

Futures Industry Association

Business Continuity and Disaster Recovery Test Briefings

September 13, 2017

“DR XIV”



Moderated by
Steve Proctor, FIA

AGENDA

- I. Introduction and Welcome
- II. Testing Goals and Objectives
- III. Review of Testing Protocol
- IV. Business Continuance Testing
- V. Participating Markets
- VI. Open Discussion – Test Preparations
- VII. Timeline and Key Dates

I. INTRODUCTION AND WELCOME

| | |
|--|---|
| Camara Central de Riesgo Contraparte (CRCC) Oscar Mauricio Modera Rojas | Minneapolis Grain Exchange: Todd Posthuma |
| CBOE Futures Exchange (CFE): Dushone Embrey-Thomas | Montreal Exchange / CDCC: Costa Angelakos, Omar Awwad |
| CME Group: Don Moore | Nodal Exchange: Jason Jernigan |
| Eris Exchange: Nick Perak, Chris White | OCC: John Kobos |
| Eurex: Wolfgang Deiseroth | OneChicago: Helen Kitching, Sean Johnson |
| ICE Exchanges / ICE Clear US / ICE Clear Credit / ICE Clear Canada / ICE Clear EU / ICE Clear SG Erik Iodice, Kristin Werner, Jocelyn Ward, Wenzel Lieb, Andrey Kalita, Cheung Kwok | Traiana: Moran Yellin |
| LCH ClearNet: Gino DiCarlo | TrueEX: Diane Sweeney, Kyle O'Donnell |
| MEFF: Arturo Piñera | |

II. TESTING GOALS AND OBJECTIVES

- Test the ability to conduct critical business functions (order entry through clearing) from alternate/back-up facilities simultaneously (i.e., business continuance)
- Test disaster recovery capabilities among futures commission merchants, back-office service providers, recovery services providers and trading system vendors
- Test the connectivity between exchanges, clearinghouses and their constituents' back-up facilities ("back-up to back-up"), and confirm member firms' ability to send/receive information to/from their back-up facilities/interfaces
- Test end-to-end processing by exchanges through to, and including clearing houses; process actual test trades and produce test end of day reports with the test data.

TESTING GOALS AND OBJECTIVES ... Continued

- Enter a small but meaningful sampling of orders and trades, which will be carried out by a limited number of essential personnel from recovery sites or alternate work locations
- Confirm the receipt/transmission of information to/from clearing members
- Transmit key clearing reports and information to clearing firms to verify “round-trip” communications.

III. REVIEW OF TESTING PROTOCOL

- Exchanges will specify products available for order entry/trading
- All exchanges will use their electronic trading venues for the test and will process test data through to end-of-day reports for clearing members. Testing will take place between 9:00 AM and 3:00 PM EDT, unless otherwise specified.
- The FIA will manage the test via an open conference bridge
- Member firms will confirm connectivity with their respective exchanges/clearinghouses:
 - Pre-test connectivity testing will be offered, as applicable
- Unless noted, firms will execute a pre-defined script of orders, and firms will use test accounts.

REVIEW OF TESTING PROTOCOL (Cont'd)...

- Exchanges will generate fill reports on the orders
- All firms will report results and confirm post-test production connectivity to the respective exchanges
- Test plans will be distributed by the exchanges and will also appear on the FIA DR Test web portal at <https://bcp.fia.org/events/2017-fia-disaster-recovery-test>

IV. BUSINESS CONTINUITY TESTING

- All participants are encouraged to use the test date to exercise their business continuity capabilities
- Firms, vendors, exchanges, clearing houses and swap execution facilities should manage the test, enter orders and have staff work from their alternate work sites
- Business continuity plans should be reviewed; those personnel that would be required to either report to an alternate work site – or work remotely from home - should do so.
- As part of the registration process, firms will be asked if they plan to have staff work remotely and from what city locations.

**V. PARTICIPATING
EXCHANGES, CLEARING
HOUSES,
SWAP EXECUTION FACILITIES
AND
CREDIT HUBS**

BGC Partners INC

Objectives:

To test the ability of member firms to conduct business based on alternate connectivity and/or back-up facilities with BGC.

Assumptions:

- The test is intended to confirm connectivity and verify data transmission

Products/Symbols Available:

- BGC Rates
- BGC Forex
- Treasury Swaps
- BGC Cash

Scope of Test Plan:

All Production logins/access will be available for use during the test.

System Availability:

- 9am-12am ET

BGC Partners INC

Support:

For support, verification of screen prices or trade executions please contact the Support

Desk @ 212-610-2300.

Connectivity

If member firms do not have alternate or back-up facilities to BGC, they have the option to connect to us via the Internet. For any questions, please contact the Support Desk.

Levels of Successful Connectivity Tests:

- I. Receipt of data on BGCTrader GUI or in-house applications. Verifying connectivity to BGC

CAMARA DE RIESGO CENTRAL DE CONTRAPARTE (CRCC)

- On October 14 CRCC will fail-over the Colombia XV production data center to the Ortezal back up data center following manuals and procedures.
- Test participants will include Bolsa de Valores de Colombia (BVC), local broker firms and the Colombia Central Bank
- BVC and the firm communications will be re-directed to the back up data center
- On October 17th, all the production systems will be open in the backup datacenter.
- Scripts are no required because all the affiliates are going to participate and the operations will be real.
- Testing will take place between Monday October 17th to Friday October 20th .

CBOE FUTURES EXCHANGE (CFE)

- Will use CBOE Command back up ETS
- Trade entry via scripts:
 - Products to be traded: VIX futures
 - Firms are also encouraged to test Web-based applications such as Market Replay and Risk Controls.
- Pre-test requirement - Users must register via the FIA website and establish back-up connectivity to CFE via the CBOE API Client Relations Group
- Order entry systems will reflect October 14th trade date.
- Test Scripts will be available by no later than July 17th. All registered firms will be sent the test script along with their registration acknowledgement.

