

CDS Risk Procedures



February 17, 2021
RELEASE 1.1





**CDS Clearing and
Depository Services Inc.**

cds.ca

Clearing and Depository Services Inc.

Toronto

100 Adelaide Street West
Toronto, ON
M5H 1S3

T 1 416 365-8375
F 1 416 367-2755

webmanuals@tmx.com

Montréal

1700 - 1190, avenue des Canadiens-de-Montréal
C. P. 14
Montréal (Québec)
H3B 0G7

T 1 514 848-1010
F 1 514 848-9745

webmanuals@tmx.com

Contents

Overview	6
Assumptions	6
Legal precedence	6
Comments and suggestions	6
CDS Trade-marks	6
Other Marks.....	7
Chapter 1: Introduction to CDS	8
1.1 Participant roles and responsibilities.....	8
1.2 Risk	8
CHAPTER 2: CDSX	9
2.1 Continuous Net Settlement Service.....	9
Withdrawing from CNS.....	9
2.2 U.S. Dollar Cross-Border Services	9
DTC Direct Link Participant Funds	10
New York Link Participant Funds.....	12
CHAPTER 3: Aggregate Collateral Value	19
3.1 ACV edit	20
Meeting payment obligations.....	21
3.2 ACV edit during payment exchange.....	21
Account movements affecting ACV	21
3.3 ACV edit for U.S. dollar transactions	21
3.4 Haircuts	21
CDS haircut rates for debt instruments	22
CDS equity haircuts	23
3.5 Determining the liquidity holding period of equity securities for ACV	23
3.6 Calculating Haircut rates for equity securities.....	24
Haircut rates for new issues	25
Haircut rates for rights, warrants and installment receipts.	25
Haircut rates for limited price history	25
3.7 Sector limits.....	25
3.8 CDS issuer ratings	26
3.9 Revaluing ACV intraday	27
3.10 Redistributing ledger ACV and sector limits.....	27
CHAPTER 4: Caps	28
4.1 Cap types	28
CHAPTER 5: Cap Administration	29
Decreases to the formula amount	29
5.1 Extenders of credit cap adjustments.....	29
5.2 Settlement agent cap adjustments.....	29
5.3 Canadian dollar receivers of credit cap adjustments	30
CHAPTER 6: Lines of Credit.....	31
CHAPTER 7: Default Procedures	32

7.1	Collateral pools and credit rings	32
	Covering obligations.....	33
	Arranging liquidity	33
	Credit rings	33
	Non-contributing credit rings for receivers of credit	34
7.2	Central counterparty funds	34
7.3	Covering obligations	35
7.4	Arranging liquidity	35
7.5	Credit rings	35
7.6	Allocating CDSX payment amounts of suspended participants	36
7.7	Allocating positive ledger balances	36
7.8	Allocating partial payments.....	36
7.9	Allocating the shortfall.....	36
7.10	Collateral.....	37
7.11	Collateral sequence	38
7.12	Collateral administration ledgers	39
7.13	Processing suspension	40
7.14	Processing a receiver of credit suspension.....	40
7.15	Processing an extender of credit suspension	41
7.16	Processing a settlement agent suspension	42
7.17	Central counterparty obligations.....	42
7.18	Credit ring obligations.....	43
7.19	Processing a suspended NYL participant's payment obligation	43

CHAPTER 8: Collateral Administration45

8.1	Acceptable collateral	46
8.2	Valuation of collateral contributions	48
8.3	Haircuts	48
8.4	Collateral Management System	49

CHAPTER 9: CNS Participant Fund, CNS Default Fund and Supplemental Liquidity Fund.....50

	CNS acceptable collateral	50
9.1	Collateral requirement calculation overview	51
9.2	CNS Participant Fund	51
	Base Initial Margin.....	51
	Additional Margins (Add-ons)	51
	Mark-to-Market Add-on	52
	Market Liquidity Risk Add-on	52
	Wrong-Way Risk Add-on.....	52
9.3	CNS Default Fund.....	53
	Triple Witching Days.....	53
	Default Fund Sizing and Allocation - Tier 1	54
	Default Fund Sizing and Allocation - Tier 2	54
	CNS Default Fund Requirement.....	55
	Intra-month Monitoring	55
9.4	Supplemental Liquidity Fund	55
	Triple Witching Days.....	56
	Methodology	57
	Supplemental Liquidity Fund Sizing and Allocation - Tier 1	57
	Supplemental Liquidity Fund Sizing and Allocation - Tier 2	58
	Regularly Scheduled Review of Supplemental Liquidity Fund Size and Intra- quarter Monitoring.....	59
9.5	Calculating the Base Initial Margin	59
	Calculating the Base IM (HVaR) Component – Diversification Eligible Securities	59
	Calculating the Base IM (CCB) Component– Diversification Eligible Securities.....	60
	Calculating the Base IM – Diversification Eligible Securities.....	60
	Calculating the Base IM (Flat Rate Margining) – Non-diversification eligible securities.....	61
	Base IM Calculation	61
9.6	Mark-to-market.....	61
	Calculating the Mark-to-Market Add-On.....	61

Calculating the Market Liquidity Risk (MLR) Add-on.....	62
Calculating the Wrong Way Risk (WWR) Add-on.....	63
9.7 CNS collateral requirements.....	63

CHAPTER 10: Collateral pools.....64

Collateral administration.....	64
Specific Collateral (Special Margin).....	65
10.1 Extenders of credit collateral pool.....	65
Extenders' acceptable collateral.....	65
10.2 Calculating extenders' collateral contributions.....	65
10.3 Updating extenders' system operating caps and ratings discounts.....	66
10.4 Calculating extenders' ratings discounts.....	67
10.5 Settlement agents' collateral pool.....	73
Settlement agents' acceptable collateral.....	73
10.6 Calculating settlement agents' collateral contributions.....	74
10.7 Calculating settlement agents' ratings discounts.....	74
10.8 Receivers of credit collateral pools.....	75
Receivers' acceptable collateral.....	76
10.9 Canadian dollar receivers' collateral pool.....	76
10.10 Updating Canadian dollar receivers' collateral contributions.....	76
10.11 New York Link/DTC Direct Link special margin participant funds.....	77
10.12 U.S. dollar receivers' collateral pool.....	77
10.13 Updating U.S. dollar receivers' collateral contributions.....	78

CHAPTER 11.....79

11.1 CCP survivor withdrawal.....	79
-----------------------------------	----

Overview

CDS participants and non-participants use this document to learn about:

- Financial risk, how to maintain collateral requirements to avoid default.

Assumptions

This manual is written with the following assumptions:

- Participants have signed the Application for Participation in CDS's services.
- The terminology used in the manual is standard in the industry.
- All dollar amounts are in Canadian funds, unless stated otherwise.
- Unless defined otherwise in this document, capitalized words in this document have the same meaning as defined in the CDS Participant Rules.

Legal precedence

The reader is advised that this procedure or user guide is one of the Legal Documents governing a participant's use of CDS's services. In the event of any conflict between: i) the Participant Agreement and the Rules and ii) the procedures or user guides, the Participant Agreement and the Rules shall have precedence and govern.

Comments and suggestions

Send any comments and suggestions for this manual to CDS Customer Service.

CDS Trade-marks

The following trade-marks and logos are used by The Canadian Depository for Securities Limited and CDS Clearing and Depository Services Inc.

- ATON™ is a trade-mark of The Canadian Depository for Securities Limited
- CDS® is a registered trade-mark of The Canadian Depository for Securities Limited
- cds.ca™ is a trade-mark of The Canadian Depository for Securities Limited
- CDSX® is a registered trade-mark of The Canadian Depository for Securities Limited

Participants should display trade-marks in the typographical treatment set out above and clearly indicate that it is a trade-mark of and property of The Canadian Depository for Securities Limited. This treatment should, at minimum, be used within the first instance. Other uses of a CDS trade-mark must be approved by The Canadian Depository for Securities Limited.

Other Marks

Other marks used by CDS may include, but are not limited to, the following:

- SEDAR® is a registered trade-mark of the Canadian Securities Administrators
- SWIFT is a trade-mark of S.W.I.F.T. SCRL.

Chapter 1: Introduction to CDS

CDS Clearing and Depository Services Inc. (CDS) is the designated central clearing corporation for all eligible debt and equity securities in Canada. CDS provides a variety of automated services for financial institutions active in Canada and international capital markets. This manual is designed to assist participants in the following tasks:

- Familiarizing themselves with CDS
- Managing their financial risk.

1.1 Participant roles and responsibilities

A participant's role determines whether they have access to specific CDS services or functions.

Refer to the *CDS Participant Rules* for more information on participants' roles, qualifications, obligations, representations and warranties in terms of the activities or functions performed in CDSX.

1.2 Risk

CDS risk mechanisms apply to all participants and to all security types, including additional payment risk controls for U.S. dollar transactions.

The CDS risk mechanisms include, but are not limited to, the following:

- System operating caps (for more information, see [Caps](#) and [Cap administration](#))
- Lines of credit (for more information, see [Lines of credit](#))
- Pool and CNS service funds collateral (for more information, see [Collateral administration](#), [Collateral pools](#), [CNS Participant Fund](#), [CNS Default Fund](#) and [Supplemental Liquidity Fund](#)).
- Aggregate collateral value (ACV) on securities transactions and sector limits on the value of eligible securities controlled by the ACV edit ([for more information, see Aggregate collateral value](#))

CHAPTER 2: CDSX

CDSX provides clearing, depository and entitlement services for eligible debt and equity securities. The system features online, real-time functionality for CDS participants.

2.1 Continuous Net Settlement Service

The Continuous Net Settlement Service nets CNS eligible trades by value date. Value-dated CNS positions that reach value date are netted with outstanding CNS positions and are eligible for settlement. For more information, refer to *Trade and Settlement Procedures*.

Withdrawing from CNS

Before participants can withdraw from CNS, they must satisfy their CNS obligations. In particular, they must settle all of their CNS obligations with CDS and pay any mark-to-market amounts owing. Participants also must have paid their share of any residual loss from a default that occurred while they were a CNS participant.

To withdraw from CNS:

1. Provide written notification to CDS of the intent to withdraw from CNS.
2. Contact Customer Service to verbally request that CDS stop netting the trades. CDS Customer Service will provide assistance in withdrawing from CNS.
3. Pay or receive any mark-to-market payments.

Note: For the purpose of allocating any residual loss, if a participant is in the process of withdrawing from CNS, they are still considered to be a CNS participant for a period of 10 business days following the date on which they have eliminated all of their CNS net trades with CDS and paid any outstanding mark-to-market amounts. CDS will return their CNS Participant Fund, CNS Default Fund and Supplemental Liquidity Fund contributions after the 10 business day period has ended, net of their share of any residual loss that was allocated to them (if they had not subsequently reconstituted their CNS service contributions, and at the exception of the Supplemental Liquidity Fund, which cannot be used to absorb any residual loss).

2.2 U.S. Dollar Cross-Border Services

CDS offers two cross-border services, DTC Direct Link (DDL) and New York Link (NYL), which provide participants with the ability to settle USD transactions at the Depository Trust and Clearing Corp. (DTCC) in New York.

Through DDL, participants are sponsored by CDS for membership in DTC only. Just

as CDS is the central depository for Canadian securities, DTC is the central depository for U.S. securities providing custodial and settlement services for its members. DDL differs from NYL in that DDL members conduct trading activity exclusively on a trade-for-trade (TFT) basis.

New York Link (NYL) has two primary components:

- a) Trade clearing and settlement services through National Securities Clearing Corporation (NSCC).
- b) Access to custodial and settlement services offered by the Depository Trust Company (DTC).

NYL allows CDS participants to become sponsored members of NSCC and DTC (subsidiaries of DTCC), thus enabling them to clear and settle over-the-counter (OTC) trades made with U.S. broker/dealers. As a sponsored member, a CDS participant has all the privileges of direct membership in the two organizations. NYL differs from DDL as NYL members, while able to trade on a trade-for-trade (TFT) basis, conduct the majority of their transactions on a continuous net settlement (CNS) basis.

DTC Direct Link Participant Funds

As sponsored members, participants using the DDL service are required to pledge collateral to DTC based on requirements calculated by DTC. In addition, participants are required to pledge collateral to CDS to support liquidity requirements in case a participant fails to honor their settlement obligation in CDS's DDL service. Each participant using the DDL service indemnifies CDS for all of CDS's obligations to DTC in respect of any cross-border claims, obligation to deliver securities, to make payments or to contribute to any funds of DTC. Since settlements occur in DTC, the system risk controls for DDL are not part of CDS.

DDL participants contribute to the following two participant funds:

- DTC Participant Fund for DTC Direct Link (administered by DTC)
- CDS Participant Fund for DTC Direct Link (administered by CDS)

DTC Participant Fund for DTC Direct Link

DTC Direct Link participants must contribute to a Participant Fund administered by DTC to support liquidity requirements if a participant fails to honor their settlement obligations.

DTC calculates the Participant Fund requirement daily and obtains payment by same-day settlement through Fedwire. If an increased contribution is not delivered by the specified deadline, the participant may be subject to suspension from CDS.

A minimum USD 10,000 initial contribution is required from each participant, with subsequent fund requirements fluctuating in accordance with each participant's trading activities. Participants must send their initial cash contribution to CDS by sending a payment in U.S. funds through Fedwire. DTC assesses participants' trading activities on a daily basis and informs both CDS and the participant if an additional contribution is required. This is done in writing at least two business days

before the due date and is charged directly as part of the participant's settlement. Each quarter, DTC informs CDS and the participant if they have excess contributions. Upon request, excess contributions are returned as part of daily settlement.

CDS Participant Fund for DTC Direct Link

The CDS Participant Fund for DTC Direct Link covers the risk of default for the DDL participant with the largest payment obligation to DTC. In a default situation, CDS must pay DTC the amount owed by the DDL participant by the end-of-day.

Participants are notified of their collateral requirements on a quarterly basis. Collateral requirements may be satisfied by delivering the collateral to CDS in the form of the eligible collateral and within the collateral limits. If an increased contribution is not delivered by the specified deadline, the participant may be subject to suspension from CDS.

CDS will update collateral requirements for CDS Participant Fund for DTC Direct Link on a quarterly basis as follows:

1. Each DDL participant is allocated DTC net debit cap by CDS. The maximum net debit cap allocated to a DDL participant or DDL participant family is USD \$10 million. DDL participants are able to elect a zero DTC net debit cap, which would enable them to reduce their collateral requirement to zero. However, as a consequence of having zero DTC net debit cap, they would be required to pre-fund their DTC settlements. DDL participants can only adjust their CDS allocated DTC net debit cap on a quarterly basis. As part of the quarterly process, each DDL participant informs CDS in writing if any changes are required to the amount of their CDS allocated DTC net debit cap at least 10 business days before the end of the quarter. In case of an increase in the DTC net debit cap, CDS may require the DDL participant to provide information, such as the reasons for the increase, pre-funding incidents and a business plan.
2. To calculate the collateral requirements for each DDL participant, CDS calculates the leverage factor as follows:

$$\text{Leverage Factor} = \frac{\text{Total of all DDL participants' allocated DTC net debit caps}}{\text{Largest CDS allocated individual DTC net debit cap}}$$

3. CDS calculates each DDL participant's required collateral requirement as follows:

$$\text{Individual participant's required collateral} = \frac{\text{CDS allocated DTC net debit cap}}{\text{Leverage factor}}$$

The aggregate value of the DTC settlement component must be equal to the maximum individual DTC net debit cap.

New York Link Participant Funds

As a member of NSCC and DTC, CDS is obligated to make contributions to funds established by NSCC and DTC. As sponsored members, participants using the NYL service are required to pledge collateral to CDS based on collateral requirements calculated by NSCC and DTC. In addition, participants are required to pledge collateral to CDS to support liquidity requirements in case a participant fails to honor their settlement obligation in CDS's NYL service. Each participant using the NYL service indemnifies CDS for all of CDS's obligations to NSCC and DTC in respect of any cross-border claims, obligation to deliver securities, to make payments, to pay marks or to contribute to any funds of NSCC or DTC. Since settlements occur in NSCC and DTC, the system risk controls for NYL are not part of CDS.

NYL participants contribute to the following three participant funds:

- NSCC Participant Fund for New York Link (administered by NSCC and CDS)
- DTC Participant Fund for New York Link (administered by DTC)
- CDS Participant Fund for New York Link (administered by CDS)

NSCC Participant Fund for New York Link

NSCC applies risk-based margining (RBM) methodology (explained later in this section) to participant accounts that are sponsored by CDS into NSCC. NSCC calculates each participant's RBM requirement daily. All Participant Fund requirements must be satisfied in the form of U.S. funds (through Fedwire).

A minimum USD 10,000 initial contribution is required from each participant. Participants must send their initial cash contribution to CDS by sending a payment in US funds through Fedwire. Participants are notified of any additional participant fund requirements by 8:00 a.m. EST daily. Additional participant fund requirements are satisfied by delivering a contribution to CDS in the form of USD cash collateral.

The provision of collateral must be completed before collateral deadlines as outlined in the CDS procedures. If the required additional contribution is not received by CDS by the specified deadline, the participant may be subject to suspension from CDS. For Canadian holidays in which NSCC and DTC (including Fedwire) are open, CDS participants are required to pledge any additional collateral in the normal manner.

Participants must submit a written request to CDS to withdraw excess cash contributions. Participants may request excess pledged contributions be released prior to the collateral deadline through the Collateral Management Group.

DTC Participant Fund for New York Link

New York Link participants must also contribute to a Participant Fund administered by DTC. DTC calculates the Participant Fund requirement daily and obtains payment by same day settlement through Fedwire. If an increased contribution is not delivered by the specified deadline, the participant may be subject to suspension from CDS.

A minimum USD 10,000 initial contribution is required from each participant, with subsequent fund requirements fluctuating in accordance with each participant's

trading activities. Participants must send their initial cash contribution to CDS by sending a payment in U.S. funds through Fedwire. DTC assesses participants' trading activities on a daily basis and informs both CDS and the participant if an additional contribution is required. This is done in writing at least two business days before the due date and is charged directly as part of the participant's settlement. Each quarter, DTC informs CDS and the participant if they have excess contributions. Upon request, excess contributions are returned as part of daily settlement.

