

*Draft – for discussion purposes*

# **Virtual Trading Risk and NYISO Collateral Policies**

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**Prepared for  
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## **BACKGROUND**

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The NYISO's collateral requirements for virtual trading are currently based on:

- A two-day-collateral multiple.
- A threshold defined by the 3% return outliers calculated for the absolute value of all returns, over the last 90 days, over all on-peak hours, for the largest absolute return across all zones.

## **BACKGROUND**

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Our expectation upon undertaking this analysis was that:

- The variability of virtual trading returns differs by zone, season and time of day.
- The returns to virtual supply offers are more variable than to virtual demand bids.
- The distribution of virtual trading returns was likely not well approximated by the normal distribution.

## **BACKGROUND**

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It is important in analyzing the NYISO collateral requirement to recognize that the probability of a virtual trader incurring losses in excess of its posted collateral does not equate to the probability of a default whose costs must be borne by other NYISO market participants.

- Virtual traders are obligated to cover all virtual trading losses, even if the losses exceed the collateral posted by the trader.
- There have been a few instances of virtual traders incurring losses that triggered a collateral call. Thus far, all of these losses were covered in full by the virtual trader.

The potential credit risk for the NYISO arises from a combination of virtual trading losses and an inability to make good the losses.

## **BACKGROUND**

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The NYISO virtual trading collateral policy should therefore be formulated taking into account the circumstances in which virtual trading losses in excess of collateral would actually result in a default.

- A large company participating in many other markets whose NYISO virtual trading operations are small relative to its total business.
- A company whose NYISO virtual trading operations are large relative to its overall business.
- An entity with few, if any, assets beyond its NYISO virtual trading collateral as a matter of trading strategy.

## **COLLATERAL MULTIPLE**

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Several features of NYISO markets are relevant to selecting a collateral multiple:

- Time lags between the day-ahead market and determination of real-time prices.
- Time lags in the NYISO calculation of trading losses.
- Time lags in the requirement to post additional collateral.
- Independence and correlation of virtual trading returns across days.
- Less volatile returns on weekends.

# COLLATERAL MULTIPLE

NYISO Market Times and Collateral Calls

Day 1 Operating Day	Day 2 Operating Day	Day 3 Operating Day	Day 4 Operating Day	Day 5 Operating Day
	<b>Losses</b>			<b>4:00 p.m. Collateral Deadline</b> Day 2 Losses
	Event 10:00 a.m.		Collateral call for Day 2 Losses	
			Settlements for Day 2	
5:00 a.m.-9:30 a.m. <b>DAM for Day 2</b>	5:00 a.m.-9:30 a.m. <b>DAM for Day 3</b>	5:00 a.m.-9:30 a.m. <b>DAM for Day 4</b>	5:00 a.m.-9:30 a.m. <b>DAM for Day 5</b>	5:00 a.m.-9:30 a.m. <b>DAM for Day 6</b>

- By the time trading losses are determined for day 2, a trader could have taken positions for day 3.
- By the time the NYISO issues a collateral call, for losses on day 2, the trader could have taken positions for days 3, 4 and 5.
- By the time the NYISO cuts off a trader for failure to post additional collateral for day 2 losses, the trader could have taken positions for days 3, 4, 5 and 6.

# COLLATERAL MULTIPLE

NYISO Market Times and Collateral Calls

Day 1 Operating Day	Day 2 Operating Day	Day 3 Operating Day	Day 4 Operating Day	Day 5 Operating Day
	<b>Losses</b>			4:00 p.m. Collateral Deadline Day 2 Losses
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5:00 a.m.-9:30 a.m. DAM for Day 2	5:00 a.m.-9:30 a.m. DAM for Day 3	5:00 a.m.-9:30 a.m. DAM for Day 4	5:00 a.m.-9:30 a.m. DAM for Day 5	5:00 a.m.-9:30 a.m. DAM for Day 6

These time lags also affect the correlation of virtual trading returns across days:

- Returns on days 2 and 3 will be correlated because events occurring after 5:00 a.m. on day 2 could affect real-time prices on both days but would not have been reflected in day-ahead prices on either day.
- Returns on days 2 and 4 should not be correlated because any event that affected real-time prices on day 2 would be known to market participants when they submit bids and offers in the day-ahead market for day 4.



## **COLLATERAL MULTIPLE**

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If virtual trading returns were independent and identically normally distributed across days, then the sum of the returns over five days would have a standard deviation equal to 2.24 times the daily standard deviation.

This is not the case in the NYISO markets:

- Actual returns are not independent across successive days.
- Actual returns are not normally distributed.

The empirical data indicate a greater variance, and need for a higher collateral multiple, than implied by independent normally distributed loss.

# COLLATERAL MULTIPLE

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## Ratio to 1-Day Loss

	2-Day	3-Day	4-Day	5-Day
iid Normal Standard Deviation	1.41	1.73	2.00	2.24
J SMD	1.58	1.95		
J pre-SMD	1.47	1.85		
East SMD	1.49	1.87		
East pre-SMD	1.47	1.81		
1% Tail-Virtual Demand				
J SMD	1.70	2.00		
J pre-SMD	1.65	2.03		
East SMD	1.49	1.77		
East pre-SMD	1.85	2.24		
99% Tail-Virtual Supply				
J SMD	1.61	2.02		
J pre-SMD	1.68	2.13		
East SMD	1.69	2.24		
East pre-SMD	1.72	2.24		

## **COLLATERAL MULTIPLE**

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The actual distribution of virtual trading returns in both the SMD and pre-SMD periods suggests that a multiple of 2 is required to cover three days of trading losses.

- Absent weekends, a multiple of around 3 would be required to cover five days of trading losses.
- Trading periods longer than three days, however, generally span weekends, reducing the correlation in on-peak returns.
- Weekends also result in Monday collateral deadlines for collateral calls on Friday, Saturday and Sunday.

The number of on-peak trading day losses prior to the collateral deadline can range from 3 to 5.

# COLLATERAL MULTIPLE

## On-Peak Collateral Calls and Weekends

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday
Tuesday DAM	Wednesday DAM	Thursday Dam	Friday DAM	Saturday DAM	Sunday DAM	Monday DAM	Tuesday DAM	
		Monday Call	Tuesday Call	Wednesday Call	Thursday Call	Friday Call		
			Monday Collateral Due	Tuesday Collateral Due			Wednesday- Friday Collateral Due	

## Losses Prior to Cutoff

Monday Tuesday Wednesday Thursday Friday	Tuesday Wednesday Thursday Friday Saturday	Wednesday Thursday Friday Saturday Sunday Monday Tuesday	Thursday Friday Saturday Sunday Monday Tuesday	Friday Saturday Sunday Monday Tuesday				
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