CBOE FUTURES EXCHANGE (Cont'd)...

- The session will open at 9:30 AM EDT.
- Transmission of trades to OCC via MQ and File transfers to/from OCC via SFTP.
- Transmission of regulatory data to NFA via SFTP.
- Pre-test connectivity tests will be offered on an ad-hoc basis. Please contact us to schedule a date/time.
- Contact CBOE Client Relations Group with any connectivity related questions: 312- 786-7300.
- Dushone Embrey-Thomas contact info:
 - 312 786-8816, embreyd@cboe.com

CME GROUP

Test Scope:

- The primary Chicago data center houses all CME Group production applications, CME Globex, and Clearing as well as Co-location services. The out-of-region data center houses Disaster Recovery (DR) services and will be accessible according to the failure scenarios highlighted in the following 2 scenarios. **Please note that the CME Group utilizes a Single IP for firms connectivity to MQ and a Single DNS name (sftpng.cmegroup.com) for firms connectivity to sFTP for production and DR environments.**
- This 2 scenario approach highlights the potential scenarios that could impact customer connectivity during a disaster in Chicago. In both scenarios Clearing and Globex will be available via the disaster recovery facility.

CME GROUP (Cont'd)...

Scenario 1: In Region: Chicago Metropolitan Disaster:

The primary CME Group data center and redundant access node have been forced to cease operations. All applications will begin functioning in the CME Group out-of-region data center and all Chicago-based connectivity solutions, including GLink and LNET, are inoperable. Customer connectivity that is not dependent on Chicago data centers will be maintained; there will be no changes required by these customers.

Note: GLink and LNET are out of scope in this first scenario, firms that are dependent on Chicago data centers submitting test trades during this window would need to utilize their back-up order routing facilities. This scenario will run for approximately the first 2 hours of the test window (9am to 11 am EDT)

CME GROUP (Cont'd)...

Scenario 2: In Region: Primary Data Center Production Room Failure, Co-location Services Available

During this scenario only the applications and production environments are disabled in the primary data center. All applications will continue functioning in the CME Group out-of-region data center. This scenario also assumes that all carrier and network facilities at the CME Group redundant access node as well as CME Group Co-Location facilities are not impacted by the failure. All methods of customer connectivity will be maintained, **GLink and LNET have been recovered**, and there will be no changes required by the customer. Customers will continue to connect to CME Globex and Clearing applications via production IP addresses.

Note: Glink/LNET have been recovered. Customers will continue to connect to CME Globex and Clearing applications via production IP addresses. LNET has been restored, firms utilizing LNET can test MQ connectivity for the duration of the test. This scenario is scheduled to run for the duration of the test window (11am to 3pm EDT).

- Single IP address/Production IP address for MQ
- Single DNS name for firms connectivity to sFTP
- There will not be any Open Outcry testing

CME GROUP (Cont'd)...

Test Preparation:

- Ping testing will be held on Sept 16th & Sept 23rd from 8:00 a.m. to 1:00 p.m. EDT.
- Firms must register via the FIA website.
- Contact CME Clearing Support (CCS) team at (312) 207-2525 with any questions on MQ IP addresses (same as Prod IP's) or DNS name for sFTP connectivity
- General questions may be directed to the Business Continuity Team -

BCM@cmegroup.com

CME GROUP (Cont'd)...

Support During the Exercise:

- Members should contact the Clearing Support Team (312) 207-2525 to report any issues.
- Members should contact the GLOBEX Control Center at the GCC
Hotline numbers which are: U.S. at +1 800 438 8616, in Europe at +44 800 898 013 or in Asia at +65 6532 5010 to report any trading problems encountered throughout the test

CME GROUP (Cont'd)...

Test Execution - Globex:

a) Verify firm connectivity:

- Clearing DR test window scheduled to begin at 9:00 AM EDT
- Any trades done prior to the start of the test will not be captured.
- October 13th is the valid order entry date
- All fills will be sent back to the Firms with the trade date of October 13th.
- Firms can send a test order in any market

b) Order entry via test script as follows:

- Enter a total of 10 trades.
- Firms should send orders in on 'Floor Only Contracts, like the SPH8 that will be listed on GLOBEX for the test.

– Firms may receive crossed trades and/or trades with other counterparties.

CME GROUP (Cont'd)...

Test Execution - Clearing:

Clearing – 9:00 AM EDT

- a) Trade reporting to firms' back office systems:
 - *Firms will* verify receipt and delete them.

- b) Connect to CME's sFTP server, using the Production DNS Name:
 - 1) Using Friday's data, FTP the PCS and Large Trader reports.
 - *CME staff* will verify receipt and delete them.
 - 2) CME will transmit Thursday's Trade Register and SPAN files.
 - *Firms will* verify receipt of these files and delete them.
 - 3) Connect to FEC/FEC+ via the web-based URL and enter a block trade for 5000 EDH8 @9900.0.
 - *CME staff* will verify receipt of the block trades and delete them.

CME GROUP (Cont'd)...

At the Conclusion of the Exercise:

- Delete any testing files.
- Fail back to your Production environment.
- **Upon test completion firms should contact the GCC at the GCC Hotline numbers which are: U.S. at +1 800 438 8616, in Europe at +44 800 898 013 or in Asia at +65 6532 5010 acknowledging test completion, and then complete/submit the test questionnaire posted on the FIA website to recap the test results. No firm names will be used on the recap report.**

ERIS EXCHANGE

Test Scope:

- Outage Scenario reflects loss of primary matching engine and primary post trade processing system.
- If you're already connecting to CME Group for DR testing, you should see test executions in existing queues.