CDS Participant Fund for New York Link

New York Link participants must also contribute to a participant fund administered by CDS. Collateral requirements may be satisfied by delivering the collateral to CDS in the form of eligible collateral and within the collateral limits. If CDS does not receive the required collateral contribution by the specified deadline, the participant may be subject to suspension from CDS.

The CDS Participant Fund for New York Link will be made up of the following components:

- DTC settlements component
- NSCC settlements component

DTC Settlements Component

The DTC settlements component of the CDS Participant Fund for New York Link covers the risk of default for the NYL participant with the largest payment obligation to DTC. In a default situation, CDS must pay DTC the amount owed by the NYL participant by the end-of-day.

CDS will update the DTC settlements component requirements on a quarterly basis as follows:

1. Each NYL participant is allocated a DTC net debit cap by CDS. The maximum net debit cap allocated to a NYL participant or NYL participant family is USD \$20 million. NYL participants are able to elect a zero DTC net debit cap, which would enable them to reduce their DTC settlements component amount to zero. However, as a consequence of having zero DTC net debit cap, they would be required to pre-fund their DTC settlements. NYL participants can only adjust their CDS allocated DTC net debit cap on a quarterly basis. As part of the quarterly process, each NYL participant informs CDS in writing if any changes are required to the amount of their CDS allocated DTC net debit cap at least 10 business days before the end of the quarter. In case of an increase in the DTC net debit cap, CDS may require the NYL participant to provide information, such as the reasons for the increase, pre-funding incidents and a business plan.
2. To calculate the DTC settlements component for each NYL participant, CDS calculates the leverage factor as follows:

$$\text{Leverage Factor} = \frac{\text{Total of all NYL participants' allocated DTC net debit caps}}{\text{Largest CDS allocated individual DTC net debit cap}}$$

3. CDS calculates each NYL participant's required DTC settlements component collateral contribution as follows:

$$\text{Individual participant's required collateral} = \frac{\text{CDS allocated DTC net debit cap}}{\text{Leverage factor}}$$

The aggregate value of the DTC settlement component collateral must be equal to the maximum individual DTC net debit cap.

NSCC Settlements Component

The NSCC settlements component covers the liquidity shortfalls of the NYL service with CDS participants' resources through a pooling-of-resources arrangement. The NSCC settlements component is sized to have resources sufficient to cover potential liquidity stress scenarios that include, but are not limited to, the default of a participant and its affiliates that would potentially cause the largest aggregate liquidity exposure in extreme but plausible market conditions.

CDS updates the NSCC settlements component requirements on a monthly basis and the requirements are based on the activity level of the Participants in the NYL service to reflect the risks that they pose to the operations of the clearing and settlement system.

To determine the size of the liquidity shortfalls used to calculate the NSCC settlements component, the liquidity shortfalls of unwinding NYL outstanding positions on each day is calculated for every Participant, for every day of the lookback periods, using stress-test scenarios and all available financial resources.

The daily liquidity shortfalls are calculated based on the following inputs:

1. Liquidity requirements over the close out period;
2. Qualifying financial resources;

The NSCC settlements component is then calculated so as to collateralize, the largest daily liquidity shortfalls over the lookback periods. The first lookback period corresponds to the previous month and the second lookback period is equal to the previous 20 business days.

Mutualization is achieved by allocating the NSCC settlements collateral requirements on a pro-rata basis taking account of the cumulative CDS Participants for NY Link liquidity requirements over the last month.

As part of CDS's monthly review of the size of the NSCC settlements component, CDS Participants for NY Link will be advised of any changes to their NSCC settlements component collateral requirement which may be required. NSCC settlement component collateral requirement will be enforced for all CDS Participants for NY Link throughout the month (subject to intra-month re-sizing – see

below).

Regularly Scheduled Review of NSCC settlement component Fund Size and intra-month Monitoring

CDS monitors the value of the NSCC settlement component Fund on a daily basis to ensure that it covers the highest shortfall observed during either: (1) the previous month or (2) the previous 20 business days. As such, the size of the NSCC settlement component Fund is revised, at a minimum, on a monthly basis. However, CDS can adjust the size of the fund between the monthly updates if a new highest shortfall is observed during the previous 20 business days. The intra-month collateral call is then allocated amongst all CDS Participants for NY Link with the same methodology as the scheduled monthly review.

New York Link Liquidity Risk Waterfall

The liquidity risk associated with a defaulting NYL participant is the amount of its payment obligation. NSCC settlements for NYL participants are not subject to a cap as is the case for DTC settlements¹. As a result, there is no limit to the size of a payment obligation of a defaulting NYL participant resulting from their NSCC settlements.

CDS would cover its liquidity shortfall using the following waterfall:

1. Apply the defaulter's CDS Participant Fund for New York Link.
2. Use CDS's existing USD LOC.
3. Allocate against surviving NYL participants based on each CDS Participant Fund for New York Link's pro-rata share of total CDS Participant Fund for New York Link.
4. Any remaining liquidity requirement will be allocated against NYL participants as follows:
 - a) Apply the defaulter's USD CDSX credits to reduce the NYL payment obligation.
 - b) Allocate against surviving NYL participants as a haircut to their USD credit based on each NYL participant's pro-rata share of total credits.
 - c) Allocate the defaulter's CAD credits to the surviving NYL participants.

Risk Controls at DTC and NSCC

Although the risk controls in CDS's cross-border services are not part of CDS, it is important to describe how DTC and NSCC control their settlement risk exposure from each participant. The mechanism is summarized below:

Net Debit Cap

¹ Net Debit Cap: DTC settlements in a participant's account are subject to a limit on the amount of the participant's payment obligation (the "net debit cap" assigned to the account) and are also subject to collateralization (the "collateral monitor") based on the haircut value of the securities in the participant's account. As a result, the credit risk associated with the default of a participant's DTC settlements is contained and mitigated.

The net debit cap is a risk control mechanism used by DTC to limit its settlement risk exposure from each participant. The net debit cap sets the maximum limit for each participant's net debit at DTC.

Transactions creating net debit requirements that exceed the participant's net debit cap can only be settled at DTC by pre-funding the account using Fedwire payments.

CDS is responsible for allocating its net debit cap at DTC to each of the sponsored participants in the DTC Direct Link and New York Link services based on their net debit requirements at DTC.

DTC recalculates each participant's net debit cap daily and the cap automatically increases or decreases relative to the participant's average intra-day net debit peaks. This cap is referred to as the system generated net debit cap. The actual net debit cap applied by DTC to each participant is the lower of the net debit cap allocated by CDS and the system generated net debit cap.

CDS allocates a net debit cap of no more than USD 20 million per participant (including family members) for NYL participants, and no more than USD 10 million per participant (including family members) for DDL participants across the cross-border services. While DTC's system generated net debit cap fluctuates daily, the net debit cap allocated by CDS remains unchanged.

For new participants joining the cross-border services, CDS allocates an initial net debit cap of USD \$1 million unless the participant requests an alternative amount. Upon receiving a request for an increase in the net debit cap, CDS may require the DDL participant to provide information, such as the reasons for the increase, pre-funding incidents and a business plan. In addition, CDS reserves the right to increase or decrease the net debit cap at its discretion.

The Collateral Monitor

The collateral monitor at DTC is similar to the ACV edit in CDS. The collateral monitor ensures that there is enough collateral in the accounts of both the seller (the deliverer) and the buyer (the receiver) to support each of their net debits. If a completed transaction will produce a net settlement debit that is not fully collateralized or exceeds the participant's net debit cap, the transaction will be automatically blocked and become pending.

NSCC's Clearing Fund and Risk Based Margining (RBM)

NSCC requires members to contribute collateral to a Clearing Fund to support the trade guarantee and cover their exposures with NSCC. Any net market loss on the close-out of guaranteed transactions of a defaulting member is first covered by the defaulter's contribution to the Clearing Fund plus any other collateral of the defaulter available to NSCC. Any part of the loss not covered by the defaulter's collateral is borne by NSCC's surviving members.

Contributions to the Clearing Fund are based on the Risk Based Margining (RBM) methodology. The rationale for implementing RBM is that it facilitates a more

accurate determination of NSCC's risk exposure from participants' outstanding positions, as compared to the earlier activity-based model. The RBM methodology is primarily based on defaulter pay model, similar to the CDS Risk Model. NSCC's RBM methodology takes into account a number of risk factors that are used to determine a participant's contribution to the Clearing Fund.

Volatility (Value-at-Risk Model) - The volatility of each member's net of its pending positions i.e., net positions that have not reached settlement and its fail positions (net positions that did not settle on settlement date), otherwise known as Net Unsettled Positions, is determined after taking into account offsetting pending transactions that have been confirmed and/or affirmed through an institutional delivery system.

The volatility of these positions is determined using a VaR methodology with a 99% confidence level and a three-day holding period. Price changes are exponentially weighted, so greater weight is placed on more recent price movements.

NSCC excludes Net Unsettled Positions in classes of securities whose volatility is a) less amenable to statistical analysis, such as OTC Bulletin Board or Pink Sheet issues or issues trading below a designated dollar threshold (e.g., \$5.00), or b) amenable to generally accepted statistical analysis only in a complex manner, such as municipal or corporate bonds. Contributions to the Clearing Fund for these Net Unsettled Positions in these classes of securities are determined by multiplying the absolute value of such positions by a percentage determined by NSCC. For securities in a), the percentage shall not be <10% and for securities in b), the percentage shall not be <2%.

plus

Mark-to-Market - Pending positions (i.e., outstanding positions) are marked-to-market on a daily basis.

plus

Special Charges - For volatility or lack of liquidity of any security

plus

Non-Standard Charges - For transactions processed on a shortened processing cycle

plus

Other Charges - for CNS long and short fails

Default of NYL or DDL Participant

Each participant using NYL and/or DDL service is a member of the respective link fund credit ring supported by the Participant Fund/s as described above. If a participant fails to fulfill their obligations arising from their participation in a cross-

border service, then each surviving member of the respective credit ring would pay their proportionate share of that obligation upon request by CDS. The members of each link credit ring have no obligation to CDS with respect to any obligation of a defaulting participant arising from that participant's use of another service or function.

U.S. Settling Bank Risk

Unlike in Canada, CDS is not able to settle transactions through the central bank (the Federal Reserve) in the United States. Therefore, CDS requires a settlement bank for settling USD domestic and cross-border transactions in the U.S. As a result, CDS is exposed to the risk that its obligations would not be settled with DTC if the settlement bank were to fail. In addition, if that bank failed CDS would be unable to access any cash deposits it may have with that bank.

Reclaims

Settlements at DTC are subject to reclaims, which have the effect of reversing previously settled transactions. Therefore, reclaims represent a material risk to participants using cross-border services. DTC has confirmed that CDS is not liable for unsettled trade-for-trade (TFT) transactions in New York Link and DTC Direct Link. Once the trades have passed the DTC risk controls and have settled, CDS is responsible for the payment obligation for those settlements. However, reclaims are not subject to the risk controls at DTC and therefore a payment obligation resulting from a reclaim could exceed the Net Debit Cap or the Collateral Monitor controls. After analyzing the nature of reclaims and receiving feedback from participants using cross-border services, CDS concluded that the risk from reclaims against the New York Link (NYL) and DTC Direct Link (DDL) participants did not need to be collateralized as it could be adequately covered by the NYL and DDL credit rings.

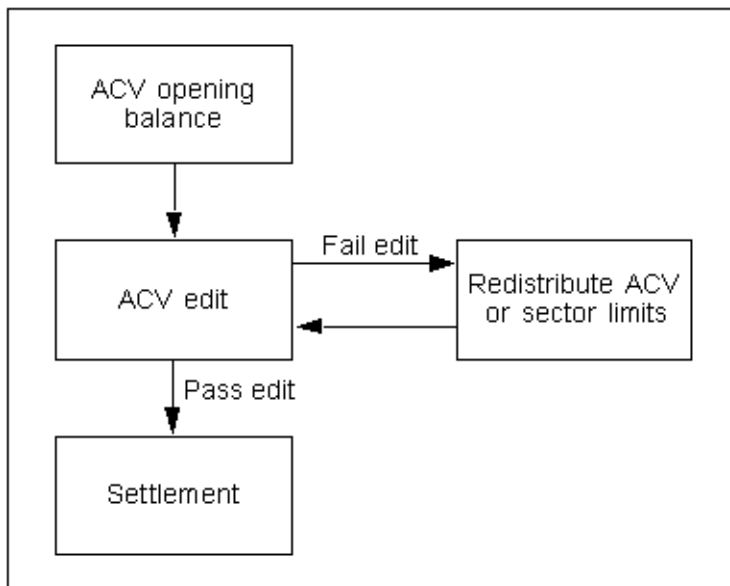
CHAPTER 3: Aggregate Collateral Value

A participant's aggregate collateral value (ACV) is the dollar value CDS assigns to their holdings. This value becomes collateral if a participant defaults on their payment obligations. ACV collateral includes all securities in a participant's risk accounts (general and restricted collateral accounts).

ACV is monitored and updated in real time, and is maintained in Canadian dollars only. CDSX does not automatically transfer available ACV and sector limit amounts because participants can monitor and redistribute their ACV throughout the day.

To prevent the concentration of ACV in a few securities, it is subject to limits. For more information, see [Sector limits](#).

The following diagram illustrates the ACV process:



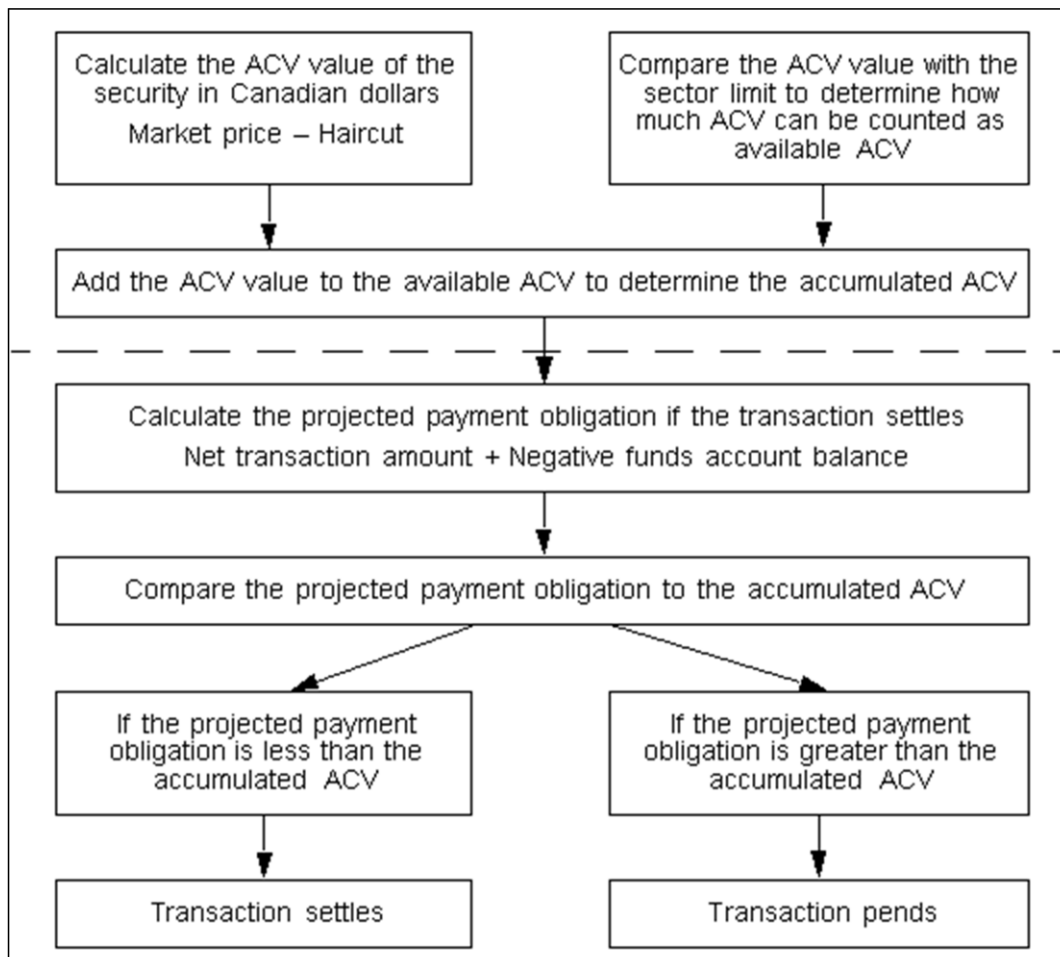
This process involves:

- Calculating the opening balance – At the start of each business day, CDSX calculates ACV opening balances for all ledgers. The opening balance is equal to initial ACV (allocated by CDS or the family administrator), plus any value of securities held in that ledger's risk accounts.
- Editing ACV – Before each transaction is processed, CDSX checks to ensure that a participant's accumulated ACV remains greater than or equal to their payment obligation after settlement (see [ACV edit](#)).

- Redistributing ACV or sector limits – If a transaction fails the ACV edit, CDSX does not process the transaction but enters it with a pending status. Participants must change their security positions or funds account balances ([see Redistributing ledger ACV and sector limits](#)) in order for their pending transactions to be reconsidered for settlement.
- Exchanging for payment – CDSX delivers securities to any participant so long as they pass the ACV edit at the start of payment exchange ([see ACV edit during payment exchange](#)).

3.1 ACV edit

CDSX continually monitors ACV to ensure that participants do not default on their obligations. The following diagram illustrates this process, which is also known as ACV edit:



Pending transactions are reconsidered for settlement if a participant's security positions or funds account balance change, or their ACV increases.

Meeting payment obligations

A participant's payment obligation is the negative balance in their funds account in a specific ledger and does not include any:

- Unused lines of credit granted by an extender of credit
- Unused cap
- Outstanding mark-to-market amounts (CNS).

3.2 ACV edit during payment exchange

During the payment exchange period when transactions are settled between CDS and its participants, securities are subject to a modified ACV edit to ensure that participants can:

Pledge all L-type positions (for more information, refer to *Pledge and Settlement Procedures*) in their risk accounts to the Bank of Canada without restrictions.

Trade all positions in their risk accounts with the Bank of Canada without restrictions.

