SIAC   Securities Industry Automation Corporation
11 Wall Street, New York, NY 10005

April 26, 2021

TO: OPRA Multicast Data Subscribers

SUBJECT: Legacy OPRA Failover Testing to Secondary Data Center: **Saturday, May, 1, 2021**
             Final Reminder

Failover Testing:

As previously announced, SIAC will be conducting legacy system failover testing with the OPRA exchanges on **Saturday, May 1, 2021, from 9:00 am - 11:00 am ET**. All OPRA multicast Data Subscribers are invited to participate.

2021 SIP Failover and MWCB Test Schedule
- Sat 5/1/21: SIP Failover / MWCB Level 1/2 Test #1
- Sat 8/21/21: SIP Failover / MWCB Level 1/2 Test #2
- Sat 9/11/21: MWCB Level 1/2 and 3
- Sat 12/4/21: SIP Failover / MWCB Level 1/2 Test #3

Failover Test Details:

The failover to the secondary data center can occur at any time during the 9:00 am - 11:00 am ET time window, to simulate an unexpected real-time event requiring a failover. Participating exchanges will continue to generate test data which will be disseminated over the production multicast lines sourced from the secondary data center.

(Test plan below.)

Upon failover to the secondary data center OPRA Data Subscribers will see:

OPRA Failover Messaging Description
Category H, Type K, Reset Multicast Line Sequence Number Control messages (3x)
Category H, Type P, Disaster Recovery Data Center Activation Control messages
Zero quotes for all securities
OPRA trades and quotes after the exchanges fail over

Testing Coordination:

To coordinate testing and to **provide oral or written confirmation of testing (as required of all Data Subscribers)**, please register as follows:

- E-mail your name, organization name, phone number to:
  CTA-OPRA-Support@siac.com

Data Subscribers who receive OPRA from connectivity service providers other than ICE Global Network (IGN) must contact their connectivity service providers to coordinate testing.

Documentation:

Please reference the latest OPRA Output Multicast Specifications which may be obtained from **www.opraplan.com**.

OPRA SIP Server Failure/Data Center Failover Test Script
Test Date & Time: May 1, 2021, 9:00am to 11:00am ET (approximate)

				Hourly Test Script	
#	Time	Test Category	Action By	Test Description	Expected Results
1	6:10:00 AM	SOD	SIP	OPRA Regular Session Start of Day messages sent	Data Subscriber to capture the Start of Day messages
2	6:30:00 AM	Open Interest Message	SIP	Open Interest messages sent over OPRA Extendes Session	Data Subscribers to capture the Open Interest messages
3	6:45 - 9:30 AM	Participant Connectivity/Input	Participants	Participants to establish connectivity for OPRA Input lines	Participants establish connections
				Participants to start submitting Options data	Quotes and trades accepted and disseminated via the multicast output lines
4	9:15:00 AM	Output Publication Primary Process Failure	SIP	Simulate Primary Output Publication process failure	-- Subscribers may see a momentary outage in data flow on the output lines
				Data Publication to switch to backup process	-- Subscriber can request retransmission for any gaps
5	9:30:00 AM	Market Open	SIP	Market Open	
6	9:30 - 10:00 AM	Input server failure at Primary Data Center	SIP	SIP to simulate primary input line failure of a subset of OPRA input lines for each Participant	Participants will see primary input lines disconnected
			Participants	For the affected lines, Participants to reconnect to SIP on their backup lines and establish sequence numbers by sending Block Sequence Number Status Inquiry Request (Category N / Type L and Message Count Status Inquiry Request (Category N / Type R). Participants to start submitting Quote and Trade data	-- SIP to accept input connections and respond with Block Sequence Response (Category N / Type M) and Message Count Status Response (Category N / Type S) -- Quotes and trades accepted and disseminated on the output lines
7	10:00 - 11:00 AM	Site failover from Primary Data Center to Disaster Recovery Data Center	SIP	OPRA to simulate Production site failure	Disconnection of all OPRA and Retransmission input lines for all Participants and Data Subscribers Subscribers: disruption in output multicast data dissemination for all lines
				OPRA to failover to DR site and publish following messages: 1) Reset Block Sequence Number (Category H Type K) for each OPRA line to be generated at 750M 2) Disaster Recovery Data Center Activation (Category H Type P) message 3) Zero Quotes (Quote messages with Zero Price and Size) on behalf of all participants across all symbols	-- Subscribers to receive and process sequence reset message (Category H / Type K) disseminated from the DR site -- Subscribers to receive the new Disaster Recovery Site Activation Control Message (Category H, Type P) over the multicast lines -- Subscribers to receive the zero quotes disseminated upon failover Note: This is not an actual gap that can be retransmitted
				OPRA to enable input lines and Retransmission lines of the DR site	DR Input IP/Ports available to establish connections
			Participants	Participants to reconnect to SIP input IP/ports on OPRA DR site and establish sequence numbers by sending Block Sequence Number Status Inquiry Request (Category N / Type L and Message Count Status Inquiry Request (Category N / Type R).	-- SIP to accept input connections and respond with Block Sequence Response (Category N / Type M) and Message Count Status Response (Category N / Type S) -- Quotes and trades accepted and disseminated on the output lines
				Participants to start submitting Options data from the latest Sequence Numbers	-- Subscribers to accept Quotes and trades disseminated on the output lines. -- Subscribers can request Retransmission for any gaps via the retransmission lines on the DR site.
			SIP	OPRA to recover Production site for redundancy	
8	11:00:00 AM			End of test	