Test Preparation:

- Firms are encouraged to verify their connectivity to Eris DR systems prior to the formal 2017 FIA Test. Contact the Eris Control Center for particulars and scheduling coordination.
- Firms must register via the FIA website.
- Contact Eris Control Center to receive backup systems connectivity information, 888-587-2699, select 1.
- General questions may be directed to: evan.loftus@erisfutures.com

Support During the Exercise:

- A testing script will be provided by Eris Exchange.
- Members should contact the Eris Control Center during the exercise for any trade related issues, 888-587-2699, select 1.

EUREX

Scenario

- The Eurex scenario used for the FIA DR test 2017 is of such a scale that the whole primary data center facility in Frankfurt becomes inaccessible for physical or virtual access.
- This scenario renders both halves of the Eurex T7 production matching engine, all production gateways located in the primary datacenter, and the customer co-location site offline.
- In such a DR scenario the back-end infrastructure regularly used for Eurex T7 simulation, which resides in a different data center, will be used to serve as the DR production back-end.

EUREX

Scenario Implications

- Due to the nature of the distributed Eurex T7 architecture, interfaces will be configured in varying ways.
- Eurex T7 interfaces whose production infrastructure is solely located in the primary data center will switch to the simulation infrastructure and will need to be accessed via simulation network addresses.
- Other Eurex T7 interfaces whose production infrastructure is distributed across both data centers will be able to continue to use the existing production infrastructure in the DR data center.

EUREX

Test Scope

- During a DR test exercise, production reference data will be used, including User IDs, T7 GUI SSH keys and ETI sessions.
- Changes done to these reference data will **NOT** be copied back to production after the test. It is not advised to perform any changes to this data during the test exercise!
- While order entry, modification and deletion will be possible during the DR test exercise, any order book or trading information created during the DR test exercise will **NOT** be transferred back to production.

EUREX

Available Interfaces

The following T7 interfaces will be available during the DR test exercise:

- Enhanced Transaction Solution (ETI)
- T7 Market Data Service (MDI)
- T7 Enhanced Market Data Service (EMDI)
- T7 GUI
- Reference Data Interface (RDI)
- Reference Data File (RDF)
- Common Report Engine (CRE)

EUREX

Test Execution

Customers participating in the DR test exercise can

- receive market data via MDI, EMDI and T7 GUI
- read reference data via RDI
- receive Reference Data File (RDF) - provided by TKAM on request
- enter orders and quotes via ETI and T7 GUI
- access CRE

EUREX

Interfaces out of Scope

The following interfaces will **NOT** be available in the DR test scenario

- Eurex clearing systems and their interfaces (FIXML Clearing Interface)
- FIX Trading Interface
- Extended Market Data Service
- Enhanced Order Book Interface
- Eurex Market Signals

EUREX

Timeline

- Start of DR scenario test 14:00 CET
- End of DR scenario test 16:00 CET
- Start of prod environment re-connect test 17:00 CET
- End of prod environment re-connect test 18:00 CET
(Prod environment remains up unattended for the rest of the weekend)

Primary Contact

- Technical Key Account Manager (via individual VIP number)

Detailed information

- Announcement via Eurex Circular (to be published end of this week)
- [Update of T7 Disaster Recovery Concept](#) (already published)

ICE EXCHANGE

The ICE Exchange secondary site in Atlanta will be used for the FIA DR Test on Saturday, October 14th

- The following markets/products will be available for testing:
 - ICE Futures US Sugar 11
 - ICE Futures US Dollar Index
 - ICE Futures Europe WTI
 - ICE Futures Europe Three Month Euribor
 - ICE Futures Canada Canola
 - ICE Futures Singapore Mini Brent
- Test markets will follow the schedule below (all times in EDT)
 - 0001 PRE-OPEN
 - 0900 OPEN
 - 1200 CLOSE
- Interface availability:
 - All front-end trading interfaces (WebICE, ICE Block, FIX, Pricefeed)
 - All reporting interfaces (Deal Reports, Position Reports, etc.) will be accurate based on test (and live SPOT/OTC/NGX) trading activity
 - Back-office interfaces NOT available (Credit Management, Clearing Admin, etc.)



IMPORTANT NOTE:

All Spot, OTC, and NGX markets will be open and live throughout the testing. NO testing is permitted in these markets. Any trades entered in these markets are valid trades and will be honored as such.

ICE EXCHANGES (Cont'd) ...

- **Registration and user setup**

- Registration for the ICE Exchange is not required
- All existing customers with valid trading IDs are welcome to participate
- Existing production User ID and password will be used for login
- No test/temporary IDs or access will be provisioned for the FIA DR testing

- **Test administration and support:**

- All participants MUST clean up all backend system data after testing
- No futures trades performed during testing hours will be valid
- At the end of the DR testing period, all futures trade data will be deleted from the ICE Exchange and databases and no record of those test transactions will persist
- The ICE Helpdesk (770-738-2101 Option 1) will be available 0800-1300 ET
- No network, DNS, or IP changes will be required to connect to the ICE Exchange secondary site during the ping test or the FIA DR Test



IMPORTANT NOTE:

All Spot, OTC, and NGX markets will be open and live throughout the testing. NO testing is permitted in these markets. Any trades entered in these markets are valid trades and will be honored as such.

ICE EXCHANGES (Cont'd) ...