Once payment exchange is complete, the ACV edit is not applied.

Account movements affecting ACV

During the day, participants can move securities from their segregated accounts into their general account to increase their ACV. Securities that are moved to the participant's segregated account overnight are paid-for securities belonging to their clients, and can no longer be used to increase ACV. Any securities that are not segregated overnight will form part of the participant's initial ACV the next day.

3.3 ACV edit for U.S. dollar transactions

Since ACV currently supports Canadian dollar transactions only, a participant's ACV for a security with a U.S. funds market price is converted to Canadian funds, using a Canadian to U.S. exchange rate. For more information, refer to *CDSX Procedures and User Guide*.

3.4 Haircuts

Haircuts are applied against the market price to determine the value of the security for the purposes of the ACV edit as follows:

Debt instruments - haircuts are based on the security class, an issuer rating and its term to maturity. See table below for the corresponding debt haircut rates that CDS applies to the market value of each debt security.

Equities - CDS uses a value-at-risk (VaR) based methodology to calculate haircut rates for equity securities.

The haircut represents the dollar value (or corresponding percentage) that securities

could decline by from default to liquidation. The size of the haircut depends on the level of risk associated with the securities.

CDS haircut rates for debt instruments

The table below indicates the haircut rates that CDS applies to the market value of each debt instrument type.

Debt instrument type ²	Term to maturity					
	0 to 1 year	1 to 3 years	3 to 5 years	5 to 10 years	10 – 35 years	Greater than 35 years
Government of Canada	0.5%	1.0%	1.5%	2.0%	3.0%	3.5%
Government of Canada (Stripped)	0.5%	1.0%	1.5%	2.0%	4.0%	11.5%
Federated Guaranteed	1.0%	1.5%	2.0%	2.5%	4.0%	4.5%
Federated Guaranteed (Stripped)	1.0%	1.5%	2.5%	4.0%	5.5%	13.0%
Provincial	1.5%	2.0%	2.5%	3.0%	4.0%	6.0%
Provincial (Stripped)	1.5%	2.0%	3.0%	4.5%	6.0%	17.0%
Provincial Guaranteed	2.0%	2.5%	3.0%	3.5%	4.5%	6.5%
Provincial Guaranteed (Stripped)	2.0%	2.5%	3.5%	5.0%	6.5%	17.5%
NHA Mortgage-Backed Securities	2.0%	2.5%	3.0%	3.5%	5.0%	5.5%
Corporate AAA	3.0%	3.5%	4.0%	6.5%	9.0%	9.0%
Corporate AA	3.0%	3.5%	4.0%	6.5%	9.0%	9.0%
Corporate A	5.0%	5.5%	6.0%	8.5%	11.0%	11.0%
Unrated public sector entities and government grants	15.0%	16.0%	17.0%	18.5%	20.0%	20.0%
Unrated municipals	20.0%	21.0%	22.0%	23.5%	25.0%	25.0%
Corporate BBB	30.0%	32.0%	33.0%	35.0%	35.0%	
Corporate BB	100.0%					
Corporate B	100.0%					
Corporate C	100.0%					
U.S. Treasury bills, notes and bonds (interest-bearing and zero-coupon bonds)	1.0%	1.5%	3.0%	4.5%	4.5%	4.5%

² CDS uses the lowest available rating from the Dominion Bond Rating Service (DBRS) and Standard & Poor's Corp. (S&P) to assign the CDS issuer rating.

CDS equity haircuts

Haircut rates for ACV equity securities are recalculated on a daily basis. CDS calculates the risk of each equity security through the use of a risk measurement technique called Value-at-Risk (VaR). VaR is defined as the expected maximum loss for a given security or portfolio of securities with a given degree of confidence over the holding period. The VaR is based on two weighted sub-components, a Historical Value-at-Risk component and a counter-cyclical buffer component. The Historical Value-at-Risk component takes into consideration a 99% confidence level, a EWMA factor and a look-back period of 1300 days (5 years). The counter-cyclical buffer component is designed to capture high financial market stress periods. Model parameters are reviewed from time to time.

The holding periods used for calculating ACV haircuts for equities is determined by the Dollar Average Daily Volume (Dollar ADV) methodology described in the section below, with less liquid securities being subject to a longer holding period and hence a higher haircut rate.

3.5 Determining the liquidity holding period of equity securities for ACV

CDS uses the Dollar Average Daily Volume (Dollar ADV), an enhanced methodology to determine the liquidity of equity securities and their corresponding holding periods. The holding period is the number of days that CDS estimates it might take to execute the close-out transactions for CNS positions. The maximum holding period that can be applied to a security is 10 days.

By applying the Dollar ADV methodology, the price of an equity security is taken into consideration in addition to the trading volumes to more appropriately classify the liquidity of equity securities. The Dollar ADV is the average of the daily Traded Values for the last 260 days. The daily Traded Value is the equity's close price (in CAD) on that date multiplied by its traded volume for that date. A Dollar ADV of \$1 million or greater is used to classify a security as highly liquid. See the table below for the liquidity classifications of equity securities.

Table: Liquidity classifications of equity securities

Liquidity Classification	Dollar ADV (CA\$)	Holding Period
Highly liquid	> \$1,000,000	2 days
Liquid	> \$500,000	3 days
Less liquid	> \$200,000	5 days
Illiquid	<= \$200,000	10 days

3.6 Calculating Haircut rates for equity securities

The risk of each equity security is calculated using the Historical VaR methodology. The Historical VaR methodology contains two weighted components – the Historical Value-at-Risk component (HVaR) and the Counter-Cyclical Buffer component (CCB). Also, to capture liquidity risk, the HVaR and CCB calculations incorporate the holding periods of equity securities. See section “[Determining the liquidity holding period of equity securities for ACV](#)” for details on how the holding periods of equity securities are determined.

HVaR Component Calculation

The following steps are taken to calculate the HVaR for every security i :

- a. At each time t of the lookback period, the filtered EWMA variance for each security is calculated as:

$$\sigma_{i,t}^2 = \lambda * \sigma_{i,t-1}^2 + (1 - \lambda) * r_{i,t}^2,$$

Where

$$\begin{aligned} \sigma_{i,t}^2 & - \text{EWMA variance of security } i \text{ returns at time } t \\ \sigma_{i,t-1}^2 & - \text{EWMA variance of security } i \text{ returns at time } t - 1 \\ \lambda & - \text{Time decay coefficient} \\ r & - \text{daily return of security } i \text{ at time } t \end{aligned}$$

Note that an initialization period is used for the calculation of the EWMA variance.

- b. Calculate the scaling factor for each security for each time t in the lookback period.
- c. Order the vector of daily profit and losses (P&Ls) from least to greatest value, and select the HVaR component value based on the percentile corresponding to the confidence level.

CCB component calculation

The methodology used for the CCB calculation is the same as the one for the HVaR calculation, with the following two exceptions:

- 1) The lookback period is 260 days to reflect a period of high financial market stress.
- 2) Filtered EWMA volatility is not calculated, and therefore no scaling factor is applied to historical returns (i.e., unfiltered).

Haircut

The Haircut for each security is calculated as a weighted average of HVaR and CCB as follows:

$$\text{Haircut}_T^i = (1 - w) \times \text{HVaR}_T^i + w \times \text{CCB}_T^i;$$

Where

w – CCB weight

FX adjustment for USD securities

For USD securities, an adjustment is added to the haircut. To calculate the adjustment, the methodology of the HVaR calculation is applied to the FX exchange rates. Note that no CCB component is calculated, only a HVaR portion for the FX. Also, the holding period is the same as that of security i .

The Haircut with the FX adjustment is then calculated as follows:

$$\text{Haircut USD}_T^i = \text{Haircut}_T^i + \text{FXHC}_T,$$

Where

Haircut USD_T^i – Adjusted Haircut for USD security i on date T
 FXHC_T – HVaR for the FX calculated at valuation date T

Haircut rates for new issues

A standard haircut rate of 100 per cent is applied to all new equity issues until a proxy security is assigned for that equity security. New equity issues do not have sufficient price history to appropriately calculate the haircut using a VaR based methodology and therefore a [Flat Rate Margining](#) methodology is used. Once a suitable proxy security is assigned for the new issue, a VaR based methodology is used to calculate the haircut for the equity based on the current price(s) for the new issue and the proxy-adjusted historical prices for the new issue.

Haircut rates for rights, warrants and installment receipts.

Rights, warrants and installment receipts receive a default haircut rate of 100 per cent and the Flat Rate Margining methodology is used.

Haircut rates for limited price history

For securities other than those mentioned above with a price history that is unsuitable for a VaR-based methodology - i.e., illiquid securities with scarce or limited prices - CDS, in its discretion, will assign a haircut rate (which may be other than 100 per cent) that it deems appropriate and the Flat Rate Margining methodology will apply.

3.7 Sector limits

Sector limits are applicable to extenders of credit and settlement agents, and their associated family members. The sector limits indicated in the table below ensure that a participant's ACV is not concentrated in certain types of securities.

Non-family member Receivers of Credit are not subject to these sector limits.

Sector limit	Field	Description
Government sector limit	GSL	Calculated as 25 per cent of the company cap and is made up of non-federal-government-sector-issued securities (provincial debt, federally-guaranteed debt and provincially-guaranteed debt)
Private sector limit	PSL	Calculated as 15 per cent of the company cap and is made up of private-sector-issued debt securities
Unrated debt limit	UDL	Set at 0 and is made up of unrated public sector bonds and unrated municipal bonds
High yield debt limit	HYL	\$100 million or less, as elected by the participant, to be shared between the participant and their family member(s) and is made up of BBB-rated corporate debt (high yield bonds)
Federal U.S. limit	FTL	Set at 0 and made up of U.S. Treasury securities
Equity sector limit	ESL	\$100 million or less, as elected by the participant, to be shared between the participant and their family member(s). This amount is deducted from the participant's existing PSL

There is no limit on the amount of ACV that can be made up of federal government securities (i.e., those issued by the Government of Canada). However, limits are placed at the family level on the amount of sector limit securities that may be counted towards that ledger's ACV. Like the initial ACV, these limits are distributed among family-member companies. Participants can acquire securities above their sector limits, however, their value will not be included in the ACV for that ledger.

Securities issued by the participant themselves or their family members are not given value for ACV purposes in their own ledgers.

3.8 CDS issuer ratings

A CDS issuer rating is applied to every debt issue deposit and is used to assess the quality of an issuer's securities. The rating is used in determining the haircut percentage applied by the ACV edit. Issuers rated BB, B or C are not used in the ACV edit. For more information, see [CDS haircut rates for debt instruments](#).

CDS uses the lowest available rating from the Dominion Bond Rating Service (DBRS) and Standard & Poor's Corp. (S&P) to assign the CDS issuer rating. The table below compares each agency's rating scale with the CDS ratings.

DBRS		S & P		CDS Rating
Short-term debt	Long-term debt	Short-term debt	Long-term debt	
R-1	High	AAA	A-1+	AAA
	Middle	AA		AA
	Low	A	A-1	A
R-2	High	BBB	A-2	BBB
	Middle	BB	A-3	BB

	Low	B	B	B	B
R-3	High	CCC	C	CCC	C
	Middle	CC		CC	
	Low	C		C	
D		D	D	D	
Unrated public debt issuers (class code - UP)					U
Unrated municipal debt issuers (class code - UM)					

3.9 Revaluing ACV intraday

Market price is used to calculate ACV and may be based on, but not limited to, price feeds from commercial pricing vendors and CDS's own pricing model. When an intraday change in the market price of a security occurs, CDS uses the following exception process to reduce the level of risk:

1. CDSX uses the new price to determine value for subsequent transactions.
2. If a security or group of securities is falling considerably in value, CDS can do one of the following:
 - Revalue participants' ACV intraday using new prices (settlement is temporarily suspended while revaluation takes place)
 - Re-mark any outstanding and value-dated CNS positions.

3.10 Redistributing ledger ACV and sector limits

The ledger sector limits manage value risk by placing a ceiling on the amount of the securities that are counted toward a ledger's ACV. Therefore, an increase or decrease in a ledger's sector limit could affect that ledger's current ACV.

To redistribute previously allocated ACV and sector limits among their company's ledgers – refer to the User Guide.

CHAPTER 4: Caps

Company caps are used by the system to enforce a limit on the amount participants are eligible to use for settlement and credit extension. The size of the company cap is determined by regulatory policy and is assigned by CDS as part of the initial setup of the participant. Only CDS can change the company cap. Company caps are input and maintained by CDS. Company caps are allocated in both Canadian and U.S. dollars. However, the U.S. dollar company cap cannot be allocated to extend credit. U.S. dollar caps can be allocated to the company's ledgers only. Settlement agents and extenders of credit elect a company cap up to the formula amount.

The caps that are given to members are used to cover settlements and other debits made to the member's Funds Account but are not used to cover mark-to-market payments generated by the CCP services.

4.1 Cap types

The types of caps are:

- Company cap
 - For extenders of credit, the company cap is an intraday dollar limit that applies to settlements and extension of credit.
 - For settlement agents and receivers of credit, the company cap is an intraday dollar limit that applies to settlements only.
- Elective cap
 - Extenders of credit set and maintain their own Canadian and U.S. dollar elective cap, and allocate portions of their elective cap to any subsidiary caps. Subsidiary caps include credit extension caps and ledger caps.
 - For settlement agents and receivers of credit, CDS sets and maintains the Canadian and U.S. dollar company cap. CDS also sets the elective cap equal to their company cap. Settlement agents and receivers of credit can allocate their elective cap to their various ledger caps only.
- Credit extension cap – One per company. Only extenders of credit have this cap. This cap controls the total value of lines of credit a participant can authorize in a given day.
- Ledger cap – Participants may allocate a portion of their elective cap among their ledgers. This cap is used to settle transactions in a given ledger and can be allocated by settlement facility; the CDSX settlement facility and the CDCC settlement facility. When CDSX uses the ledger cap to settle a transaction, a negative position is created in the funds account. In a given day, this negative position cannot exceed the amount of the ledger cap.

CHAPTER 5: Cap Administration

A company's cap (also known as the system-operating cap) may be adjusted periodically. The rules and procedures relating to changing caps are defined in the *CDS Participant Rules*.

An additional collateral contribution may be necessary to meet new requirements brought on by cap increases.

Decreases to the formula amount

The formula amount determines the system-operating cap for capped participants, and is calculated differently for each of the credit rings. CDS is responsible for entering mandatory decreases to the formula amount.

5.1 Extenders of credit cap adjustments

CDS updates the formula amounts for the extenders of credit on a quarterly basis. This involves calculating capital from the extenders' most current quarterly common shareholders equity and applying the rating discounts and adjustment factors. For more information, see [Updating extenders' system operating caps and ratings discounts](#).

5.2 Settlement agent cap adjustments

Settlement agents provide CDS with their elected cap on a quarterly basis. Settlement agents can elect their cap as follows:

- **MAXIMUM cap – TENURED MEMBERS:** The settlement agent category credit ring having established a maximum cap of C\$1.0 billion
 - **TENURE CRITERIA:** To elect the maximum cap of C\$1.0 billion a member must have been a member of the of the settlement agent category credit ring for a period of at least 1 year
- **MAXIMUM cap – NEW MEMBERS:** New members of the settlement agent category credit ring can elect a SOC not exceeding 50% of the maximum cap
- **MAXIMUM US\$ cap:** Settlement agents may elect to convert up to 3% of their elected C\$ cap to a US\$ cap

CDS uses these amounts to calculate the settlement agent pool collateral requirement and member allocations as follows:

- The settlement agent pool collateral requirement is calculated as 25% of maximum SOC elected by a member of the settlement agent category credit ring
- **Settlement agent member Collateral Requirement:** Members of the settlement agent category credit ring contribute to the settlement agents category credit ring collateral equivalent to their pro-rata share of the total elected cap

- **RATING DISCOUNT:** The settlement agent category credit ring retains the use of a “Ratings Discount” to adjust the initial ACV allotted to each settlement agent
 - A settlement agent category credit ring member’s initial ACV is equal to its collateral requirement adjusted by multiplying it by its rating discount

A settlement agent’s cap is updated only on request.

5.3 Canadian dollar receivers of credit cap adjustments

CDS updates the formula amounts for the Canadian dollar receivers of credit on a quarterly basis. For more information, see [Updating Canadian dollar receivers’ collateral contributions](#).

CHAPTER 6: Lines of Credit

Lines of credit provide intraday financing in CDSX. Participants arrange for credit with an extender of credit. The terms of a line of credit are negotiated outside CDSX. Lines of credit are available in Canadian dollars only.

A CDS participant may perform one of the following roles when dealing with lines of credit:

- Extender of credit – Refers to the participant who extends the line of credit.
- Receiver of credit – Refers to the participant who is using the line of credit.

Any participant (i.e., extenders of credit, settlement agents or receivers of credit) can use lines of credit to increase their available funds for settling transactions in CDSX.

CDSX automatically draws on a line of credit when a participant does not have a sufficient positive funds account balance in the affected ledger and/or does not have a sufficient ledger cap. Lines of credit are not drawn for CNS mark-to-market payments.

When a line of credit is used to settle a transaction, the participant's funds account shows a negative balance and one or more lines of credit are drawn down for the amount of the negative balance. For participants with no ledger cap, the line of credit in effect "covers" the negative balance in the funds account. For participants with a ledger cap, all or part of a negative funds account balance may be covered by the cap.

CHAPTER 7: Default Procedures

During payment exchange, participants either pay to or are paid by CDS for any outstanding payment obligation. A default results when a participant with a payment obligation to CDS fails to deliver an acceptable payment or to deliver collateral to CDS by the deadline.

If a participant fails to make a timely payment to CDS, CDS must suspend the participant. CDS can also suspend a participant if its financial or operating condition is likely to disrupt or jeopardize CDS's services. A suspension automatically triggers CDSX risk controls and freezes the participant's functional capabilities in CDSX. Suspension of the participant also prevents any further settlement from being completed. If the suspended participant has extended lines of credit to other participants, these lines of credit may be paid but not drawn upon. A participant default may be one of the consequences resulting from suspension because the participant is not permitted to engage in payment exchange with CDS.

