transactions by CDCC).<sup>2</sup> Thus, we will not investigate further the close-out periods to apply for Governmental and provincial bonds within the current analysis.

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<sup>1</sup> CDCC technical document “Risk Analysis – Liquidity Analysis of Provincial Bonds”. August 14, 2013.

<sup>2</sup> The liquidity analysis for Provincial bonds has recommended that the close-out period for fixed income transactions should be reevaluated on a semi-annual basis. The last review was performed on August 2013.

For the remaining instruments, the close-out periods were previously set on a judgemental or benchmarking basis. Thus, a more technical approach would be implemented in this review to check if the current close-out period for each instrument cleared at CDCC is appropriate.

#### **b. Description and Analysis of Impacts**

The close-out periods analysis is divided in two sections: 1) for the listed products and 2) for the OTC products.

##### 1. Listed products:

For listed products, we have assumed that a shorter close-out period should be considered for more liquid derivatives.

The analysis is performed separately for Future and Options contracts.

- For Future contracts, we have gathered historical data regarding trading volumes, open interest and bid-ask spreads for the Generic 1st contracts.
- For Options, we have applied a four-step approach to set the minimal close-out period. To do so, we have considered the following data: daily traded volumes and turnovers, end of day mid, bid and ask prices for the underlying assets, and the number of market makers for each option.

The proposed close-out periods for all of the listed contracts range from 2 to 5 days.

##### 2. OTC Products

Due to lack of data for OTC derivatives, CDCC should continue to consider a minimal close-out period of 5 days for such instruments to fulfill regulatory requirements and best industry practices. In addition, CDCC should consider add-ons on its initial margin requirements to cover extreme liquidity, and concentration risks.

#### **c. Proposed Amendments**

The proposed amendments are presented in Appendix 1.

#### **d. Benchmarking**

The determination of the number of liquidation days is a parameter that regulators around the world are analyzing and there is no clear consensus in its selection. For example, current European Securities and Markets Authority (ESMA<sup>3</sup>) proposal

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<sup>3</sup> Draft Technical Standards for the Regulation on OTC Derivatives, CPPs and Trade Repositories, <http://www.esma.europa.eu/system/files/2012-95.pdf> and <http://www.esma.europa.eu/system/files/2012-379.pdf>

suggests that a minimum of two (2) business days must be used for listed products and at least five (5) business days for OTC derivatives<sup>4</sup>. In contrast, CFTC rules<sup>5</sup> set a minimum of one (1) day for Futures/Options, a minimum of one (1) day for swaps on agricultural commodities, energy commodities, metals and a minimum of five (5) days for all other swaps. Furthermore, the CFTC states that among the factors that Derivatives Clearing Organizations should consider in establishing minimum liquidation times are:

- (i) Average daily trading volume in a product;
- (ii) Average daily open interest in a product;
- (iii) Concentration of open interest;
- (iv) Availability of a predictable basis relationship with a highly liquid product;
- (v) Availability of multiple market participants in related markets to take on positions in the market in question.

LCH Clearnet<sup>6</sup>, through its PAIRS model (for interest rate swaps), uses a close-out period of five days for the proprietary house positions of members. For client positions, this close-out period assumption is increased to seven days.

Different close-out periods are considered by LCH Clearnet for other markets. As of February 21, 2014, the CCP applies the following close-out periods<sup>7</sup>.

Market	EquityClear	RepoClear	NLX	Fixed Income	Cash Securities	Derivatives
Close-out period	2-7 days	5 days	2 days	3-5 days	3 days	<b>3 days</b>

In addition, CME self assessment of PFMI requirements<sup>8</sup> has reported that the group considers an initial margin that covers a minimum of one-day for futures and options on futures; one day for swaps on agricultural commodities, energy commodities, and metals; and five days for all other swaps.

<sup>4</sup> ESMA has also mentioned that CCPs clearing OTC derivatives that have the same risk characteristics as derivatives executed on regulated markets, or an equivalent third country market, may apply a time horizon for the liquidation period lower than 5 business days.