- **Clearing Information:**

- All ICE Futures US trades will be submitted to the ICE Clear US secondary site
- All ICE Futures Europe trades will be submitted to the ICE Clear Europe secondary site
- All ICE Futures Canada trades will be submitted to the ICE Clear Canada secondary site
- All ICE Futures Singapore trades will be submitted to the ICE Clear Singapore secondary site

- **Ping test overview**

- Atlanta DR site will be available for the first ping test ONLY (Saturday, 9/9)
- All futures markets will be closed, only ping and system logins will be permitted
- Spot/OTC/NGX markets will be open for production trading – no test trades permitted
- The system will be available for testing between 0900-1200 ET
- The ICE Helpdesk (770-738-2101 Option 1) will be available between 0900-1200 EDT
- No network, DNS, or IP changes will be required to connect to the DR site during the ping test or the FIA DR Test



IMPORTANT NOTE:

All Spot, OTC, and NGX markets will be open and live throughout the testing. NO testing is permitted in these markets. Any trades entered in these markets are valid trades and will be honored as such.

ICE CLEAR - ICUS, ICEU, ICCA, ICSG

ICE operates several Clearing Houses (CHs) globally, each of which will participate in the annual FIA Industry Disaster Recovery testing. The ICE CHs covered within this section are:

ICE Clear U.S. (ICUS)

ICE Clear Europe (ICEU)

ICE Clear Canada (ICCA)

ICE Clear Singapore (ICSG)

- All CMs must register via the FIA registration website
- Trade date will be Saturday, October 14th ; clearing date will be Monday, October 16th.
- Clearing members will use production URLs for the following clearing applications. URLs by CH are listed below.
 - MFT
 - ECS
 - PTMS/ACT
- Trade messaging MQ changes will be completed prior to the start of the test.

ICE CLEARING HOUSES (Cont'd)...

Ping Testing

Clearing members must verify connection to online clearing applications, using production URL's and MQ configurations.

- Ping testing will be conducted on Saturday, 9/9 (all) and Saturday, 9/30 (ICUS only) from 9am-12 pm ET. While this is primarily an opportunity to verify changes necessary for trade messaging over MQ, the clearing applications available online will also be switched over.
- For MQ, Clearing members must verify connection by sending an MQ ping through their channel.

ICE CLEARING HOUSES (Cont'd)...

Test Day

- All times Eastern Time (ET).
- Clearing applications will be available at 9:00 am on Saturday, October 14th.
- Beginning at 12:30 pm, ICE will revert all trading and clearing applications, including MQ channels, back to production.
- An advisory will be sent to test participants and announced on the ICE and FIA bridge calls.
- Clearing members are strongly encouraged to confirm their reconnection to production at the conclusion of the testing.

ICE CLEARING HOUSES (Cont'd)...

Test Cases – Test Day

- Clearing members will log in to post trade management systems (PTMS/ACT) to allocate test trades which have passed through to clearing from the WebICE trading system.
 - Clearing Members will confirm receipt of trade messages over MQ.
 - Clearing Members will log in to ECS to verify connectivity. CMs may enter test banking instructions in ECS (instructions will not be passed to SWIFT).
 - Clearing Members will login to MFT to deliver a test GCM or Large Trader file (GCM, or FIFO for ICCA) and retrieve a Matchoff file and Clearing reports.
-
- CM's are required to complete and submit the checklist of results to each clearing house at the completion of the testing.

ICE CLEARING HOUSES (Cont'd)...

- **ICE Clear US**

ECS (<https://ecs.usclearing.theice.com/trade/login>)

MFT (<https://mft.usclearing.theice.com>)

PTMS (<https://ptms.usclearing.theice.com/client/>)

ACT (<https://act.usclearing.theice.com/AllocateClaim/login.jsp>)

- **ICE Clear Europe**

ECS (<https://ecs.euclearing.theice.com/trade/login>)

MFT (<https://mft.euclearing.theice.com>)

PTMS (<https://ptms.euclearing.theice.com/client/>)

ACT (<https://act.euclearing.theice.com/AllocateClaim/login.jsp>)

ICE CLEARING HOUSES (Cont'd)...

- **ICE Clear Canada**

ECS (<https://ecs.caclearing.theice.com/trade/login>)

MFT (<https://mft.caclearing.theice.com>)

PTMS (<https://ptms.caclearing.theice.com/client/>)

ACT (<https://act.caclearing.theice.com/AllocateClaim/login.jsp>)

- **ICE Clear Singapore**

ECS (<https://ecs.sgclearing.theice.com/trade/login>)

MFT (<https://mft.sgclearing.theice.com>)

PTMS (<https://ptms.sgclearing.theice.com/client/>)

ACT (<https://act.sgclearing.theice.com/AllocateClaim/login.jsp>)

ICE CLEAR CREDIT

ICE Clear Credit will participate in the FIA Disaster Recovery Test on Saturday, October 14th.

- All times are Eastern Time (ET).
- CDS clearing applications will be available at 10:00 am ET.
- Beginning at 1:00 pm ET, ICE will revert all clearing applications back to production.

Ping Testing

Ping testing will be conducted on Saturday, September 9th from 10:00 am ET - 1:00 pm ET. The CDS clearing applications available will be switched over. Participants must verify connection to the CDS clearing applications using the URLs given in the following slides.

ICE CLEAR CREDIT

The following CDS clearing applications will be available through the ICE Clear Credit DR site for Clearing Participants to test:

➤ **Managed File Transfer (MFT):**

- File Download
 - *E.g. Clearing Eligible Trade File, Final Clearing Instruction File*
- File Upload
 - *E.g. Clearing Eligible Trade File*

➤ **ECS Banking System**

➤ **Direct Pricing:**

- FIX Pricing API
- PACE UI

**ICE Clear Credit will be operating from its DR location; therefore all data entered into the DR clearing system will be deleted. CDS Participants that receive data during the test to their production system should take precautions not to process disaster recovery transactions with production data.*

ICE CLEAR CREDIT

Retrieve Data Files via SFTP

CDS Clearing Participants can test the SFTP functionality in order to retrieve data files. ICE Clear Credit will make production data files available to CDS Clearing Participants by using the below:

For Individual Account Users Server/Host Name URL: securemft.icc.theice.com

IP Address: 63.247.112.89

Port: 22

For Service Account Users Server/Host Name URL: mft.icc.theice.com

IP Address: 63.247.112.88

Port: 22

ICE CLEAR CREDIT ECS Banking System

ICE Clear Credit CDS Clearing Participants should make sure they have access to the ECS Banking system. Clearing Participants should login to the below URL to ensure they have access:

Host Name URL: <https://ecs.icc.theice.com/trade/Login>

ICE CLEAR CREDIT

Direct Pricing

ICE Clear Credit CDS Clearing Participants should make sure they have access to the FIX Pricing API and PACE UI. Clearing Participants should login to ensure they are able to establish connectivity to these applications.