A suspension is processed separately for each currency in which the suspended participant has an obligation to CDS. CDS has developed the following mechanisms to absorb a participant's failure to make their payment obligation to CDS:

- Collateral pools
- Participant funds
- Lines of credit.

During the processing of a suspension, CDS allocates the suspended participant's current payment obligation to the appropriate mechanism, which in turn is responsible for paying CDS the default amount allocated to them.

When a participant's payment is late, CDS contacts the person(s) designated by the participant to arrange for a replacement payment. The designated person(s) must be available, by phone, from at least 4:00 p.m. ET (2:00 p.m. MT, 1:00 p.m. PT) to 5:00 p.m. ET (3:00 p.m. MT, 2:00 p.m. PT). Participants must ensure that their list of designated contacts is kept current at CDS.

7.1 Collateral pools and credit rings

The following collateral pools have been established to provide members with system operating caps in CDSX that can be used to cover negative balances that occur in a member's funds account:

- Extender of credit
- Settlement agent

- Receiver of credit for Canadian dollars
- Receiver of credit for U.S. dollars.

Each participant is a member of the collateral pool for the category under which the participant is classified. An eligible receiver of credit can choose to be a member of either the credit ring for RCP receivers making settlements in U.S. and Canadian dollars or the credit ring for non-contributing receivers making settlements in U.S. and Canadian dollars. Members of non-contributing credit rings do not receive system operating caps in CDSX.

Covering obligations

The members of each collateral pool guarantee the obligations of the other members of their collateral pool. Each member receives a system operating cap and initial ACV from their participation in the collateral pool, except from the U.S. dollar RCP which does not provide initial ACV in CDSX. The caps that are given to members are used to cover settlements and other debits made to the member's funds account but are not used to cover mark-to-market payments generated by the central counterparty services.

Each member of a collateral pool contributes collateral based on a formula. For more information, see [Calculating extenders' collateral contributions](#).

Arranging liquidity

The members of the extender and settlement agent collateral pools are responsible for arranging their own liquidity. For example, in the event that one of their members with a payment obligation to CDS is suspended, the other members of these collateral pools are responsible for obtaining their own replacement liquidity.

CDS arranges standby liquidity for the largest caps in the receivers of credit (both Canadian and U.S. dollar) collateral pools.

Credit rings

Each collateral pool has a credit ring associated with it. If the processing of a suspension requires that the surviving members of a collateral pool pay CDS more than the value of the collateral they have received, the survivors are required to pay the shortfall as part of their obligations as members of the credit ring.

Non-contributing credit rings for receivers of credit

If a receiver of credit elects not to belong to the contributing collateral pools, then they must belong to one of the following non-contributing credit rings:

- Canadian dollar
- U.S. dollar.

Members of non-contributing credit rings do not pledge collateral to CDS as part of their participation (in the non-contributing credit rings). Non-contributing credit rings are used to address certain obligations of a suspended participant that may not be covered by a line of credit, cap or a CCP service fund. For example, if a suspended participant does not have a line of credit, but owes funds to CDS due to an entitlement reversal, then this portion of the suspended participant's obligation becomes the responsibility of the non-contributing credit ring members.

7.2 Central counterparty funds

The following central counterparty participant funds and liquidity fund have been established to cover the risks generated by the use of CDS's central counterparty service:

- CNS Participant Fund
- CNS Default Fund
- Supplemental Liquidity Fund.

Participants that use the CNS central counterparty service must contribute to the central counterparty CNS Participant Fund, CNS Default Fund and Supplemental Liquidity Fund established for that service.

The central counterparty CNS Participant Fund covers only the mark-to-market payments and the future risk from the CNS positions that are unique to the CNS service. In the event that a central counterparty CNS participant is suspended, the central counterparty Participant Fund is responsible for paying only these portions of the suspended participant's obligations.

The CNS Default Fund is designed to allow CDS to maintain additional financial resources for its CCP CNS service sufficient to cover a wide range of stress test scenarios in extreme but plausible market conditions. The CNS Default Fund is a prefunded default arrangement contributed by CNS participants (mutualized) that may be used by the CCP in certain circumstances to cover credit shortfalls from participant defaults.

The Supplemental Liquidity Fund is designed to cover the liquidity shortfalls of the CCP CNS service with CNS participants' resources through a pooling-of-resources arrangement. The Supplemental Liquidity Fund is sized to have resources sufficient to cover extreme but plausible liquidity stress scenarios that include, but are not limited to, the default of a participant and its affiliates that would potentially cause the largest aggregate liquidity exposure for the CCP in extreme but plausible market conditions.

7.3 Covering obligations

The members of CDS's central counterparty service guarantee the following obligations of the other members:

- Mark-to-market payments made as part of a central counterparty service
- Any loss generated by the close-out of an outstanding or value-dated position (i.e., an outstanding and/or value-dated to-deliver (short) position or an outstanding and/or value-dated to-receive (long) position).

The central counterparty participant funds associated with a service are responsible only for the obligations generated by that central counterparty service.

Each member of the CNS Participant Fund, CNS Default Fund and the Supplemental Liquidity Fund contributes collateral based on the formulae for the respective funds.

7.4 Arranging liquidity

CDS arranges standby liquidity for the central counterparty participant funds.

7.5 Credit rings

Each participant fund has a credit ring associated with it. If the processing of a suspended participant requires that the surviving members of a participant fund pay CDS more than the value of the collateral they have pledged, the survivors are required to pay this shortfall as part of their obligations as members of the credit ring.

7.6 Allocating CDSX payment amounts of suspended participants

The payment obligation in CDSX of any suspended participant (i.e., extender of credit, settlement agent or receiver of credit) must be replaced on the day of suspension. Settled transactions cannot be unwound during the processing of a suspension nor can the suspended participant's payment obligation be delayed. On the day of suspension, an alternative source of funds must be available to replace the amount that was owed to CDS by the suspended participant. The process of determining the amount under suspension is conducted separately for each currency in which the suspended participant has an obligation owing to CDS.

7.7 Allocating positive ledger balances

If a participant defaults in their obligation to make payments to CDS with respect to a negative balance in the funds account in one ledger, and the participant has a positive balance denominated in another currency in the funds account of another ledger, then CDS does not allocate the positive balance to the suspended participant's designated banker nor shall pay the positive balance to the suspended participant.

Instead, for the purpose of determining the net obligation owed by the suspended participant, CDS may apply the positive balance in a funds account of the suspended participant against any negative balance denominated in the same currency in any other funds account of the suspended participant. If the suspended participant has more than one funds account with a negative balance, the positive balance shall be allocated to reduce the negative balances denominated in the same currency on a pro rata basis.

7.8 Allocating partial payments

To determine the net obligation owed by the suspended participant, CDS may apply any partial payment made directly by the suspended participant, before it was suspended against any negative balance denominated in the same currency in any funds account of the suspended participant. If the partial payment has been made by a designated banker, the partial payment is returned to the designated banker. If the partial payment has been made by a qualified banker against the suspended participant's use of a line of credit, that partial payment shall be allocated by CDS to discharge the liability of the qualified banker as surety and shall be applied against the negative balance in the funds account that the line of credit was established for.

7.9 Allocating the shortfall

Once CDS has determined the amount of the suspended participant's obligation that must be replaced, individual portions of the shortfall are allocated to the various risk containment mechanisms. The allocation of the shortfall is done as follows:

- Amounts drawn under a cap – Survivors in the suspended participant's collateral pool and category credit ring that generated the cap

- Amounts drawn under a line of credit – Suspended participant’s extender(s) of credit
- Mark-to-market payments – Survivors in the suspended participant’s central counterparty service fund(s)
- Other amounts that exceed the cap or line of credit – Survivors in the suspended participant’s collateral pool and category credit ring (or the non-contributing credit ring).

7.10 Collateral

There are several sources of collateral that can be obtained for use during the processing of a suspension in CDSX. Part of this collateral comes from the suspended participant and part from the suspended participant’s collateral pool or CNS Participant fund, CNS Default Fund or Supplemental Liquidity Fund.

The types of collateral that may be used in a CDSX suspension are:

- Suspended participant’s settlement service collateral – The collateral in the suspended participant’s risk accounts (i.e., the general accounts and restricted collateral accounts). This type of collateral is also known as the ACV collateral since the purpose of the ACV edit is to ensure that this collateral is available and in place in the event of a suspension.
- Suspended participant’s collateral pool contributions – The collateral pledged/ deposited by the suspended participant to a collateral pool and category credit ring.
- Suspended participant’s CNS Participant Fund contributions – The collateral pledged/ deposited by the suspended participant to the CNS Participant Fund.
- Suspended participant’s CNS Default Fund contributions – The collateral pledged/ deposited by the suspended participant to the CNS Default Fund.
- Suspended participant’s Supplemental Liquidity Fund contributions – The collateral pledged/deposited by the suspended participant to the Supplemental Liquidity Fund.
- Suspended participant’s specific collateral (special margin) – The collateral that have been pledged/deposited by the suspended participant to CDS as specific collateral. CDS may require a participant to pledge specific collateral if CDS determines that a participant’s activities present extra risks to CDS and the other participants that may not be covered by the normal risk containment mechanisms. For example, CDS may require specific collateral from a participant with unusually large central counterparty outstanding and value-dated positions or central counterparty positions in very illiquid securities.
- CDS’s own dedicated CNS resources, only after all the defaulter’s CNS collateral has been exhausted and prior to using Survivors’ CNS Default Fund contributions.
- Survivors’ collateral pool contributions – The collateral pledged/deposited by the other members of a suspended participant’s collateral pool and category credit ring.
- Survivors’ central counterparty CNS Default Fund contributions – The

collateral pledged by the other members of a suspended participant's central counterparty funds.

- Survivors' Supplemental Liquidity Fund contributions – The collateral pledged by the other members of a suspended participant's central counterparty funds.

7.11 Collateral sequence

The sequence in which the collateral is used is designed to ensure that there is no spillover of risk between the various services (such as CNS) and between the various risk containment mechanisms. For example, the payment obligations that are covered by a collateral pool are never transferred to an extender of credit. Each type of collateral has a primary use.

In cases where there is excess collateral available from the suspended participant, the use of this excess collateral is also specified. For example, collateral pledged to the CNS Participant Fund and the CNS Default Fund must first be used to cover any CNS mark-to-market amounts of the suspended participant and any losses generated by the close-out of the suspended participant's CNS positions. After these two items have been addressed, any excess amounts of CNS collateral from the suspended participant itself would be used by CDS to mitigate other losses.

The table below indicates the sequence in which each type of collateral is used after suspending a participant.

Using collateral of a suspended participant		
Type	Primary use	Sequence of secondary use
Suspended receiver of credit's settlement service collateral	CDS (on behalf of the members of the CAD receivers of credit CCR) and Extenders of credit (if any) according to the use and allocation methodology described in Processing a receiver of credit suspension	Any remaining collateral goes next to the survivors of the collateral pools in either currency (if the suspended receiver of credit was a member of that collateral pool) Any excess is used by CDS to mitigate other losses
Suspended receiver of credit's collateral pool contributions (if any)	Survivors of the collateral pools of which the suspended receiver of credit was a member	Any remaining collateral goes next to the extenders of credit (if necessary) Any excess is used by CDS to mitigate other losses
Suspended receiver of credit's specific collateral (if any)	Survivors of the central counterparty service or collateral pool for which the specific collateral was required	Any excess specific collateral is shared pro rata by the suspended receiver of credit's extenders (if any) and the survivors of the receivers of credit collateral pools of which the suspended receiver of credit was a member

Using collateral of a suspended participant		
Type	Primary use	Sequence of secondary use
Survivors' receivers of credit collateral pool contributions	CDS (for liquidity facility collateral to cover cap used by suspended Receiver when defaulter's pool collateral is not enough)	Any excess collateral is shared pro rata by the survivors of the receivers of credit collateral pools of which the suspended receiver of credit was a member.
Suspended Extender/Settlement Agent settlement service collateral	Collateral pool survivors (for Cap used) and Surety (for LOC used, if any)	Any remaining collateral goes next to the suspended participant's credit extenders (if any) Any excess is used by CDS to mitigate other losses
Suspended Extender/Settlement Agent collateral pool contributions (if any)	Collateral pool survivors (for Cap used)	Any remaining collateral goes next to the suspended participant's credit extenders (if any) Any excess is used by CDS to mitigate other losses
Suspended participant's central counterparty CNS Participant Fund and CNS Default Fund contributions (if any)	Extinguish defaulter's losses in the central counterparty service	Any remaining collateral goes to CDS to mitigate other losses
Survivors' central counterparty CNS Default Fund contributions	Extinguish the defaulter's losses in the central counterparty service	This type of collateral is never used for any other purpose
Suspended participant's specific collateral (if any)	Survivors of the central counterparty service or collateral pool for which the specific collateral was required	Any excess specific collateral is shared pro rata by the suspended participant's extenders (if any) and the suspended participant's collateral pool (if any)
Survivor's collateral pool contributions	Collateral pool survivors	This type of collateral is never used for any other purpose

7.12 Collateral administration ledgers

CDS maintains collateral administration ledgers for each participant and for CDS. These ledgers hold all of the collateral pledged by the participant for various purposes (i.e., collateral pool contributions, central counterparty fund contributions, Supplemental Liquidity Fund contributions and specific collateral). During the processing of a suspension, the suspended participant's settlement service collateral is first moved to CDS's collateral administration ledger and then to the collateral

administration ledgers of other participants.

The extenders of credit and the survivors in the suspended participant's collateral pool are entitled to use their share of the suspended participant's own collateral to make their replacement payment to CDS to satisfy settled obligations.

In the case of the central counterparty service, CDS initially retains the collateral in its own collateral administration ledger for use in obtaining the liquidity to make the replacement payment(s). Later, CDS may use the suspended participant's central counterparty CNS Participant Fund and CNS Default Fund contributions to absorb residual losses.

In the case of the extenders, collateral is moved first to the lead extender (appointed by the other extenders) and then to the other surviving extenders.

In the case of the settlement agents, collateral is moved pro rata to the surviving settlement agents based on each survivor's replacement payment.

In the case of the receiver's collateral pool, CDS initially retains the collateral in its own collateral administration ledger for use in obtaining the liquidity to make the replacement payment(s). Later, CDS may distribute the survivors pro rata based on their share of any replacement payment or loss.

7.13 Processing suspension

In the event that a participant fails to pay their payment obligation to CDS (or if some other failure causes CDS to invoke the suspension and default procedures) and CDS has exhausted all of the escalation procedures, the following occurs for all types of suspensions:

1. CDS immediately suspends the participant from all CDS services and functions.
2. CDS notifies all participants that the suspension procedures have been initiated against the participant.
3. CDS immediately moves all of the suspended participant's settlement service collateral from their risk accounts to CDS's collateral administration ledger.
4. CDS calculates the suspended participant's obligation to CDS.
5. CDS determines the portion of the suspended participant's obligation that is the responsibility of each extender of credit, collateral pool, category credit ring survivor and central counterparty fund survivor.

7.14 Processing a receiver of credit suspension

To process a suspension of a receiver of credit:

1. CDS requests a replacement payment from each extender of credit equal to the used amount of each extender's line of credit.

2. CDS arranges for a replacement payment equal to the used amount of the suspended participant's cap (if any). To obtain the necessary liquidity to make the replacement payment, CDS uses the suspended participant's own collateral pool contributions, eligible settlement service collateral allocated to CDS and any specific collateral that the suspended participant had pledged to the collateral pool. If necessary, the contributions of the survivors in the suspended participant's collateral pool are also used by CDS to obtain liquidity.

The suspended participant's settlement service collateral (ACV risk accounts) will be allocated to both CDS and the sureties according to the following ratio:

$$X = \frac{[\text{SOC}_{\text{utilized}} - \text{Defaulter's Collateral Requirement to the CCR}]}{[\text{SOC}_{\text{utilized}} - \text{Defaulter's Collateral Requirement to the CCR} + \text{LOC}_{\text{utilized}}]}$$

Where X defines the proportion of the suspended participant's settlement service collateral allocated to CDS to collateralize the exposure associated with the CAD receiver of credit's utilization of its SOC.

$\text{LOC}_{\text{utilized}}$ = the sum total of the line(s) of credit utilized.

The settlement service collateral not allocated to CDS is allocated to the sureties.

The allocation is done at the security level.

3. For each central counterparty service the suspended participant is a member of, CDS arranges for a replacement payment equal to mark-to-market payment (if any) of the suspended participant on the day of suspension. To obtain the necessary liquidity to make the replacement payment, CDS uses the suspended participant's CNS Participant Fund, the suspended participant's CNS Default Fund, the suspended participant's Supplemental Liquidity Fund and any specific collateral that the suspended participant had pledged/deposited to the central counterparty service. If necessary, the CNS Default Fund contributions of the survivors and the Supplemental Liquidity Fund contributions of the survivors in the suspended participant's central counterparty service are also used by CDS to obtain liquidity.
4. CDS moves the suspended participant's settlement service collateral as allocated to its sureties (as described in step 2) who are required to make payments to CDS; or, if there is no such surety, then the suspended participant's settlement service collateral is transferred to the other members of its category credit rings.
5. CDS moves collateral to the collateral administration ledgers of CDS, the extenders and the survivors of the receiver's collateral pool and central counterparty service. For more information, see [Collateral](#).

7.15 Processing an extender of credit suspension

To process suspension of an extender of credit:

1. CDS requests a replacement payment from each extender of credit equal to its proportionate share of the suspended participant's obligation to CDS.
2. For each central counterparty service the suspended participant is a member of,

CDS arranges for a replacement payment equal to mark-to-market payment (if any) of the suspended participant on the day of suspension. To obtain the necessary liquidity to make the replacement payment, CDS uses the suspended participant's CNS Participant Fund, the suspended participant's CNS Default Fund, the suspended participant's Supplemental Liquidity Fund and any specific collateral that the suspended participant had pledged/deposited to the central counterparty service. If necessary, the CNS Default Fund contributions of the survivors and the Supplemental Liquidity Fund contributions of the survivors in the suspended participant's central counterparty service are also used by CDS to obtain liquidity.

3. CDS moves collateral to the collateral administration ledgers of CDS, the extenders and central counterparty service. For more information, see [Collateral](#).