<sup>5</sup> <http://www.cftc.gov/LawRegulation/CommodityExchangeAct/index.htm>, rule 39.13(g)(2)(ii) and <http://www.gpo.gov/fdsys/pkg/FR-2011-11-08/html/2011-27536.htm>

<sup>6</sup> LCH Clearnet LLC. "Disclosure under the Principles for Financial Market Infrastructures." *Information is accurate as of December 31, 2013*. Available on [www.lchclearnet.com/about\\_us/corporate\\_governance](http://www.lchclearnet.com/about_us/corporate_governance)

<sup>7</sup> For reference, see [http://www.lchclearnet.com/risk\\_management/sa/](http://www.lchclearnet.com/risk_management/sa/) and [http://www.lchclearnet.com/risk\\_management/ltid/](http://www.lchclearnet.com/risk_management/ltid/)

<sup>8</sup> CME Clearing. "Principles for Financial Market Infrastructures Disclosure." *Information is accurate as of December 31, 2013*. Available on [cmegroup.com/pfmidisclosure](http://cmegroup.com/pfmidisclosure)

Therefore, although there is no formal methodology proposed to select the number of liquidation days, the proposed guidelines by ESMA and the CFTC, combined with global standards, can guide us in the selection of the number of liquidation days. In fact, with reference to the liquidation period, ESMA considers that *"a prescriptive approach defined by class of financial instruments will help ensure consistency and harmonisation among different CCP margin models, thus limiting the risk of competition on risk management grounds"*. ESMA also considers that *" for the determination of the adequate liquidation period, the CCP shall evaluate and sum at least the following:*

- a. The longest possible period that may elapse since the last collection of margins up to the declaration of default by the CCP (or activation of the CCPs default management procedures).*
- b. The estimated period needed to determine and execute the default management strategy according to the particularities of each class of financial instrument and the markets the CCP will use to close-out or hedge completely an average clearing member position.*
- c. where relevant, the period needed to cover the counterparty risk which the CCP is exposed. "*<sup>9</sup>

### **III. DRAFTING PROCESS**

The Committee on Payment and Settlement Systems had clearly stated in April 2012<sup>10</sup> that the close-out periods considered by central counterparties ("CCP") should be based on anticipated close-out times in stressed market conditions. In addition, these close-out periods should be set on a product specific basis.

### **IV. IMPACTS ON TECHNOLOGICAL SYSTEMS**

There is no impact on technological systems since the proposed changes to the MI calculation are performed upstream of SOLA<sup>®</sup> Clearing.

### **V. OBJECTIVES OF THE PROPOSED MODIFICATIONS**

The objective of the proposed modification is to set appropriate number of liquidations days in the calculation of the margin requirement currently requested by CDCC from its Clearing Members.

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<sup>9</sup> Draft Technical Standards for the Regulation on OTC Derivatives, CPPs and Trade Repositories, <http://www.esma.europa.eu/system/files/2012-95.pdf> and <http://www.esma.europa.eu/system/files/2012-379.pdf>

<sup>10</sup> Bank for International Settlements: "Principles for financial market infrastructure". April 2012.

## VI. PUBLIC INTEREST

In CDCC's opinion, the proposed amendment to CDCC's Risk Manual is not contrary to the public interest.

## VII. MARKET IMPACTS

The review of the close-out periods of contracts cleared at CDCC will have a direct impact on Initial Margins. To assess the impact of our review, we have compared Initial Margins obtained from current and revised close-out periods for each Clearing Member by considering their position as of October 30, 2013 and January 29, 2014. The results of our empirical analysis are summarized as follow:

<b>Valuation Date</b>	<b>Average Variation for all Clearing Members*</b>	<b>Highest Variation</b>	<b>Lowest Variation</b>
October 30, 2013	1.4%	13.1%	0.0%
January 29, 2014	1.5%	15.4%	0.0%

*\* We report the weighted average variation of Initial Margins following the review of close-out periods*

It appears that the impact of our review of close-out periods will have a different impact among CDCC's Clearing Members. Such observation is due to the portfolio composition of each Clearing Member. For example, a higher variation of Initial Margins is expected if the Clearing Member has a relatively large exposure in moderately and non liquid options<sup>11</sup>.