FIX Pricing API

Host Name URL: fix.icc.theice.com

IP Address: 63.247.112.95

Port: 10001

PACE UI

<https://pace.theice.com/>

ICE CLEAR CREDIT

At the Start of the Test

Participants are encouraged to contact the ICE Clear Credit CSS staff at (312) 836-6890 prior to the DR test. This will allow the appropriate ICE Clear Credit CSS staff to monitor results and assist participants in the DR test if need be.

At the Completion of the Test

Once a Clearing Participant has determined that all their test objectives have been met, please send an email outlining each item tested along with the results to css@theice.com.

At the completion of the test, Clearing Participants are encouraged to contact CSS at (312) 836-6890 in order to provide ICE Clear Credit with your firm's CDS DR test status.

ICE CLEAR CREDIT

How to Participate

ICE Clear CreditCDS Marketplace Disaster Recovery Test Request Form

To help prepare for a smooth CDS Marketplace disaster recovery test, please complete the following form and provide appropriate contacts. After completion, please return the form by e-mail to css@theice.com.

Will your firm be participating in the ICE Clear Credit Disaster Recovery Test?

Yes ___ No ___

SCM ___ FCM ___

| | |
|-----------|--|
| Firm Name | |
|-----------|--|

| | Contact | Position | Phone | DR Phone |
|-----------|---------|----------|-------|----------|
| Primary | | | | |
| Secondary | | | | |



ICE CLEAR CREDIT

Contacts:

Should you have any questions, please call or e-mail the Client Services and Support Group:

Client Services and Support

312-836-6890

css@theice.com

LCH CLEARNET

Test Scope:

- LCH.Clearnet's DR Test scenario mimics an outage to it's London primary data center
- All SwapClear LTD and MemberWeb system access will be operating via our backup data center
- All customers will be able to reach the backup data center without any changes to their systems as cutover is seamless using the same IP Addresses and access methods
- Ping and Login testing will be available prior to the test date

LCH CLEARNET (Cont'd) ...

Test Preparation:

- A Pre-Test ping and/or login test will be held on September 23rd
- Firms must register via the FIA website
- Contact LCH.Clearnet Support at 1-212-513-8265 with any questions or issues
- General questions may be directed to Gino DiCarlo at gino.dicarlo@lch.com or Ayman Ileiwat at ayman.ileiwat@lch.com

LCH CLEARNET (Cont'd) ...

Support During the Exercise:

- Members should contact the Support Team +44-20-7426-7200 to report any access issues

Test Execution - SwapClear LTD :

- Verify firm connectivity:
 - DR test window scheduled to begin at 9:00 AM EST
 - Members can log in and access Reports via HTTP or SFTP
 - October 13th will be the valid report date
 - Trades should not be entered and data should not be altered during this test

LCH CLEARNET (Cont'd) ...

At the Conclusion of the Exercise:

- Members and the Exchange will fall back to their Primary data center sites
- Members can re-test to LCH.Clearnet's data center with the same IP address and access method
- Members should be able to access reports in the same manner as the test procedure
- Firms can contact Support Team at +44-20-7426-7200 to report any access issues and general questions may be directed to Gino DiCarlo at gino.dicarlo@lch.com

MEFF

- Trade date will be Saturday October 14th, and testing will take place between 12:30 and 15:00 CEST, 06:30 AM and 09:00 AM EDT
- Will use the MEFF production environment SMART ETS
- BME Clearing will also participate in the test
- Members will be able to trade
- During the test, MEFF and BME Clearing will failover to their backup systems
- MEFF will simulate a data center disaster scenario, and the LasRozas's data center computers will be unavailable, including those in co-location and proximity sites

MEFF (Cont'd) ...

- Once the failover is complete, members will be able to continue trading, connected to alternate datacenters and access points
- Members will be able to get reports of their trades
- Back office systems will be prevented to enter this test
- MEFF contacts:
 - Arturo Piñera apinera@grupobme.es (+34 91 709 5500)
 - Enric Padro epadro@grupobme.es (+34 93 412 1128)
 - Jesús Torrecilla jtorrecilla@grupobme.es (+34 93 412 1128)

MINNEAPOLIS GRAIN EXCHANGE (MGEX)

- MGEX will be utilizing MGEX DR systems for the FIA DR test on Saturday, October 14th.
- Clearing Members and Firms must register on the FIA website to participate in the MGEX Clearing test.
- Testing will occur from 8AM – Noon CDT on October 14th.
- Trade date can be either October 13th or 14th.
- All MGEX products will be available for testing.
- Trade Entry via CME Globex® and MGEX Trade Entry Matching System (“TEMS”)
- MGEX Open Outcry trades will be entered in the TEMS system.
- Trades entered for MGEX products into the CME GLOBEX platform and MGEX TEMS will be cleared by MGEX Clearing using the MGEX DR Site.

MGEX (Cont'd)...