7.16 Processing a settlement agent suspension

To process a suspension of a settlement agent:

1. CDS requests a replacement payment from each extender of credit equal to the used amount of each extender's line of credit.
2. CDS requests a replacement payment from each surviving settlement agent equal to their proportionate share of the suspended settlement agent's obligation to CDS.
3. For each central counterparty service the suspended participant is a member of, CDS arranges for a replacement payment equal to mark-to-market payment (if any) of the suspended participant on the day of suspension. To obtain the necessary liquidity to make the replacement payment, CDS uses the suspended participant's CNS Participant Fund, the suspended participant's CNS Default Fund, the suspended participant's Supplemental Liquidity Fund and any specific collateral that the suspended participant had pledged/deposited to the central counterparty service. If necessary, the CNS Default Fund contributions of the survivors and the Supplemental Liquidity Fund contributions of the survivors in the suspended participant's central counterparty service are also used by CDS to obtain liquidity.
4. CDS moves collateral to the collateral administration ledgers of CDS, the settlement agents and central counterparty service. For more information, see [Collateral](#).

7.17 Central counterparty obligations

If a suspended participant has outstanding and/or value-dated central counterparty obligations (i.e., outstanding and/or value-dated to-deliver or to-receive positions in CNS), CDS executes close-out transactions to clear these CNS positions. For example, if the suspended participant left a CNS outstanding or value-dated to-deliver position, CDS buys the securities in the market to clear the outstanding or value-dated position. Similarly, if the suspended participant left an outstanding or value-dated to-receive position, CDS sells the securities in the market to clear the

outstanding or value-dated position.

Any loss that is generated by the execution of these close-out transactions is allocated against the suspended participant's financial resources (CNS Participant Fund contributions and CNS Default Fund contributions), CDS's Dedicated Own Resources and the survivors' Default Fund contributions. If, at a later point in time, CDS is able to recover any amount from the suspended participant, such amount shall be returned to the other participant to compensate for any amount charged to them and for the financial resources levied from them as part of Default Management. This return will be in the reverse order that these resources were used to cover the losses, with the exception of the Supplemental Liquidity Fund, which is not used in the loss allocation process.

7.18 Credit ring obligations

Each collateral pool has a credit ring associated with it. In the event that the replacement payments owed by the collateral pool exceed the value of the collateral in the collateral pool, each member of the credit ring is responsible for paying their share of the excess obligation. In addition to paying their share of suspended participant's payment obligations, the Extenders of Credit and the Settlement Agents are also obligated to reconstitute their respective collateral pools according to the formula size defined by their individual groups. However, there is no formula size defined for the Receivers of Credit collateral pools, and therefore the Receivers are not obligated to reconstitute their pools to any prescribed size.

Each CCP participant fund has a credit ring associated with it. In the event that the replacement payments owed by the CCP participant fund exceed the value of the collateral in the CCP participant fund, each member of the credit ring is responsible for paying their share of the excess obligation. In addition to paying their share of suspended participant's payment obligations, the members of the CCP services are also obligated to reconstitute their respective participant funds although CDS allows CCP services members to withdraw from the respective service through the CCP withdrawal option.

Failure of any participant to reconstitute the collateral pool or participant fund by the specified time is a ground suspension.

7.19 Processing a suspended NYL participant's payment obligation

Once CDS has determined the amount of the suspended NYL participant's payment obligation that must be replaced (i.e., the shortfall), individual portions of the shortfall are allocated to the surviving members of the NYL service. The allocation of the shortfall is done as follows:

1. Apply the defaulter's CDS Participant Fund for New York Link.
2. Use CDS's existing USD LOC
3. Allocate against surviving NYL participants based on each CDS Participant Fund

for New York Link's pro-rata share of total CDS Participant Fund for New York Link.

4. Any remaining liquidity requirement will be allocated against NYL participants as follows:
 - a. Apply the defaulter's USD CDSX credits to reduce the NYL payment obligation.
 - b. Allocate against surviving NYL participants as a haircut to their USD credits based on each NYL participant's pro-rata share of total credits.
 - c. Allocate the defaulter's CAD credits to the surviving NYL participants.

CHAPTER 8: Collateral Administration

Each participant designates a collateral administrator who is responsible for maintaining their collateral pool or participant fund.

At all times, participants are required to maintain an amount of collateral with CDS that is at least equal to their required collateral pool or participant fund contribution.

If collateral requirements that are due to be paid on a given day are not in place by the imposed deadlines, participants may be fined or suspended, as described in the table below.

Contribution	Beginning of day requirement		Action
	All services (excluding the NSCC participant fund for New York Link)	NSCC participant fund for New York Link only	
Initial	10:00 a.m. ET/ 8:00 a.m. MT/ 7:00 a.m. PT	9:00 a.m. ET 7:00 a.m. MT 6:00 a.m. PT	If CDS does not receive the required contribution by the initial deadline, the participant is fined
Final	10:30 a.m. ET 8:30 a.m. MT 7:30 a.m. PT	9:30 a.m. ET 7:30 a.m. MT 6:30 a.m. PT	If CDS does not receive the required contribution by the final deadline, the participant is suspended

CDS’s role in collateral administration includes:

- Managing the collateral administration ledgers (CALs) for each of the collateral pools and participant funds
- Assisting participants with the pool and fund collateralization process
- Processing the movement of collateral, as necessary, in a default.

8.1 Acceptable collateral

The table below lists the eligible collateral for each collateral pool and participant fund. For more information on the CDS issuer ratings in this table, see the [CDS issuer ratings](#) section.

CDS eligible collateral	Instrument type ¹	Extenders of credit	Settlement agents	CAD receivers of credit	USD receivers of credit	CNS Participant Fund	CNS Default Fund	CNS Supplemental Liquidity Fund	NSCC Participant Fund for New York Link	CDS Participant Fund for New York Link	CDS Participant Fund for DTC Direct Link
Securities issued by the Government of Canada	Canada treasury bill Government of Canada bond	✓	✓	✓	✓	✓					✓
Government of Canada stripped coupons and residuals	Coupon Principal Receipt Payment Package	✓	✓	✓	✓	✓					✓
Securities guaranteed by the Government of Canada (including Canada mortgage bonds and NHA mortgage-backed securities)	Canada mortgage bond Mortgage-backed security	✓	✓	✓	✓	✓					
Securities issued or guaranteed by a provincial government	Provincial treasury bill Provincial bond Provincial note	✓	✓ ²	✓	✓	✓					
Banker's acceptances and promissory notes ^{3, 4} Minimum issuer rating of A by CDS ^{4, 5}	Banker's acceptance Bearer deposit note Certificate of deposit Guaranteed investment certificate		✓ ⁶	✓	✓	✓					
Commercial paper and short-term municipal paper ^{3, 4} Minimum issuer rating of A by CDS ^{4, 5}	Municipal treasury bill Commercial paper Municipal note		✓ ⁶	✓	✓	✓					

CDS eligible collateral	Instrument type ¹	Extenders of credit	Settlement agents	CAD receivers of credit	USD receivers of credit	CNS Participant Fund	CNS Default Fund	CNS Supplemental Liquidity Fund	NSSC Participant Fund for New York Link	CDS Participant Fund for New York Link	CDS Participant Fund for DTC Direct Link
Corporate bonds and municipal bonds ^{3, 4} Minimum issuer rating of A by CDS ^{4, 7}	Corporate bond Municipal bond Other market bond		6 ✓	✓	✓	✓					
U.S. Treasury securities	U.S. Treasury bill U.S. Treasury bond or note				✓						✓
Cash (U.S. dollars) in the form of a Fedwire payment	N/A				✓				8 ✓	✓	
Cash (Canadian dollars) in the form of a LVTS payment	N/A	✓	✓	✓		✓	✓	✓			

¹ Instrument type. For more information, refer to Security types, subtypes and instrument types in the Legal Documents.

² Rated R1 [low] for short-term debt by DBRS with a minimum issuer rating of A by CDS and rated AA [low] for long-term debt by DBRS with a minimum issuer rating of AA by CDS.

³ No more than 20 per cent of the value of collateral pledged can be the obligation of private and municipal sector issuers – subject to the additional restrictions that (i) only 10 percent of the collateral value pledged can be from LVTS and related issuers; and (ii) only 5 percent of the value of collateral pledged can be the obligation of a single private and municipal sector issuer.

⁴ Securities issued by members of a pool or fund, or “family” of a pool or fund member, are not eligible for collateral related to the pool or fund.

⁵ Rated R-1 [low] by DBRS or A-1 [mid] by S&P or P1 by Moody’s.

⁶ Rated R1 [mid] by DBRS or A-1 [mid] by S&P. Minimum issuer rating of AA by CDS.

⁷ Rated A [low] by DBRS or A- by S&P or A3 by Moody’s.

⁸ 100 per cent of the contribution must be made in U.S. cash.

8.2 Valuation of collateral contributions

A pledge is revalued whenever it is changed intraday or overnight as part of the CDSX process. The valuation of delivered collateral includes a market price, accrued interest (for bonds) and a haircut that is applied to each security that is pledged as margin collateral. The applicable value of a security that is contributed as margin collateral is calculated as indicated below.

$$\text{Applicable Value} = \text{Market Value} \times (1 - \text{Haircut})$$

Where,

$$\text{Market Value} = (\text{Par value} \times \text{Market Price}) + \text{Accrued interest}$$

For eligible U.S. securities pledged to a U.S. dollar pool, the collateral value is calculated as follows:

$$\text{Applicable value} = \text{Market Value USD} \times (1 - (\text{HC}_{\text{USD}}\%))$$

In this case, the forex haircut is not applied to the USD security because the pool currency is also in USD (i.e., no foreign currency exposure).

For eligible Canadian securities pledged to a U.S. dollar pool, the collateral value is calculated as follows:

$$\text{Applicable value} = \text{Market Value CAD} \times (1 - (\text{HC}_{\text{CAD}}\% + \text{FX HC}_{\text{CAD/USD}}\%)) \times \text{FX}_{\text{CAD/USD}}$$

In this case, the forex haircut must be applied to the CAD security because the pool currency is in USD (i.e., there is foreign currency exposure because of the currency mismatch between the pledged security and the pool currency).

Where,

- HC_{CAD} is the base haircut rate for the CAD instrument
- HC_{USD} is the base haircut rate for the USD instrument
- $\text{FX HC}_{\text{CAD/USD}}$ is the forex haircut for the CAD instrument
- $\text{FX}_{\text{CAD/USD}}$ is the foreign exchange rate where CAD is the base currency (1) and USD the quoted currency

8.3 Haircuts

In addition to market valuation, securities pledged as collateral will be discounted based on a haircut amount. For each security contributed as margin collateral, the haircuts listed in [CDS haircut rates for debt instruments](#) must be applied to the market value.

The accrued interest calculation should be made on the basis that valuation prior to

payable date includes interest due, and valuation on payable date does not include interest due.

For example, if a participant is required to have \$1,000 in margin collateral contributed to their collateral pool or CNS Participant Fund, the participant must ensure that the securities pledged by the participant to CDS have a value, after the application of market prices, accrued interest and the haircut, of at least \$1,000.

8.4 Collateral Management System

The Collateral Management System (CMS) provides participants with a valuation of the collateral pledged to CDS for various clearing and settlement services.

CHAPTER 9: CNS Participant Fund, CNS Default Fund and Supplemental Liquidity Fund

CDS is the central counterparty to all domestic continuous net settlements in CNS. To manage the risk associated with being the central counterparty, CDS calculates requirements based on the following:

- CNS Participant Fund
 - Base Initial Margin: Estimates the potential future losses that may occur as a result of adverse price movements across a portfolio of net CNS unsettled equity positions, both outstanding and value-dated (hereafter referred to as “CNS positions”), for each participant under normal market conditions
 - Plus the following additional margin requirements (“add-ons”):
 - Mark-to-Market
 - Market Liquidity Risk
 - Wrong Way Risk
- CNS Default Fund
 - Estimates the risk not covered by a defaulting participant’s and its affiliate’s Base Initial Margin (i.e., the residual risk or shortfall) under a wide range of potential credit risk stress tests that would potentially cause the largest aggregate credit exposure in extreme but plausible market conditions.
- Supplemental Liquidity Fund
 - Estimates the value of fund required to cover the default of a Participant and its affiliates that would potentially cause the largest aggregate liquidity exposure in extreme but plausible market conditions

CNS acceptable collateral

All contributions to the CNS Participant Fund, CNS Default Fund and Supplemental Liquidity Fund must be in the form of the eligible collateral indicated in [Acceptable collateral](#).

9.1 Collateral requirement calculation overview

9.2 CNS Participant Fund

The CNS Participant Fund collateral requirement for a participant is calculated daily and consists of a Base Initial Margin (IM) plus additional margins (add-ons):

CNS Participant Fund Requirement = Base IM + Mark-to-Market Add-on + Market Liquidity Risk Add-on + Wrong Way Risk Add-on

The CNS Participant Fund is calculated at the ledger level for each participant and then aggregated at the participant level. Hence, the CNS Participant Fund requirement for each participant is simply the sum of the calculated CNS Participant Fund requirements for all the participant's ledgers.

Base Initial Margin

The Base Initial Margin (IM) requirement covers the potential future losses that may occur as a result of adverse price movements across the portfolio of CNS positions for each participant under normal market conditions.

The risk methodology used for the Base IM is the Value at Risk (VaR) methodology. VaR is a widely used and accepted method of measuring the risk associated with changes in the price and value of equity securities. This methodology incorporates the historical volatility of the daily price returns of a portfolio of CNS positions over its lookback period (last 5 years). In addition, the Base IM incorporates the volatility of the daily price returns over a historical period of high market volatility to mitigate the procyclicality of daily CNS collateral requirements. For the VaR methodology, CDS incorporates a volatility estimator, a margin period of risk (MPOR) of 2 days for all CNS positions and a confidence level of 99% (non-parametric).

Finally, the Base IM also applies a flat rate margining methodology to CNS securities in which the price history is limited (e.g., newly issued securities) or where the security is deemed not to be suitable for portfolio margining (e.g., warrants, rights and installment receipts). Flat rate margining applies a haircut to the market value of the security to obtain its margin requirement. These margin requirements are then summed for all these securities to obtain the Flat Rate Margin component. Flat rate treatment of newly issued securities will apply only until a proxy security is assigned in order to complete the required price history.

Note that CNS positions identified as Wrong Way Risk (WWR) securities are excluded from the Base IM calculations since their unique risk is fully collateralized in the specific WWR Add-on. See section [Wrong Way Risk Add-on](#).

Additional Margins (Add-ons)

In addition to the Base IM, the following additional margin requirements are calculated:

1. Mark-to-Market Add-on
 - Settlement Value Mark (SVM)

- Variation Margin (VM)
- 2. Market Liquidity Risk (MLR) Add-on
- 3. Wrong Way Risk (WWR) Add-on

Mark-to-Market Add-on

The Mark-to-Market add-on is the sum of the Settlement Value Mark (SVM) and the Variation Margin (VM).

The **Settlement Value Mark (SVM)** is the additional margin required at the beginning of the day to account for any net negative mark-to-market of CNS positions calculated prior to the CNS batch settlement process. This additional margin calculation marks all CNS positions to their last close prices. The SVM amount is also applied to participants' funds accounts. The SVM can change intra-day with new transactions – i.e., settlements, entitlements and newly novated CNS trades/positions during the day.

The **Variation Margin (VM)** is the additional margin required to account for the difference between the last close prices (used for SVM) and the new intraday prices of CNS positions. The VM marks all positions to the new intraday prices from the last close prices. Since intraday prices are not updated by CDS, the VM is not applied to the Mark-to-Market add-on and is not applied to participants' funds accounts.

Market Liquidity Risk Add-on

The Market Liquidity Risk (MLR) add-on covers the liquidity risk arising when CDS must close-out CNS positions at a price other than the prevailing market price. The MLR add-on consists of two components: liquidity risk and concentration risk. The liquidity risk component covers the potential price variation of buy or sell market orders used to close out existing open positions. This risk is measured using the average bid-ask spread of the equity security. The concentration risk component covers the additional costs associated with closing out highly concentrated CNS positions in a participant's portfolio that exceed the security's volume threshold for an MPOR of 2 days, which will incur additional market costs and take longer to be absorbed in the market. The concentration risk calculation takes into account the current price, historical return volatility and average daily traded volume of the equity security.

Note that CNS positions identified as WWR securities are excluded from MLR charge calculations since their unique risk is already fully collateralized in the Specific WWR Add-on.

Wrong-Way Risk Add-on

The Wrong Way Risk add-on covers the risk that arises when a participant holds a CNS position in its own, or that of its affiliate's, equity security that is adversely correlated with the credit worthiness of that participant – also referred to as specific wrong-way risk. The additional margin for Wrong-Way Risk aims to measure the risk exposure that represents the net wrong-way exposure less any eligible right-way exposure. When a participant holds a net long CNS position in its own issued security or that of its affiliate ("WWR security"), it will be charged a WWR add-on equal to the full market value of the long position. This is the Wrong Way Risk (WWR) charge due to the net long CNS position, which is adversely correlated with the credit worthiness of the participant. If the

participant also holds a net short CNS position in a different WWR security, then Right Way Risk (RWR) also applies, and the market value of this short position will be used to reduce the Wrong Way Risk of the long CNS position, but limited to a net WWR add-on of 0 (i.e., the resulting net WWR add-on must be 0 or positive).

9.3 CNS Default Fund

CDS calculates the CNS Default Fund collateral requirement on a monthly basis using credit stress testing scenarios. CDS monitors the value of the CNS Default Fund on a daily basis and can adjust the size of the fund on an intra-month basis, if required.

The CNS Default Fund is designed to cover the credit shortfalls (residual risk) of the CNS CCP service with CNS participants' resources through a pooling-of-resources arrangement. The CNS Default Fund is sized to have resources sufficient to cover potential credit stress scenarios that include, but are not limited to, the default of a participant and its affiliates that would potentially cause the largest aggregate credit exposure for the CCP in extreme but plausible market conditions.

The CNS Default Fund consists of two tiers based on the activity level of the participants in the CNS service, which are then multiplied by a buffer.