However, no significant variation of Initial Margins is expected for Clearings Members with large exposure to high liquid options and very liquid Future contracts (such as SXF, BAX, and CGB) since the close-out period remains at 2 days following our review.

We recall that, in aggregate, most of the clearing activity at CDCC is concentrated in three Future contracts (namely, SXF, BAX and CGB) and Fixed Income<sup>12</sup>. The proposed close-out periods for all of these contracts remains constant following our review. Thus, such concentration fully explains the overall low variation in Initial Margins, which stands around 1.5%.

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<sup>11</sup> We recall that, a 2 days close-out period is currently applied to all Options cleared at CDCC. Such close-out period is increased to 4 and 5 days for moderately and non liquid options. Thus, Initial Margins should increase by 41% and 58%, respectively, for these options.

<sup>12</sup> The close-out period of Fixed Income is out of scope from our analysis. Thus, we have no variation of Initial Margins due to such transactions.



In other words, the overall variation in Initial Margins is mainly explained by the proposed 3 to 5 days close-out periods for 91%<sup>13</sup> of Options on stocks and ETFs cleared at CDCC and 4 to 5 days close-out periods for non liquid Future contracts<sup>14</sup>.

To conclude, a minimal increase of Initial Margins is expected following our review of close-out periods. The impact may differ among clearing members regarding their positions with CDCC. Thus, we will not expect any significant change in clearing activity or increase of moral hazard following the implementation of the revised close-out periods.

## **VIII. PROCESS**

The proposed amendment is submitted for approval by the CDCC Board. Once the approval has been obtained, the proposed amendment, including this analysis, will be transmitted to the *Autorité des marchés financiers* in accordance with the self-certification process and the Ontario Securities Commission in accordance with the “Rule Change Requiring Approval in Ontario” process. The proposed amendment and analysis will also be submitted for approval to the Bank of Canada in accordance with the Oversight Regulatory Agreement.

## **IX. EFFECTIVE DATE**

The proposed changes to address the close-out periods used in the margin calculation will be implemented in December 2014. This is subject to the regulatory approval.

## **X. ATTACHED DOCUMENTS**

Appendix 1: Amended Risk Manual

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<sup>13</sup> Such portion includes only liquid, moderately liquid and non liquid options. A 2 day close-out period is still applied to high liquid options cleared at CDCC.

<sup>14</sup> The following Future contracts are considered non liquid: CGF, CGZ, SCF, SXA, SXB, SXY, SXH, ONX, OIS, and LGB.



# Risk Manual

## MARGIN DEPOSIT

The Corporation has three different funds for margining purposes and each serves a specific purpose:

- Margin Fund
- Difference Fund
- Clearing Fund

### MARGIN FUND

The Margin Fund is composed of the Initial Margin and the Variation Margin. The Initial Margin covers the potential losses and market risk that may occur as a result of future adverse price movements across the portfolio of each Clearing Member under normal market conditions. Furthermore, in the event of a default, the Corporation is faced with closing out the defaulters' portfolio within a short period (the liquidation period). In a complementary manner, Variation Margin is a daily payment process that covers the market risk due to the change in price since the previous day, ahead of the default of one of its Clearing Members. Variation Margin is settled in cash for Futures contracts and collateralized for Options contracts, OTCI and Fixed Income Transactions.

### INITIAL MARGIN

As fundamental inputs to calculate the Initial Margin, the Corporation uses the following parameters: 1) confidence level (to reflect normal market conditions), 2) assumed liquidation period and 3) historical volatility over a specific period.