- After Trade Entry is completed, trade files (TRES files) will be generated by the MGEX DR Clearing Server and placed on the MGEX DR FTP server. The MGEX DR FTP server is accessible via IP with the same logins and passwords as the production system.
- Participants are reminded to fail back to Production systems at the conclusion of the FIA DR test.
- Connectivity and Ping testing will be available prior to the test and can be scheduled on an ad-hoc basis.
- Firms having technical issues with MGEX Clearing on the day of the test may call the MGEX Clearing group at (800) 827-4746 (option 3 then option 1) or (612) 321-7146 for support.
- Please contact MGEX Clearing group for information or support pertaining to the FIA DR Test. Email: clearing@mgex.com

TMX GROUP – MONTREAL EXCHANGE (MX)

MX will offer two connection periods. An early one that will permit connectivity to the primary site, and a second to access our back-up site.

Times and systems availability will be as follows:

| Time | Access to Primary or back-up system | | Instrument state |
|--------------------------------|-------------------------------------|---------------------------------|-----------------------|
| 7:00 am – 7 :55 AM | Primary | | Pre-open |
| 7:55 – 11 AM* | No access | 7:55 – 9:00 disaster simulation | Market out of service |
| | | 9:00 – 11:00 recovery | |
| Time of recovery until 1:30 PM | Back-up | | 15 minutes - Pre-Open |
| | | | Trading |

*System will be up by 11

TMX GROUP – MONTREAL EXCHANGE (MX)

- **No network, DNS, or IP changes will be required to connect to the DR site during the connectivity test or the FIA DR Test**
- **No trades will occur during the Pre-Opening period**
- **MX will provide automated market volume for bid/offer on selected instruments in the back-up environment**
- **Orders must be entered with a October 14th Trade Date (day orders only)**
- **Broadcast of trades transmitted to firms via SOLA Trading protocols and disseminated via the HSVF**
- **No trades performed during testing hours will be valid**
- **All participants MUST clean up all backend system data after testing**

CANADIAN DERIVATIVES CLEARING CORP. (CDCC)

- CDCC will recover to its DR site
 - Clearing Members will verify connectivity and can send/receive messages
 - No network, DNS, or IP changes will be required to connect to the DR site during the connectivity test or the FIA DR Test
 - Clearing Members must register via the FIA website
 - Will test FTP/Reporting capabilities
 - Will test FIXML capabilities
- Markets will be in Pre-Opening state by 11:00 AM EDT
 - No trades will occur during the Pre-Opening period
 - Pre-Opening and Opening Times will need to be confirmed
 - MX will provide automated market volume for bid/offer on selected instruments
- The market will open at 11:15 AM EDT
 - No trades performed during testing hours will be valid
 - All Clearing Members MUST clean up all backend system data after testing
 - Trades will flow from MX to CDCC's environment
 - Trades & Positions will be available for validation via SOLA® Clearing Manager

MX / CDCC (cont'd)

Important Dates

- Connectivity testing will be offered on September 9th 2017 for both MX and CDCC participants/clearing members

Contacts

- Contact Costa Angelakos with any Montreal Exchange business questions:
514-871-7877
costa.angelakos@tmx.com

- Contact Olivier Leon with any CDCC business questions:
514-787-6476
olivier.leon@tmx.com

NODAL EXCHANGE

- We will failover to the DR site.
- We will change DNS to point at our DR site
 - IP's will change
 - DNS names will remain the same
- Pre-test requirement - Users must register via the FIA website
- Participants will use test logins on accounts that mirror the production accounts
- All exchange activity, clearing activity and test logins will be removed after the test
- Trading date will be October 13th
- Ping testing will be on an ad-hoc basis during September for those signed up via the FIA website.

Nodal Exchange (Cont'd) ...

- All products will be available
- Web, SFTP, and FIX will be accessible
- We will not send emails
- Test trades and orders will be scripted and managed by Nodal Exchange
- We will publish a schedule to registered participants
- For support please call 703-962-9825 or email acctmgmt@nodalexchange.com

OCC

Overview

- OCC's version of the FIA Business Continuity and Disaster Recovery Industry Test will include round trip processing with members and exchanges.
- Similar to last year's test, OCC will simulate a standard business day from market open through positions finalization.
- OCC will support all inbound and outbound communication protocols from our DR environment along with the ENCORE GUI application.
- All data received will be processed and distributed to registered participants according to their registration specifications.

OCC (Cont'd) ...

Test Objectives:

- Test round trip processing with Members and Exchanges including trades, post trades, positions finalization, outbound data distribution and end of day reports
- Test the ability to conduct critical business functions (trades processing through positions finalization) from alternate/back-up/DR facilities simultaneously

OCC (Cont'd) ...

Test Details:

- **Starting Inventory**
 - Product/Contract and Position Inventory for the test will be a snapshot of the production inventory as of “Market Open” Thursday, October 12, 2017
- **Symbols / CUSIP**
 - OCC will support production symbols and CUSIP’s
- **Trade Date**
 - Trade date for the OCC Encore System will be Thursday, October 12, 2017
 - All inbound Exchange Trades will have a trade date of Saturday, October 14, 2017
 - All inbound Member transactions are required to have a trade date of Thursday, October 12, 2017
 - All outbound data from OCC will have a trade date of Thursday, October 12, 2017.
- **Trade Date Processing Note:**
 - *All data processed and distributed by OCC will have the trade date of 10/12/2017. The inbound exchange trades will be received by OCC with a trade date of Saturday 10/14/2017. Upon receipt of the trades from the exchanges, OCC will trigger the trade date to be flipped to Thursday 10/12/2017 for processing. All member data received by OCC or distributed by OCC will have a trade date of Thursday, 10/12/2017.*

General Test Information

| Description | Details |
|--|--|
| Test Registration Required | Yes FIA Industry Test Registration Website https://www.theocc.com/clearing/certification-testing/reg_sci_dr_industry_test_registration.jsp |
| Environment Used For Test | Back-up Environment |
| Advanced Planning & IT/Connectivity Contacts | Karen Glad (Primary) kglad@theocc.com 312-322-2041 Member Services Help Desk 800-621-6072 occDRtest@theocc.com |
| Test Day Contacts | Member Services Help Desk 800-621-6072 Option 1 Support will be available for the duration of the test |
| Availability of Test Day Conference Bridge | No |
| Completion of Test Acknowledgement Protocol | Complete Email Template and Send To occDRtest@theocc.com |

OCC (Cont'd) ...