- Tier 1 - CNS Default Fund contributions will be based on the credit risk arising from the daily CNS positions of all CNS participants, excluding those CNS positions included in Tier 2.
- Tier 2 - CNS Default Fund contributions will be based on the credit risk arising from a specific subset of CNS positions: the positions of those CNS participants whose activity levels have demonstrated spikes in CNS activity on certain specific business days³.

Note that CNS positions considered for participants' default fund sizing exclude those participants' Wrong Way Risk security positions, consistent with their exclusion in the calculation of participants' Base IMs.

Triple Witching Days

Transactions submitted for clearing and settlement on Triple Witching Days impact CNS position settlement volumes, and the related risk. CNS transactions are novated on value date minus one and, as a result, the risk related to transactions sent for clearing and settlement on Triple Witching days impacts CNS position volumes, and the size of the CNS Default Fund, 8 days a year (Triple Witching activity). These 8 days include the day the positions are scheduled to settle (Triple

³ The affected days are: (i) the day(s) on which CNS transactions deemed to be triple-witching-related novate (i.e., value date minus one); and, (ii) the day on which CNS positions deemed to be triple-witching related are eligible to settle (i.e., value date).

Witching settlement day) and the day prior to the settlement day (novation day) in the months of March, June, September and December.

CDS uses a threshold to determine whether a CNS participant had Triple Witching activity (i.e., is deemed a Triple Witching participant). CDS measures the relative change in the participant's Base IM requirement between the Triple Witching settlement date and the Triple Witching settlement date -1, and also between the Triple Witching settlement date - 1 and the Triple Witching trade date. A participant will be deemed to have Triple Witching activity when the day-over-day increase in that participant's Base IM requirements is greater than or equal to (\geq) 100% on any one of those days in the 1-year lookback period.

The CNS Default Fund is then calculated to collateralize the largest of the daily residual stress-test losses over the lookback period for each Tier.

The daily residual stress-test profit / losses for each CNS participant and for each stress test scenario are calculated by summing the following:

- The post stress-test profit or loss of unwinding a participant's CNS positions on that day
- The participant's Base IM collateral requirement;

The CNS Default Fund collateralizes, on a mutualized basis, the risk associated with CNS participants' positions that would result in the *largest credit risk (residual stress test loss) under extreme, but plausible, market conditions*. The CNS Default Fund allocates the collateral requirements on a pro-rata basis, taking into account the cumulative Base IM collateral requirements, over the look-back period, for those business days associated with either of Tier 1 or Tier 2 activity.

Default Fund Sizing and Allocation - Tier 1

The largest residual stress-test loss of the CNS positions in Tier 1 (as defined above) for all days in the 1-year lookback period which do not have associated Triple Witching Activity is used to calculate the size of the CNS Default Fund.

The largest Tier 1 residual stress-test loss of the CNS Default Fund is then allocated amongst all CNS Service participants according to their pro-rata share of the cumulative Base IM collateral requirements over the days in the look-back period, excluding the Triple Witching days.

CDS's monthly re-sizing of the CNS Default Fund will advise CNS participants of any changes to their Tier 1 CNS Default Fund collateral requirements to ensure the CNS Default Fund remains Cover-1 compliant. The Tier 1 CNS Default Fund requirements will be in effect for all CNS participants throughout the month, subject to intra-month resizing. See [Intra-month Monitoring](#) section below.

Default Fund Sizing and Allocation - Tier 2

The difference between the largest residual stress-test loss of the CNS positions contained in Tier 2, and the largest residual stress-test loss of the CNS positions in

Tier 1, is allocated amongst those CNS participants identified as having triple witching activity.

The Tier 2 CNS Default Fund requirement will be in addition to the Tier 1 requirement and will apply only to CNS participants identified as having Triple Witching activity. The Tier 2 additional requirement will be in effect on the day prior to the novation of that month's Triple Witching Activity (i.e., Triple Witching settlement day - 2).

The Tier 2 CNS Default Fund requirement is based on a Triple witching participant's pro-rata share of the cumulative Base IM collateral requirements on Triple Witching activity days only during the 1-year lookback period.

CDS's monthly resizing of the CNS Default Fund will advise CNS participants of any revisions to their Tier 2 CNS Default Fund collateral requirement on the applicable months of March, June, September and December only. The Tier 2 collateral requirements will remain in effect for a period of 3 – 10 business days, subject to the affected participants' Base IM collateral requirement returning to a level similar to that which existed prior to the Triple Witching Activity.

CNS Default Fund Requirement

The CNS Default Fund requirement for each participant is then increased by a buffer factor for each Tier (e.g., buffer factor of '1+X' for Tier 1 and '1+Y' for Tier 2). Therefore, for any month, the CNS Default Fund requirement for a CNS participant will be:

$$\text{CNS Default Fund Requirement} = [\text{Tier 1 Default Fund Requirement}] \times (1+X) + [\text{Tier 2 Default Fund requirement*}] \times (1+Y)$$

**The additional Tier 2 Default Fund requirement will only apply to CNS participants identified as Triple Witching participants and will only apply in the months of March, June, September and December for 3-10 business days.*

Intra-month Monitoring

CDS monitors the daily residual stress-test losses intra-month. In the event that an intra-month residual stress-test loss (in either the non-Triple Witching or Triple Witching days) exceeds the Tier 1 and/or Tier 2 residual stress losses used to calculate the size of the CNS Default Fund, the CNS Default Fund will automatically be recalculated in its entirety and CDS will make an intra-month CNS Default Fund collateral call against both Tier 1 and Tier 2 participants for the updated collateral requirements.

The allocation of the Default Fund requirements is always based on the 1-year lookback period from the date of determination (monthly or intra-month, if necessary).

9.4 Supplemental Liquidity Fund

CDS calculates the Supplemental Liquidity Fund collateral requirement on a

quarterly basis using liquidity stress scenarios. CDS monitors the value of the Supplemental Liquidity Fund on a daily basis and can adjust the size of the fund between the quarterly updates, if required.

The Supplemental Liquidity Fund is designed to cover the liquidity shortfalls of the CNS CCP service with CNS participants' resources through a pooling-of-resources arrangement. The Supplemental Liquidity Fund is sized to have resources sufficient to cover potential liquidity stress scenarios that include, but are not limited to, the default of a participant and its affiliates that would potentially cause the largest aggregate liquidity exposure for the CCP in extreme but plausible market conditions.

The Supplemental Liquidity Fund will consist of two tiers based on the activity level of the participants in the CNS service.

- Tier 1 - Supplemental Liquidity Fund contributions will be based on the liquidity risk arising from the CNS positions of all CNS participants, excluding those CNS positions included in Tier 2.
- Tier 2 - Supplemental Liquidity Fund contributions will be based on the liquidity risk arising from a specific subset of CNS positions: the positions of those CNS participants whose activity levels have demonstrated spikes in CNS activity on certain specific business days.⁴

Triple Witching Days

Transactions submitted for clearing and settlement on Triple Witching Days impact CNS position settlement volumes, and the related risk. CNS transactions are novated on value date minus one and, as a result, the risk related to transactions sent for clearing and settlement on triple witching days impacts CNS position volumes, and the size of the Supplemental Liquidity Fund, 8 days a year (triple witching activity). These 8 days include the day the positions are scheduled to settle (triple witching settlement day) and the day prior to the settlement day (novation day) in the months of March, June, September and December.

In order to determine whether a CNS participant has a Triple Witching Activity for the calculation of the Supplemental Liquidity Fund (i.e., is deemed a Triple Witch participant), CDS uses two thresholds:

1. CDS measures the variation in the CNS participant's liquidity exposure between the Triple Witching settlement date and the previous business day. A participant will be deemed to have a Triple Witching Activity when the day-over-day increase in that participant's liquidity exposure is greater than or equal to 100% of that participant's liquidity exposure.
2. CDS measures the variation in the CNS participant's liquidity exposure between one business day after the Triple Witching settlement date and the Triple Witching settlement day. A participant will be deemed to have a Triple

⁴ The affected days are: (i) the day(s) on which CNS transactions deemed to be triple-witching-related novate (i.e., value date minus one); and, (ii) the day on which CNS positions deemed to be triple-witching related are eligible to settle (i.e., value date).

Witching Activity when the day-over-day decrease in that participant's liquidity exposure is less than or equal to -100% of that participant's liquidity exposure.

A CNS participant reaching either one or both of the above thresholds will be deemed to have a Triple Witching Activity for that period of time.

Methodology

To determine the size of the liquidity shortfall used to calculate the Supplemental Liquidity Fund collateral requirement, the liquidity shortfalls of unwinding each day's CNS positions are calculated for every participant, for every day of the respective lookback periods, using the stress-test scenarios, and all available financial resources.

The Supplemental Liquidity Fund collateral requirement is then calculated so as to collateralize the largest daily liquidity shortfall over the respective lookback periods.

The daily liquidity shortfalls are calculated based on the following inputs:

1. Liquidity exposure over the close out period;
2. Qualifying financial resources (excluding the CNS Supplemental Liquidity Fund);

The Supplemental Liquidity Fund is designed to collateralize, on a mutualized basis, the risk associated with CNS positions that would result in the largest liquidity shortfall under extreme, but plausible, market conditions.

Mutualization is achieved by allocating the Supplemental Liquidity Fund exposures on a pro rata basis taking account the cumulative CNS participant liquidity exposures over the respective lookback periods for either the Tier 1 or Tier 2 Supplemental Liquidity Fund contributions.

Supplemental Liquidity Fund Sizing and Allocation - Tier 1

The largest liquidity shortfall over the lookback periods arising from all CNS positions of all CNS participants, excluding those CNS positions included in Tier 2, are used to calibrate the Supplemental Liquidity Fund. The first lookback period corresponds to the previous quarter and the second lookback period is equal to the previous 60 business days.

The largest Tier 1 liquidity shortfall of the Supplemental Liquidity Fund is then allocated amongst all CNS participants in accordance with their pro rata share of the cumulative CNS participant liquidity exposures across all CNS participants over the last quarter for those days and participants having Tier 1 CNS positions.

As part of CDS's quarterly review of the size of the Supplemental Liquidity Fund, CNS participants will be advised of any changes to their Tier 1 Supplemental Liquidity collateral requirement which may be required. Tier 1 Supplemental Liquidity Fund collateral requirements will be enforced for all CNS participants throughout the quarter (subject to intra-quarter re-sizing – see below).

Supplemental Liquidity Fund Sizing and Allocation - Tier 2

The Tier 2 Supplemental Liquidity collateral requirement is based on a two-step methodology.

Step 1:

Six business days before the Triple Witching Settlement date, the estimated amount of the Tier 2 Supplemental Liquidity collateral requirement is computed. The amount is the difference between the average value of the Tier 2 Supplemental Liquidity Fund collateral requirements calculated over the last two Triple Witching Activity periods and the Tier 1 Supplemental Liquidity Fund collateral requirement value. The allocation of the Tier 2 Supplemental Liquidity Fund collateral requirement will be incremental to the Tier 1 allocation and only against those CNS participants identified as having Triple Witching Activity.

The incremental Tier 2 Supplemental Liquidity Fund collateral requirement is allocated against those participants identified as having Triple Witching Activity, based on: (1) their pro-rata share of the number of occurrences of Triple Witching Activity periods over the four previous quarters across all occurrences of all CNS Service participants identified as having Triple Witching Activity over the same lookback period and (2) in accordance with their pro rata share of the cumulative CNS participant liquidity exposures across all CNS participants over the previous last two quarters for those days and participants having Triple Witching Activities.

The value calculated as part of this first step remains valid until the day prior the triple witching settlement day.

Step 2:

One business day before the Triple Witching settlement date, the largest liquidity shortfall derived from the CNS positions as of the Triple Witching settlement date is calculated. If the difference between the value calculated in the second step and the first step is greater than zero, the incremental value is added to the requirement value calculated in step 1. If the difference is lower than zero, the requirement value calculated in step 1 is adjusted accordingly.

The allocation method used in the second step is the same as the one described in the step 1.

As part of CDS's quarterly review of the size of the Supplemental Liquidity Fund, CNS participants will be advised of any revisions to their Tier 2 Supplemental Liquidity Fund collateral requirement. Tier 2 Supplemental Liquidity Fund collateral requirements will be effective for a period of 9 business days during a quarter, subject to the affected participants' Supplemental Liquidity Fund collateral requirement returning to a level similar to that which existed prior to the novation of that quarter's triple witching transactions.

Regularly Scheduled Review of Supplemental Liquidity Fund Size and Intra-quarter Monitoring

CDS monitors the value of the Tier 1 Supplemental Liquidity Fund on a daily basis to ensure that it covers the highest shortfall observed during either: (1) the previous quarter or (2) the previous 60 business days. As such, the size of the Tier 1 Supplemental Liquidity Fund is revised, at a minimum, on a quarterly basis. However, CDS can adjust the size of the fund between the quarterly updates if a new highest shortfall is observed during the previous 60 business days. The intra-quarter collateral call is then allocated amongst all CNS participants with the same methodology as the scheduled quarterly review.

Tier 2 Supplemental Liquidity Fund contributions are required 11 days in a quarter. More specifically, six business days before the Triple Witching Settlement Day, the estimated amount of the Tier 2 Supplemental Liquidity Fund collateral requirement is computed. A revised Tier 2 Supplemental Liquidity Fund collateral requirement is determined one business day before the Triple Witching Settlement Day.

9.5 Calculating the Base Initial Margin

The CDS Base Initial Margin (IM) is calibrated to ensure that in the event of a participant default under 'normal' market conditions, the Base IM pledged will be sufficient to cover market risk resulting from adverse price movements with a high degree of confidence (>99% confidence level).

Portfolio securities are segregated into two categories – diversification eligible and non-diversification eligible. Diversification eligibility is determined by the sufficiency of existing price data for the security. Securities that are diversification eligible will be allowed diversification benefits, using the Historical Simulation methodology. The Historical Simulation methodology contains two weighted components – Historical Value-at-Risk (HVaR) and Counter-cyclical buffer (CCB). The addition of the CCB component ensures the Base IM incorporates the volatility of the daily price returns over a historical period of high market volatility to mitigate the procyclicality of daily CNS collateral requirements.

Securities that are not diversification eligible (non-diversification eligible) will receive flat rate margining treatment.

The Base IM for each participant ledger is the sum of diversification eligible and non-diversification eligible Base IM.

Note that securities identified as WWR securities are excluded from the Base IM calculations since their unique risk is fully collateralized in the WWR Add-on.

CDS executes the Base IM calculations after CDS's batch settlement process (4:00 a.m. ET to 6:00 a.m. ET) has been completed.

Calculating the Base IM (HVaR) Component – Diversification Eligible Securities

The following steps are taken to calculate the HVaR for the diversification eligible

portion of a portfolio:

- a. At each time t of the lookback period, the Filtered EWMA Variance for each diversification eligible security in the portfolio is calculated as:

$$\sigma_{i,t}^2 = \lambda * \sigma_{i,t-1}^2 + (1 - \lambda) * r_{i,t}^2,$$

Where,

$\sigma_{i,t}^2$ – EWMA variance of diversification eligible security i returns at time t

$\sigma_{i,t-1}^2$ – EWMA variance of security i returns at time $t - 1$

λ – Time decay coefficient

r – daily return of security i at time t

Note that an initialization period is used for the calculation of EWMA variance.

- b. Calculate the scaling factor for each diversification eligible security in the portfolio for each time t in the lookback period.
- c. Order the vector of daily portfolio profit and losses⁵ (P&Ls) from least to greatest value and select the HVaR based on the percentile corresponding to the confidence level.

Calculating the Base IM (CCB) Component– Diversification Eligible Securities

The methodology used for the CCB calculation is the same as the one for the HVaR, with the following two exceptions:

- 1) The lookback period is 260 days to reflect a period of high financial market stress
- 2) Filtered EWMA volatility is not calculated, and there no scaling factor is applied to historical returns (i.e., unfiltered).

Calculating the Base IM – Diversification Eligible Securities

The Base IM for diversification eligible securities is calculated as a weighted average of the HVaR and CCB components as follows:

$$Div. Base IM_T = (1 - w) * HVaR_T + w * CCB_T;$$

Where,

$Div. Base IM_T$ – base IM for diversification eligible securities at valuation date T

CCB_T – CCB calculated at valuation date T

w – CCB weight

⁵ For USD securities in the portfolio of CNS positions, the P&Ls are converted to CAD.

Calculating the Base IM (Flat Rate Margining) – Non-diversification eligible securities

For non-diversification eligible securities (i.e., securities with limited or scarce price history and for warrants, rights and installment receipts), the flat rate margining methodology is used (Flat Rate VaR).

Flat Rate VaR (in CAD) is calculated for each non-diversification eligible security within a portfolio as follows:

Flat Rate VaR (CAD) = Close price x net position quantity x Haircut x FX rate (if USD security)

The Base IM for non-diversification eligible securities is then the sum of the Flat Rate VaRs for all the non-diversification eligible securities.

Base IM Calculation

The Base IM for a portfolio of CNS positions in a ledger is the sum of the diversification eligible Base IM and the non-diversification eligible Base IM.

Finally, the Base IM for a participant is the sum of the Base IMs for all of the participant's ledgers.

9.6 Mark-to-market

CDS applies a mark-to-market to all trades and CNS positions for the central counterparty services. This mark-to-market process addresses the potential loss from the original trade price to the current price (i.e., for newly netted trades), or from the last mark price to the current price for CNS positions. CDS marks trades for the first time at netting and novation (e.g., the morning of value date -1 for equities in CNS) and continues to mark daily until the position is settled or the outstanding position is cleared.

Mark-to-markets are applied to all CNS trades and CNS positions in each security based on the closing price available for that security as of the prior day. The daily mark-to-market payment exchange is included in the daily processes of CDSX.

Since a participant's CNS mark is calculated and applied to the participant's funds accounts during the early morning batch settlement process in CDSX, the entry to a participant's funds account occurs prior to CDS having an opportunity to receive additional collateral from the participant.

Calculating the Mark-to-Market Add-On

The Mark-to-Market add-on is the sum of the Settlement Value Mark (SVM) and the Variation Margin (VM).