Specifically, the Corporation uses three standard deviations to consider a confidence level over 99% under the normal distribution's assumption. The Corporation also considers a variable number of days as an acceptable liquidation period. The Initial Margin amount is calculated using the historical volatility of the daily price returns of the Underlying Interests for Options contracts, the daily price returns of the futures prices for Futures contracts and the yield-to-maturity (YTM) daily variation of the on-the-run security for Fixed Income Transactions. The historical volatility, combined with the liquidation period and the confidence level gives the Margin Interval (MI) as described below.

#### MARGIN INTERVAL (MI) CALCULATION

The Margin Interval calculations are re-evaluated regularly. However, the Corporation may use its discretion and update the Margin Intervals more frequently if necessary. The Margin Intervals are used to calculate the Initial Margin for each Derivative Instrument.

The Margin Interval (MI) is calculated using the following formula:

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$$MI = 3 \times \sqrt{n} \times \text{Max}[\sigma_{20 \text{ days}}, \sigma_{90 \text{ days}}, \sigma_{260 \text{ days}}]$$

Where 'n' is the number of liquidation days<sup>1</sup>, 'σ' is the standard deviation of the daily variation over 20, 90 and 260 days, and 3 is equivalent to 99.87% for a one-tail confidence interval under the normal distribution's assumption.

### Liquidation Period

The Corporation applies different number of liquidation days "n" depending on the type of product. The Corporation uses quantitative and qualitative analysis, established according to the degree of liquidity of the Product/Underlying Interest which is derived from parameters such as, but not limited, to traded volume, Government of Canada/provincial yield spreads and international guidelines. For all products, "n" is determined at least once a year and communicated to Clearing Members by a written notice.

Furthermore, in anticipation of Remembrance Day (the "Banking Holiday"), the Corporation will add (1) more Business Day to the number of liquidation days "n". Hence, the liquidation period will be increased by one (1) more Business Day prior and up to the Banking Holiday. The additional margin amount for the Banking Holiday will be released on the morning of the following Business Day.

### **Price Scan Range (PSR) Calculation**

In order to calculate the most unfavourable projected liquidation value, the Risk

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<sup>1</sup> The Corporation uses the following number of liquidation days 'n' as follows:

- For Futures contracts and Options contracts n = 2 days;
- For OTCI options n = 5 days;
- For Fixed Income Transactions, where the Underlying Interest is issued by the Government of Canada or a federal Crown corporation n = 2 days; and
- For Fixed Income Transactions, where the Underlying Interest is issued by a provincial government or a provincial Crown corporation n = a + 2 days, where a = number of additional days.

'a' is based on a quantitative and qualitative analysis, established according to the degree of liquidity of the Underlying Interest which is derived from parameters such as but not limited to traded volume, Government of Canada/ provincial yield spreads and international guidelines. For a provincial government or provincial Crown corporation issuer 'a' is determined at least once a year and communicated to Clearing Members by written notice.

Furthermore, in anticipation of Remembrance Day (the "Banking Holiday") the Corporation will add one more day to the number of liquidation days 'n'. Hence, for Options and Futures contracts where the Underlying Interest is an Equity (i.e. Stock and ETF) or an Index the liquidation period will increase to three Business Days prior and up to the Banking Holiday, and for OTCI options, the liquidation period will increase to six Business Days prior and up to the Banking Holiday. The additional margin amount for the Banking Holiday will be released on the morning of the following Business Day.

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Engine uses the MI of the above formula to calculate the Price Scan Range (PSR) and to run several scenarios through its Risk Array calculation (for a detailed description refer to the section on Risk Arrays below).

A Risk Array is a set of 16 scenarios defined for a particular contract specifying how a hypothetical single position will lose or gain value if the corresponding risk scenario occurs from the current situation to the near future (usually next day).

PSR is the maximum price movement reasonably likely to occur, for each Derivative Instrument or, for Options contracts, their Underlying Interest. The term PSR is used by the Risk Engine to represent the potential variation of the product value and it is calculated through the following formula:

$$\text{PSR} = \text{Underlying Interest Price} \times \text{MI} \times \text{Contract Size}.$$