General Test Information (Cont'd) ...

| Description | Details |
|---|---|
| Systems Supported | Encore, DDS |
| Client Connectivity Configurations | IP and Leased Lines (includes NDM, SFTP & MQ) |
| Production Systems Reset and Test Data Purged | Yes – Prior to Monday opening Firms are responsible for purging test data on their systems |
| Special Registration Requirements | Advanced Registration Required – No Day Of Registration Accepted |
| Special Instructions | OCC will require all firms testing on October 14, 2017 to pre-test connectivity on one of the designated test dates in July, August, or September |
| | |

OCC (Cont'd) ...

Testing Pre-Requisites :

- Participants must register in advance via the FIA website
- Once registered OCC will contact registered participant to provide overview of testing scope and distribute the Industry Test Questionnaire and the 2017 Technical Specification forms which must be filled out and returned to OCC.
- Members can choose to test from Production/Back-up or DR site and must disclose to OCC what site is being used for the test
- Connectivity Testing is required in advance of participation in the Industry Test. OCC will support connectivity testing on the following dates:

| Day/Date | Time (ET) | Connectivity Pre-registration | 2017 Tech Spec Form |
|-------------------------|-----------------------|-------------------------------|---------------------|
| Saturday, July 29, 2017 | 9:00 a.m. – Noon | Required | Required |
| Saturday, Aug 5, 2017 | 9:00 a.m. – 2:00 p.m. | Required | Required |
| Saturday, Sept 9, 2017 | 9:00 a.m. – 2:00 p.m. | Required | Required |

OCC (Cont'd) ...

• Test Schedule

| Exchange Trade Date | Encore Trade Date | Time(ET) | Activity | Inputs to OCC /Outputs from OCC | Description | |
|------------------------|---------------------------------------|-----------------------|---|---------------------------------|---|--|
| Saturday 10/14/2017 | Thursday 10/12/2017 | 7:30 – 9:15 a.m. | Pre-Market Open Activity | N/A | - Resolution of connectivity and start-up issues | |
| | | 9:30 a.m. – 1:00 p.m. | Exchange Mock Trading Cycle | Inputs | - Exchange Trades ¹ | |
| | | | | Outputs | - Real-time Trades DDS – Pends/Rejects (Exchanges) ² | |
| | | | Encore Daily Cycle | Inputs | - Real-time, Batch, GUI Post trades (Members) | |
| | | | | Outputs | - Real-time DDS (Members) | |
| | | 1:00 p.m. | Market Close | | | |
| | | 1:00 -2:00 p.m. | Post Trade Activity | Inputs | - Trade Balancing (Exchanges) - Back-up Trade File (Exchange) - Exchange Price File (Exchange) - Real-time, Batch, GUI Post Trades (Members) | |
| | | | | Outputs | - Real-time DDS (Members) | |
| 2:00 – 4:30 p.m. | Positions Finalization/ End of Day | Outputs | - ORSA DDS (Exchanges) - Batch, Real-time DDS (Members) - External Reports (Members) | | | |

¹ Exchange Trades will be sent to OCC with Trade Date of 10/14/2017, OCC will accept and flip date to match Encore Trade Date 10/12/2017

² OCC Output to Exchanges will have Encore Trade Date 10/12/2017

ONECHICAGO

Background

- Test scripts were published on Monday, August 28th.
- Pre-test connectivity screening was scheduled on Saturday September 9th.
- Ping testing was concurrently held on Saturday September 9th.

ONECHICAGO

Objectives

- Testing the ability to conduct critical business functions (order entry through settlement) from alternate/back-up facilities simultaneously
- Testing disaster recovery capabilities between customers and OneChicago
- Testing the connectivity between customers and OneChicago's DR site beyond basic connectivity testing activities
- Testing end-to-end processing between customers and OneChicago; including connectivity, submitting trades, calculating settlement prices and the dissemination of OneChicago Real-time Market Data (OCTP)

ONECHICAGO

Schedule

| Time (CT) | Activity | Description |
|------------|--------------------------------|--|
| 5:00 a.m. | Application Gateways Available | OneChicago Disaster Recovery applications are available for connections |
| 6:00 a.m. | Product Catalog | OneChicago Ticker Plant will disseminate a product catalog stream for the products as of Friday's trade date over main channel |
| 6:30 a.m. | Exchange Summary | OneChicago Ticker Plant will disseminate the SOD exchange summary message over the main channel |
| 8:30 a.m. | Exchange Mock Trading Cycle | OneChicago Products Open |
| 9:30 a.m. | Mock Trading Complete | OneChicago Products Close |
| 9:45 a.m. | Exchange Summary | OneChicago Ticker Plant will disseminate the EOD exchange summary message over the main channel |
| 10:00 a.m. | EOD Processing at the OCC | Customers should receive DDS messages and see OneChicago trading activity in OCC's Encore |
| 1:00 p.m. | Application Gateways Shutdown | OneChicago Disaster Recovery applications are no longer available for connections |

ONECHICAGO (Cont'd)...