The Settlement Value Mark (SVM) is the additional margin required at the beginning of the day to account for any net negative mark-to-market of CNS positions calculated prior to the CNS batch settlement process. If the calculated SVM is negative, the absolute value of this amount will be the additional margin added to the Base IM and the participant's funds account will be reduced (debited) by this amount. If the calculated SVM is positive, there will be no additional margin added to the Base IM and the participant's funds account will be increased (credited) by this amount. This additional margin calculation marks all CNS positions to their last close prices. The SVM amount is also applied to participants' funds accounts. The SVM can change intra-day with new transactions – i.e., settlements, entitlements and newly novated CNS trades/positions during the day.

The Variation Margin (VM) is the additional margin required to account for the difference between the last close prices (used for SVM) and the new intraday prices of CNS positions. If the calculated VM is negative, the absolute value of this amount will be added to the Base IM. If the calculated VM is positive, there will be no additional margin added to the Base IM. For VM (positive or negative), the participant's funds account will not be impacted. The VM marks all positions to the new intraday prices from the last close prices.

The VM is only applicable when intraday prices are updated for CNS securities. Since intraday prices are not updated by CDS, the VM is not applied to the Mark-to-Market add-on.

Mark-to-Market add-on per ledger = Maximum (0, SVM) + Maximum (0, VM)

Mark-to-Market add-on per participant = Sum of the Mark-to-Market add-on per ledger for all of the participant's ledgers.

Calculating the Market Liquidity Risk (MLR) Add-on

The following steps are used to calculate the MLR add-on:

1. Calculate the Average Daily Spread (ADS) of the security (used for the liquidity risk component of the MLR charge per share).
2. Calculate the Average Daily Volume (ADV) for the security
3. Calculate the Expected Volume (EV) for the security for the 2-day MPOR
4. Establish volume thresholds⁶ for the security in order to locate the participant's CNS position in an interval (used for the concentration risk component of the MLR charge per share)
5. Calculate the MLR charge per share for the security (corresponding to its CNS position and interval location) and multiply by the participant's CNS position in that security to get the MLR charge for that security. If the source currency and MLR charge per share for the security is in USD, the MLR charge will be converted to CAD using the CAD-USD FX rate in effect.
6. Sum the MLR charges in the above step for all of the participant's securities and positions for each ledger (if more than one ledger) to get the MLR add-on for each ledger.

⁶ The volume thresholds are determined based on quantitative adjustments such as the trading volume, price and volatility of the security.

7. Finally, sum the MLR add-ons for all the participant's ledgers to calculate the participant's MLR add-on.

Note that WWR securities are excluded from the MLR add-on calculation since the WWR securities are fully collateralized with the WWR add-on calculation.

Calculating the Wrong Way Risk (WWR) Add-on

The following steps are used to calculate the WWR add-on:

1. Identify the WWR security (e.g., Common Shares and/or Preferred shares) in a participant's CNS positions that are their own securities or that of its affiliate(s)
2. Calculate the Wrong Way Risk (WWR) or Right Way Risk (RWR) for each identified WWR security using the following equations:

Wrong Way Risk Charge (per WWR security)

$$WWR_i = \text{Max} (0; \text{Net Position}_i * \text{Settlement Price}_i),$$

Right Way Risk Charge (per WWR security)

$$RWR_i = \text{Min} (0; \text{Net Position}_i * \text{Settlement Price}_i),$$

Where:

$$i = \text{WWR Common Share or WWR Preferred Share ;}$$

Net Position = Positive QTY for long positions; Negative QTY for short positions;

$$\text{Settlement Price} = \text{CAD EOD price} \left[\text{or USD EOD Price} * \text{FX Rate} \left(\frac{\text{CAD}}{\text{USD}} \right) \right].$$

3. Sum the calculated WWR and RWR amounts in a ledger to obtain the WWR Add-on for that participant's ledger (Note: The result of the sum must be positive; if the result is negative, then the WWR Add-on for the ledger is 0)
4. Sum the result in step 3 for all of the participant's ledgers (if more than one ledger) to obtain the WWR Add-on for the participant.

9.7 CNS collateral requirements

CNS participants can view their collateral requirement after the CNS batch settlement process (approximately 7:00 a.m. ET, 5:00 a.m. MT, 4:00 a.m. PT).

Participants must contribute sufficient collateral to the CNS central counterparty service Participant Fund, Default Fund and the Supplemental Liquidity Fund by the imposed deadlines. If the requirements are not met, participants can be fined or suspended. For more information on collateral contribution deadlines and penalties, see [Collateral administration](#).

CHAPTER 10: Collateral pools

Collateral pools have been established to guarantee the payment obligations of their members. Each pool maintains collateral that is used in the event that a member of the pool defaults when making payment to CDS. To ensure that sufficient collateral is available to cover a default, certain collateral is removed from the control of each collateral pool member and placed in collateral administration ledgers (CALs).

CDS maintains ledgers for the administration of collateral from each of the following collateral pools:

- Extenders
- Settlement agents
- Receivers for Canadian dollars
- Receivers for U.S. dollars.

Each collateral pool uses a different formula to determine an individual member's contribution. The total margined value of securities in the pool must at least equal this amount.

In a default situation, the defaulter's collateral is available to cover the default amount. For extenders of credit and settlement agents in a default, all survivors of the defaulter's collateral pool may pledge the survivor's pool contributions or the survivor's share of the defaulter's pool contributions to the Bank of Canada for liquidity.

Collateral administration

Within each participant's collateral administration ledger, different accounts are used to store different types of collateral.

Account	Collateral administration usage
Restricted collateral account (CX)	Holds contributions received as collateral in a pledge for the current day
Collateral account (CA)	Holds contributions received as collateral in a pledge for previous days

Each collateral pool has its own set of CALs. Each participant has been allocated special user IDs to use with their collateral administration CUID. These user IDs have limited access to the Pledge to CDS function and Ledger function (only inquiry functions are permitted). For more information on the Ledger function, refer to *CDSX Procedures and User Guide*.

Collateral pool contributions are held in the unrestricted collateral account of the CAL.

Specific Collateral (Special Margin)

Specific Collateral shall mean collateral of a specified value that a participant has pledged to CDS pursuant to a request by CDS to pledge Specific Collateral. CDS may request a participant to pledge Specific Collateral if it determines, in its sole discretion, that the pledge of such Collateral is prudent to ensure the due discharge of the Participant’s obligations to CDS.

10.1 Extenders of credit collateral pool

Extenders of credit are assigned a collateral management system (CMS) ledger and CUID for use in managing their collateral pool contributions. The following table lists the ledger and CUID for Extenders.

Extender	CMS	
	Ledger	CUID
Extenders of Credit	EXT10	EXTC

In a default, CDS moves the defaulter’s contributions to the special collateral administrative ledger (CAL) established for the Lead Extender.

Extenders’ acceptable collateral

All contributions to extenders of credit collateral pool must be in the form of the eligible collateral indicated in [Acceptable collateral](#).

10.2 Calculating extenders’ collateral contributions

Each of the extenders makes an individual contribution to the pool that is based on the basic pool amount, the extender’s own record date maximum exposure point (MEP) average and the total record date MEP averages of all the extenders. Extenders of credit calculate their required pool contribution using the formulas shown below.

$\text{Proportionate share} = \frac{\text{Extender's record date MEP average}}{\text{Total record date MEP average}}$

$$\text{Extender's contribution} = \text{Proportionate share} \times \text{Basic pool amount}$$

10.3 Updating extenders' system operating caps and ratings discounts

CDS updates extenders' system operating caps and ratings discounts on a quarterly basis as follows:

1. CDS recalculates the extenders' system operating caps based on the extenders' most current quarterly common shareholders' equity (formula amount). Extenders can then elect a CAD cap up to their formula amount.
2. CDS provides the extenders of credit with the following charts:
 - Revised system operating caps and collateral pool contributions – Indicates any increases or decreases in the system operating caps and collateral pool requirements for the extenders' collateral pools
 - Current system operating caps and collateral pool contributions – Indicates the current system operating caps and collateral pool requirements
 - Comparative Debt Ratings and Rating Discounts – Provides comparative ratings for both short and long term debt.
3. Each extender is required to complete the System Operating Cap: Acknowledgement Form to confirm the accuracy of their system operating cap formula amount, debt ratings and their elected C\$ cap amount.
4. Upon receipt of the form, CDS performs the appropriate system operating cap update.
5. Extenders of Credit may convert up to 3% of their elected C\$ cap to a US\$ cap.

10.4 Calculating extenders' ratings discounts

For extenders of credit, CDS calculates the rating discount based on the adjustment factors determined by the Extenders' Senior Risk Management Committee. CDS calculates the rating discount based on the lowest rating in the U.S. and Canadian Ratings Correlation table, which provides the correlation between the three rating agencies and the equivalent adjustment discount factor.

STANDARD & POORS		MOODY'S		DBRS	
LONG TERM	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM	SHORT TERM
AAA	A-1+	Aaa	P-1	AAA	R-1 HIGH
AA+	A-1+	Aa1	P-1	AA HIGH	R-1 HIGH/MIDDLE
AA	A-1+	Aa2	P-1	AA	R-1 MIDDLE
AA-	A-1+	Aa3	P-1	AA LOW	R-1 MIDDLE/LOW
A+	A-1	A1	P-1	A HIGH	R-1 MIDDLE/LOW
A	A-2	A2	P-2	A	R-1 LOW
A-	A-2	A3	P-2	A LOW	R-1 LOW
BBB+	A-2	Baa1	P-2	BBB HIGH	R-2 HIGH
BBB	A-2	Baa2	P-2	BBB	R-2 HIGH
BBB-	A-3	Baa3	P-3	BBB LOW	R-2 MIDDLE
BB+	B	Ba1	NOT PRIME	BB HIGH	R-2 LOW
BB	B	Ba2	NOT PRIME	BB	R-2 LOW
BB-	B	Ba3	NOT PRIME	BB LOW	R-2 LOW
B+	B	B1	NOT PRIME	B HIGH	R-3 HIGH
B	B	B2	NOT PRIME	B	R-3 MIDDLE
B-	B	B3	NOT PRIME	B LOW	R-3 LOW
CCC+	C	Caa	NOT PRIME	CCC	R-3 LOW
CCC	C	Caa	NOT PRIME	CCC	R-3 LOW
CCC-	C	Caa	NOT PRIME	CCC	R-3 LOW
CC+	C	Ca	NOT PRIME	CC	R-3 LOW
CC	C	Ca	NOT PRIME	CC	R-3 LOW
CC-	C	Ca	NOT PRIME	CC	R-3 LOW
C+	C	C	NOT PRIME	C	R-3 LOW
C	C	C	NOT PRIME	C	R-3 LOW
C-	C	C	NOT PRIME	C	R-3 LOW
D	D	D	NOT PRIME	U	U

The table below is used to calculate the rating discount for extenders of credit using an adjustment factor of 100 per cent. For an extender whose rating is within the clear area, CDS applies an adjustment factor of 100 per cent. If an extender's short-term rating displays in the shaded area, the extender's long-term rating is used to determine if the adjustment factor should be 100 per cent or lower.

STANDARD & POORS		MOODY'S		DBRS 100%	
LONG TERM	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM	SHORT TERM
AAA	A-1+	Aaa	P-1	AAA	R-1 HIGH
AA+	A-1+	Aa1	P-1	AA HIGH	R-1 HIGH/MIDDLE
AA	A-1+	Aa2	P-1	AA	R-1 MIDDLE
AA-	A-1+	Aa3	P-1	AA LOW	R-1 MIDDLE/LOW
A+	A-1	A1	P-1	A HIGH	R-1 MIDDLE/LOW
A	A-1	A2	P-1	A	R-1 LOW
A-	A-2	A3	P-2	A LOW	R-1 LOW
BBB+	A-2	Baa1	P-2	BBB HIGH	R-2 HIGH
BBB	A-2	Baa2	P-2	BBB	R-2 HIGH
BBB-	A-3	Baa3	P-3	BBB LOW	R-2 MIDDLE
BB+	B	Ba1	NOT PRIME	BB HIGH	R-2 LOW
BB	B	Ba2	NOT PRIME	BB	R-2 LOW
BB-	B	Ba3	NOT PRIME	BB LOW	R-2 LOW
B+	B	B1	NOT PRIME	B HIGH	R-3 HIGH
B	B	B2	NOT PRIME	B	R-3 MIDDLE
B-	B	B3	NOT PRIME	B LOW	R-3 LOW
CCC+	C	Caa	NOT PRIME	CCC	R-3 LOW
CCC	C	Caa	NOT PRIME	CCC	R-3 LOW
CCC-	C	Caa	NOT PRIME	CCC	R-3 LOW
CC+	C	Ca	NOT PRIME	CC	R-3 LOW
CC	C	Ca	NOT PRIME	CC	R-3 LOW
CC-	C	Ca	NOT PRIME	CC	R-3 LOW
C+	C	C	NOT PRIME	C	R-3 LOW
C	C	C	NOT PRIME	C	R-3 LOW
C-	C	C	NOT PRIME	C	R-3 LOW
D	D	D	NOT PRIME	U	U

The table below is used to calculate the rating discount for extenders of credit using an adjustment factor of 95 per cent. For an extender whose rating is within the clear area, CDS adjusts the capital to 95 per cent of their reported capital. If a short-term rating displays in the shaded area, the extender's long-term rating is used to determine if the adjustment factor should be 95 per cent or lower.

STANDARD & POORS		MOODY'S		DBRS 95%	
LONG TERM	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM	SHORT TERM
AAA	A-1+	Aaa	P-1	AAA	R-1 HIGH
AA+	A-1+	Aa1	P-1	AA HIGH	R-1 HIGH/MIDDLE
AA	A-1+	Aa2	P-1	AA	R-1 MIDDLE
AA-	A-1+	Aa3	P-1	AA LOW	R-1 MIDDLE/LOW
A+	A-1	A1	P-1	A HIGH	R-1 MIDDLE/LOW
A	A-1	A2	P-1	A	R-1 LOW
A-	A-2	A3	P-2	A LOW	R-1 LOW
BBB+	A-2	Baa1	P-2	BBB HIGH	R-2 HIGH
BBB	A-2	Baa2	P-2	BBB	R-2 HIGH
BBB-	A-3	Baa3	P-3	BBB LOW	R-2 MIDDLE
BB+	B	Ba1	NOT PRIME	BB HIGH	R-2 LOW
BB	B	Ba2	NOT PRIME	BB	R-2 LOW
BB-	B	Ba3	NOT PRIME	BB LOW	R-2 LOW
B+	B	B1	NOT PRIME	B HIGH	R-3 HIGH
B	B	B2	NOT PRIME	B	R-3 MIDDLE
B-	B	B3	NOT PRIME	B LOW	R-3 LOW
CCC+	C	Caa	NOT PRIME	CCC	R-3 LOW
CCC	C	Caa	NOT PRIME	CCC	R-3 LOW
CCC-	C	Caa	NOT PRIME	CCC	R-3 LOW
CC+	C	Ca	NOT PRIME	CC	R-3 LOW
CC	C	Ca	NOT PRIME	CC	R-3 LOW
CC-	C	Ca	NOT PRIME	CC	R-3 LOW
C+	C	C	NOT PRIME	C	R-3 LOW
C	C	C	NOT PRIME	C	R-3 LOW
C-	C	C	NOT PRIME	C	R-3 LOW
D	D	D	NOT PRIME	U	U

The table below is used to calculate the rating discount for extenders of credit using an adjustment factor of 80 per cent. For an extender whose rating is within the clear area, CDS adjusts the capital to 80 per cent of their reported capital. If a short-term rating displays in the shaded area, the extender's long-term rating is used to determine if the adjustment factor should be 80 per cent or lower.

STANDARD & POORS		MOODY'S		DBRS 80%	
LONG TERM	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM	SHORT TERM
AAA	A-1+	Aaa	P-1	AAA	R-1 HIGH
AA+	A-1+	Aa1	P-1	AA HIGH	R-1 HIGH/MIDDLE
AA	A-1+	Aa2	P-1	AA	R-1 MIDDLE
AA-	A-1+	Aa3	P-1	AA LOW	R-1 MIDDLE/LOW
A+	A-1	A1	P-1	A HIGH	R-1 MIDDLE/LOW
A	A-1	A2	P-1	A	R-1 LOW
A-	A-2	A3	P-2	A LOW	R-1 LOW
BBB+	A-2	Baa1	P-2	BBB HIGH	R-2 HIGH
BBB	A-2	Baa2	P-2	BBB	R-2 HIGH
BBB-	A-3	Baa3	P-3	BBB LOW	R-2 MIDDLE
BB+	B	Ba1	NOT PRIME	BB HIGH	R-2 LOW
BB	B	Ba2	NOT PRIME	BB	R-2 LOW
BB-	B	Ba3	NOT PRIME	BB LOW	R-2 LOW
B+	B	B1	NOT PRIME	B HIGH	R-3 HIGH
B	B	B2	NOT PRIME	B	R-3 MIDDLE
B-	B	B3	NOT PRIME	B LOW	R-3 LOW
CCC+	C	Caa	NOT PRIME	CCC	R-3 LOW
CCC	C	Caa	NOT PRIME	CCC	R-3 LOW
CCC-	C	Caa	NOT PRIME	CCC	R-3 LOW
CC+	C	Ca	NOT PRIME	CC	R-3 LOW
CC	C	Ca	NOT PRIME	CC	R-3 LOW
CC-	C	Ca	NOT PRIME	CC	R-3 LOW
C+	C	C	NOT PRIME	C	R-3 LOW
C	C	C	NOT PRIME	C	R-3 LOW
C-	C	C	NOT PRIME	C	R-3 LOW
D	D	D	NOT PRIME	U	U

The table below is used to calculate the rating discount for extenders of credit using an adjustment factor of 80 per cent plus 50 per cent collateral. For an extender whose rating is within the clear area, CDS adjusts the capital to 80 per cent of their reported capital and requires them to pledge securities equal to 50 per cent of their company cap into the collateral pool. The pledged collateral is added to the amount of collateral already pledged to their collateral pool. If a short-term rating displays in the shaded area, the extender's long-term rating is used to determine if the adjustment factor should be 80 per cent plus 50 per cent collateral or lower.

STANDARD & POORS		MOODY'S		DBRS 80% + 50% Collateral	
LONG TERM	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM	SHORT TERM
AAA	A-1+	Aaa	P-1	AAA	R-1 HIGH
AA+	A-1+	Aa1	P-1	AA HIGH	R-1 HIGH/MIDDLE
AA	A-1+	Aa2	P-1	AA	R-1 MIDDLE
AA-	A-1+	Aa3	P-1	AA LOW	R-1 MIDDLE/LOW
A+	A-1	A1	P-1	A HIGH	R-1 MIDDLE/LOW
A	A-1	A2	P-1	A	R-1 LOW
A-	A-2	A3	P-2	A LOW	R-1 LOW
BBB+	A-2	Baa1	P-2	BBB HIGH	R-2 HIGH
BBB	A-2	Baa2	P-2	BBB	R-2 HIGH
BBB-	A-3	Baa3	P-3	BBB LOW	R-2 MIDDLE
BB+	B	Ba1	NOT PRIME	BB HIGH	R-2 LOW
BB	B	Ba2	NOT PRIME	BB	R-2 LOW
BB-	B	Ba3	NOT PRIME	BB LOW	R-2 LOW
B+	B	B1	NOT PRIME	B HIGH	R-3 HIGH
B	B	B2	NOT PRIME	B	R-3 MIDDLE
B-	B	B3	NOT PRIME	B LOW	R-3 LOW
CCC+	C	Caa	NOT PRIME	CCC	R-3 LOW
CCC	C	Caa	NOT PRIME	CCC	R-3 LOW
CCC-	C	Caa	NOT PRIME	CCC	R-3 LOW
CC+	C	Ca	NOT PRIME	CC	R-3 LOW
CC	C	Ca	NOT PRIME	CC	R-3 LOW
CC-	C	Ca	NOT PRIME	CC	R-3 LOW
C+	C	C	NOT PRIME	C	R-3 LOW
C	C	C	NOT PRIME	C	R-3 LOW
C-	C	C	NOT PRIME	C	R-3 LOW
D	D	D	NOT PRIME	U	U

The table below is used to calculate the rating discount for extenders of credit using an adjustment factor of 80 per cent plus 100 per cent of collateral. The extender's long-term rating is not needed to determine this adjustment factor. For an extender whose rating is within the clear area, CDS adjusts the capital to 80 per cent of their reported capital and requires them to pledge securities equal to 100 per cent of their company cap (system operating cap) into the collateral pool. The pledged collateral is added to the amount of collateral already pledged to their collateral pool.

STANDARD & POORS		MOODY'S		DBRS 80% + 100% Collateral	
LONG TERM	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM	SHORT TERM
AAA	A-1+	Aaa	P-1	AAA	R-1 HIGH
AA+	A-1+	Aa1	P-1	AA HIGH	R-1 HIGH/MIDDLE
AA	A-1+	Aa2	P-1	AA	R-1 MIDDLE
AA-	A-1+	Aa3	P-1	AA LOW	R-1 MIDDLE/LOW
A+	A-1	A1	P-1	A HIGH	R-1 MIDDLE/LOW
A	A-1	A2	P-1	A	R-1 LOW
A-	A-2	A3	P-2	A LOW	R-1 LOW
BBB+	A-2	Baa1	P-2	BBB HIGH	R-2 HIGH
BBB	A-2	Baa2	P-2	BBB	R-2 HIGH
BBB-	A-3	Baa3	P-3	BBB LOW	R-2 MIDDLE
BB+	B	Ba1	NOT PRIME	BB HIGH	R-2 LOW
BB	B	Ba2	NOT PRIME	BB	R-2 LOW
BB-	B	Ba3	NOT PRIME	BB LOW	R-2 LOW
B+	B	B1	NOT PRIME	B HIGH	R-3 HIGH
B	B	B2	NOT PRIME	B	R-3 MIDDLE
B-	B	B3	NOT PRIME	B LOW	R-3 LOW
CCC+	C	Caa	NOT PRIME	CCC	R-3 LOW
CCC	C	Caa	NOT PRIME	CCC	R-3 LOW
CCC-	C	Caa	NOT PRIME	CCC	R-3 LOW
CC+	C	Ca	NOT PRIME	CC	R-3 LOW
CC	C	Ca	NOT PRIME	CC	R-3 LOW
CC-	C	Ca	NOT PRIME	CC	R-3 LOW
C+	C	C	NOT PRIME	C	R-3 LOW
C	C	C	NOT PRIME	C	R-3 LOW
C-	C	C	NOT PRIME	C	R-3 LOW
D	D	D	NOT PRIME	U	U

The table below displays the ratings for which an adjustment factor of 0 per cent is used to calculate the rating discount for extenders of credit. For the other adjustment factors, two bond rating agencies would have to have assigned such a low rating for the rating to be used.

The Extenders Senior Risk Management Committee may allow the extender to continue at an 80 per cent adjustment factor with 100 per cent collateralization.

STANDARD & POORS		MOODY'S		DBRS		0%
LONG TERM	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM	SHORT TERM	
AAA	A-1+	Aaa	P-1	AAA	R-1 HIGH	
AA+	A-1+	Aa1	P-1	AA HIGH	R-1 HIGH/MIDDLE	
AA	A-1+	Aa2	P-1	AA	R-1 MIDDLE	
AA-	A-1+	Aa3	P-1	AA LOW	R-1 MIDDLE/LOW	
A+	A-1	A1	P-1	A HIGH	R-1 MIDDLE/LOW	
A	A-1	A2	P-1	A	R-1 LOW	
A-	A-2	A3	P-2	A LOW	R-1 LOW	
BBB+	A-2	Baa1	P-2	BBB HIGH	R-2 HIGH	
BBB	A-2	Baa2	P-2	BBB	R-2 HIGH	
BBB-	A-3	Baa3	P-3	BBB LOW	R-2 MIDDLE	
BB+	B	Ba1	NOT PRIME	BB HIGH	R-2 LOW	
BB	B	Ba2	NOT PRIME	BB	R-2 LOW	
BB-	B	Ba3	NOT PRIME	BB LOW	R-2 LOW	
B+	B	B1	NOT PRIME	B HIGH	R-3 HIGH	
B	B	B2	NOT PRIME	B	R-3 MIDDLE	
B-	B	B3	NOT PRIME	B LOW	R-3 LOW	
CCC+	C	Caa	NOT PRIME	CCC	R-3 LOW	
CCC	C	Caa	NOT PRIME	CCC	R-3 LOW	
CCC-	C	Caa	NOT PRIME	CCC	R-3 LOW	
CC+	C	Ca	NOT PRIME	CC	R-3 LOW	
CC	C	Ca	NOT PRIME	CC	R-3 LOW	
CC-	C	C	NOT PRIME	C	R-3 LOW	
C+	C	C	NOT PRIME	C	R-3 LOW	
C	C	C	NOT PRIME	C	R-3 LOW	
C-	C	C	NOT PRIME	C	R-3 LOW	
D	D	D	NOT PRIME	U	U	

10.5 Settlement agents' collateral pool

Settlement Agents are assigned a collateral management system (CMS) ledger and CUID for use in managing their collateral pool and contributions. The following table lists the ledger and CUID assigned for settlement agents.

Settlement agent	CMS	
	Ledger	CUID
Settlement Agents	SAT10	SATC

In a default, CDS moves the defaulter's contributions to the appropriate CAL ledger for subsequent transfer to each Settlement Agent Survivor.

Settlement agents' acceptable collateral

All contributions to settlement agents' collateral pool must be in the form of the eligible collateral indicated in [Acceptable collateral](#).

10.6 Calculating settlement agents' collateral contributions

The aggregate size of the settlement agents' collateral pool is the amount determined as agreed to by the *Settlement Agents Credit Ring Council*.

Each settlement agent makes an individual contribution to the basic pool that is based on the size of the basic pool as well as the settlement agent's own system operating cap as a proportion of the total of all the settlement agents' system operating caps. Settlement agents calculate their required pool contribution using the formulas shown below.

$$\text{Proportionate share} = \frac{\text{Settlement agent's system operating cap}}{\text{Total settlement agent caps}}$$

$$\text{Settlement agent's contribution} = \text{Proportionate share} \times \text{Basic pool size}$$

Note: CDS supplies settlement agents with the current total of the settlement agents' system operating caps and the basic pool size.

10.7 Calculating settlement agents' ratings discounts

For settlement agents, CDS calculates the rating discount based on the adjustment factors determined by the Settlement Agents Category Credit Ring Council. CDS calculates the rating discount based on the lowest rating in the U.S. and Canadian Ratings Correlation table, which provides the correlation between the three rating agencies and the equivalent adjustment discount factor.

The table below is used to calculate the rating discount for settlement agents using the corresponding adjustment factor indicated in the "Ratings Discount" column.

S&P		Moody's		DBRS		Ratings discount
Long term	Short term (Canadian CP scale)	Long term	Short term	Long term	Short term	
AAA	A-1 (high)	Aaa	P-1	AAA	R-1 High	100%
AA+	A-1 (high)	Aa1	P-1	AA High	R-1 High	
AA	A-1 (high)	Aa2	P-1	AA	R-1 Middle	95%
AA-	A-1 (high)	Aa3	P-1	AA Low	R-1 Middle	
A+	A-1 (mid)	A1	P-1	A High	R-1 Low	80%
A	A-1 (mid)	A2	P-1	A	R-1 Low	
A-	A-1 (low)	A3	P-2	A Low	R-1 Low	

S&P		Moody's		DBRS		Ratings discount
Long term	Short term (Canadian CP scale)	Long term	Short term	Long term	Short term	
BBB+	A-1 (low)	Baa1	P-2	BBB High	R-2 High	70%
BBB	A-2	Baa2	P-2	BBB	R-2 Middle	
BBB-	A-3	Baa3	P-3	BBB Low	R-2 Low	50%
BB+	B	Ba1	Not prime	BB High	R-3 High	0%
BB	B	Ba2	Not prime	BB	R-3 High	
BB-	B	Ba3	Not prime	BB Low	R-3 High	
B+	C	B1	Not prime	B High	R-3 Middle	
B	C	B2	Not prime	B	R-3 Middle	
B-	C	B3	Not prime	B Low	R-3 Low	
CCC+	C	Caa	Not prime	CCC	R-3 Low	

10.8 Receivers of credit collateral pools

Receivers of credit can belong to the following collateral pools:

- Canadian dollar receivers' collateral pool – Receivers of credit must meet the requirements indicated in the CAD RCP Receivers Credit Ring Agreement to become a member. For more information, see [Canadian dollar receivers' collateral pool](#).
- U.S. dollar receivers' collateral pool – For more information, see [U.S. dollar receivers' collateral pool](#).

The following rules and restrictions apply to both receivers of credit collateral pools:

- Receivers of credit may join the receivers collateral pool before the next regular quarterly recalculation date, provided that their contribution does not exceed the current largest contribution to the collateral pool.

When a receiver of credit joins the collateral pool before the quarterly recalculation, CDS does not recalculate the pool factor to take into account the new member's contribution. Instead, the pool factor remains unchanged until the next quarterly recalculation. As a result, the new member's maximum cap for the duration of that quarter cannot exceed the largest cap as determined immediately before the new member joined the receivers' collateral pool.

- Receivers of credit initiating their withdrawal from the receivers collateral pool must withdraw effective the end of the quarter and must give CDS at least 10 business days' notice.

If a receiver of credit is required to withdraw from the receivers collateral pool before the next regular quarterly recalculation date, CDS immediately recalculates

the pool factor. The new pool factor is applied to the remaining members' contributions in order to determine their caps for the duration of that quarter.

- In a default, CDS moves the defaulter's contributions to the CAL established by CDS to deal with the default.

Receivers' acceptable collateral

All contributions to the receivers of credit collateral pool must be in the form of the eligible collateral indicated in [Acceptable collateral](#).

10.9 Canadian dollar receivers' collateral pool

A collateral management system (CMS) ledger is assigned to hold the collateral contributions of the receivers of credit for Canadian dollars. Each receiver pledges securities to the ledger and CUID indicated in the table below.

Collateral pool member	CMS	
	Ledger	CUID
Receivers of credit for Canadian dollars	RCP10	RCPC

Receivers of credit for Canadian dollars calculate and update their required pool contributions as described in [Updating Canadian dollar receivers' collateral contributions](#).

10.10 Updating Canadian dollar receivers' collateral contributions

CDS updates Canadian dollar receivers' collateral pool requirements on a quarterly basis as follows:

1. Each Canadian dollar receiver provides their CDS collateral administrator with the amount of their elected collateral contribution at least 10 business days before the end of the quarter. No receiver may exceed \$2.5 million in their contribution to the receivers' collateral pool.
2. CDS recalculates the Canadian dollar receivers' pool factor as follows:

$\text{Pool Factor} = \frac{\text{Total collateral contributions of the receivers participating in the Canadian dollar receivers collateral pool}}{\text{Largest Canadian dollar receiver's individual collateral contribution}}$

3. CDS calculates each Canadian dollar receivers' formula amount as follows:

Each Canadian dollar receiver's formula amount equals their cap unless their cap has been subject to a voluntary or mandatory adjustment. The total collateral in the Canadian dollar receivers' collateral pool is equal to the aggregate value of the Canadian dollar receivers' collateral contributions, which is equal to the largest cap.

Each CAD dollar receivers' pool collateral requirement is equal to their Initial ACV.

10.11 New York Link/DTC Direct Link special margin participant funds

Special margin participant fund	Collateral deadlines	Eligible collateral	Pledging collateral
CDS participant fund for DTC Direct Link	For information on collateral deadlines, see Collateral administration	For information on eligible collateral, see Acceptable collateral	Securities are pledged from the participant's CUID to CDS's restricted collateral account (DDLX) If all the requirements are satisfied, CMS automatically confirms the pledge and moves the securities in to CDS's DDL ledger For more information, see Pledging securities as collateral
CDS participant fund for New York Link			To cover the requirement, participants must deposit cash collateral at CDS. For more information, see Delivering U.S. dollar cash as collateral .
NSCC participant fund for New York Link			Not applicable

Note: Information related to these special margin participant funds is available through CMS and reports.

10.12 U.S. dollar receivers' collateral pool

A collateral management system (CMS) ledger is assigned to hold the collateral contributions of the receivers of credit for U.S. dollars. Each receiver pledges securities to the ledger and CUID indicated in the table below.

Collateral pool member	CMS	
	Ledger	CUID
Receivers of credit for U.S. dollars	RCP20	RCPU

Receivers of credit for U.S. dollars calculate and update their required pool contributions as described in [Updating U.S. dollar receivers' collateral contributions](#).

10.13 Updating U.S. dollar receivers' collateral contributions

CDS updates U.S. dollar receivers' collateral pool requirements on a quarterly basis as follows:

1. Each U.S. dollar receiver provides their CDS collateral administrator with the amount of their elected cap at least 10 business days before the end of the quarter.

Note: Receivers can only adjust their cap on a quarterly basis.

2. U.S. dollar receivers may elect a cap up to a maximum amount agreed to by CDS and the Receivers of Credit Council.
3. Each U.S. dollar receivers' required collateral requirement is equal to its elected cap.

CHAPTER 11

11.1 CCP survivor withdrawal

The CCP survivor withdrawal option is a mechanism that enables participants in a central counterparty service to limit the loss allocation they are responsible for by withdrawing from the service when one or more members of the service defaults. This option is applicable only in the event of a default and does not affect the normal non-default withdrawal of a participant from a central counterparty service.

The following rules and restrictions govern a survivor's withdrawal from a central counterparty service:

- A participant can only withdraw from a CCP service in which a member of that service has defaulted.
- On the day of withdrawal, a participant must pledge one of the following:
 - If the participant is withdrawing from CNS, an additional 700 per cent of its CNS Default Fund requirement.
- Once a participant has withdrawn from a CCP service, they cannot be reinstated until they have accepted liability for any losses that they would have incurred if they had not withdrawn from the service, and the board of directors has provided approval.
- When losses are allocated by CDS, the withdrawing participant's collateral can be used if there is anything owed.
- The withdrawing participant is responsible for any other defaults in the service they have opted out of that occur within the next 15 business days.

Following a default:

1. The participant who intends to withdraw from a CCP service must contact CDS Customer Service and advise of their intention to withdraw and provide the following information:
 - CCP service(s) that they intend to withdraw from
 - Which default triggered their decision.
2. Once the intent to withdraw is confirmed, CDS Customer Service instructs the participant to submit the formal CCP Notice of Intent to Withdraw.
3. By 11:00 a.m. ET (9:00 a.m. MT, 8:00 a.m. PT) on the effective date of withdrawal, the participant must fax their formal CCP Notice of Intent to Withdraw to CDS Customer Service. This form must be signed by a Schedule B signing officer.
4. On the effective date of withdrawal, the participant must deliver the required collateral (the current business day's requirement plus the special margin amount) owed to CDS in the Collateral Management System by the initial cutoff time. The

special margin amount is five times the current business day's collateral requirement for the service the participant is withdrawing from.

5. If the participant does not deliver the required collateral or delivers less than the required collateral by the initial cutoff time, the participant is fined. If the contribution is still outstanding by the final cutoff time, the participant is suspended and the default procedures will be invoked. For more information, see [Default procedures](#).
6. If the participant delivers the current business day's requirement by the initial cutoff time, but not the special margin amount, they have not met their requirements to be able to withdraw. The Default Management Group sends a formal communication to the participant to advise them of the situation.
7. If the participant meets the withdrawal criteria, Collateral Management provides the Default Management Group with the following information for the withdrawing participant:
 - Amount of their current business day's requirement
 - Amount of their special margin amount
 - Amount of their final contribution.
8. Once the participant has closed out their CNS positions and CDS has closed out all relevant defaults and allocated the residual loss, the participant can request to have any excess collateral returned. CDS only releases the collateral once it is approved by the Default Management Group.
9. When a participant has withdrawn from CNS domestic:
 - a. CDS changes the participant's netting indicator in order to restrict them from netting in CNS.
 - b. The participant must take immediate action to close out their CNS positions. Upon written request from the participant, CDS may allow trades that will reduce their outstanding positions to net. The participant must send CDS Customer Service a written request indicating the trades to be netted and their rationale for selecting the trades.

For more information on collateral contribution deadlines and penalties, see [Collateral administration](#).