Support Contacts

- Helen Kitching contact info:
 - 312-883-3427, hkitching@onechicago.com
- Sean Johnson contact info:
 - 312-883-3439, sjohnson@onechicago.com

Contact OneChicago with any test related questions:
312-883-3411 bcdrtesting@onechicago.com

TRAIANA LIMIT HUB

- Traiana operates Limit Hub globally, which will participate in the 2017 FIA Industry Disaster Recovery testing.
- The primary Limit Hub data center at NY will be forced to cease operations. Limit Hub will be functioning from the secondary data center in Chicago.
- No action is required by Limit Hub participants as they connect to both primary and secondary instances via the same IP addresses.
- The test scenario will take place between 9:00 AM and 12:00 PM EDT
- Limit Hub participants should contact the support team at LHDRTestSupport@Traiana.com to report any issues

TRAIANA LIMIT HUB (Cont'd) ...

- Traiana switchover to DR site Quarterly and run production environment from Chigaco site for a week / two weeks (meaning LH fully connected and live from DR site to all participants)
- Possible test scenarios:
 - Switch between Prod and DR sites - Transport Layer
- Pre-test requirement –
 - Participating firms must register via the FIA website and coordinate test scripts with Traiana
- At the conclusion of the testing participating firms will confirm reconnection to production

TRAIANA LIMIT HUB COMMUNITY

| FCM | SEF |
|-------------------------------|-----------------------------|
| Bank of America Merrill Lynch | BGC Derivatives Markets |
| Barclays | Bloomberg SEF |
| BNP Paribas | Clear Markets North America |
| Citi | GFI Swaps Exchange |
| Credit Suisse | ICAP SEF |
| Deutsche Bank | ICE Swap Trade |
| Goldman Sacks | Javelin SEF |
| HSBC | MarketAxess SEF Corporation |
| JPMorgan Chase | TeraExchange |
| Morgan Stanley | TradeWeb (TW SEF) |
| Nomura | Tradition (Trad-X) |
| SG Americas | trueEX |
| UBS | Yield Broker |
| Wells Fargo | |

TRAIANA LIMIT HUB (Cont'd) ...

TEST COVERAGE - TRANSPORT

- Will use Limit Hub Secondary Site (Traiana DR at Chicago)
- Pre-test connectivity tests will be offered on an ad-hoc basis. Please contact us to schedule a date/time.
- Contact Traiana Limit Hub Support with any test related questions:
LHDRTTestSupport@Traiana.com
- FIX Heartbeat
 - Prod to Traiana DR
 - DR to Traiana DR
- MQ Ping
 - Prod to Traiana DR
 - DR to Traiana DR

TRAIANA LIMIT HUB (Cont'd) ...

TEST COVERAGE – FCM FLOWS

- Limits and Utilization Update
 - FCM can set / update limits or current utilization
- Limit Check (Trade Certainty) – Orders and Packages
 - Forward Limit Check from SEF to FCM. As FYI or requesting FCM response
- Trade Execution
 - FCM can receive drop copy of SEF executions
- Cleared Trades and Allocations
 - FCM can receive from Hub clearing confirmation or consent requests forwarded from CCPs
 - FCM can allocate on-behalf-of-client via Hub a trade cleared at a suspense account

TRAIANA LIMIT HUB (Cont'd) ...

TEST COVERAGE – SEF FLOWS

- Pre-Trade Limit Check
- Limits Distribution to Push SEFs
- Trade Execution reporting
- Application Level Heartbeats

TRAIANA LIMIT HUB (Cont'd) ...

TEST COVERAGE – CCP FLOWS

- Take Up Flow
 - Hub receives consent request from CCP, responds back to CCP or forwards to FCM
- Bunched Order Flow
 - Hub communicates allocation instruction to CCP for cleared bunched order trade

trueEX

DCM Platform

- GUI hostname will not change
- FIX IP addresses will change
- Test trades to be executed on the 2Y
- Test orders can be posted/received on the 5Y
- Pre-Open 0830, Open 0900, Close 0100 (EDT)

SEF Platform

- GUI hostname will not change
- FIX IP addresses will change
- trueEX support staff to act as respondent for all trades
- Platform Open 0900, Close 0100 (EDT)

trueEX (Cont'd)...

- Trade date will be October 14th 2017
- Firms must register on the FIA website
- Firms must validate connectivity on September 9th or September 23rd
- Test plans to be delivered in July
- Contact trueEX Support with any questions: [\(646\) 786-8526](tel:6467868526), support@trueex.com.

VI. OPEN DISCUSSION - TEST PREPARATIONS

- Discussion with member firms and exchanges as to their state of preparation and readiness:
 - Back-up systems/communications links
 - Order entry and routing
 - Give up processing
 - Clearance and settlement
 - Use of third party service providers
- Major issues or concerns

EXCHANGE AND CLEARING HOUSE TESTING MATRIX

| Exchanges and Clearing Houses | CRCC | CBOE FUTURES | CME GROUP | ERIS EXCHANGE | EUREX EXCHANGE | ICE EXCHANGES ICE CLEAR | LCH CLEARNET |
|--|--------|--------------|-------------------------------|------------------|------------------------|---|------------------|
| Systems | SMART | CBOE Command | GLOBEX Clearing360 SFTP | Eris SwapBook | T7 Trading Platform | Web ICE ECS PTMS/ACT MFT Files FIX Pricing API PACE UI | SwapClear LTD |
| Pre-Test/Ping Testing Dates | Ad Hoc | Ad Hoc | 9/16, 9/23 | Ad Hoc | N/A | 9/9 (all) 9/30 (ICUS only) | 9/23 |
| Successful Login from Members DR Site | Y | Y | Y | Y | Y | Y | Y |
| Trade Date | 10/14 | 10/14 | 10/13 | 10/14 | 10/14 | 10/14 | 10/13 |
| Receipt of 10 Orders from Members Via Pre-Defined Scripts | Y | Y | Y | Y | Y | N | N/A |
| Transmit 10 Fill Reports to Members | Y | Y | Y | Y | Y | N | N/A |
| Receipt of PCS and Large Trader Reports from Members | N/A | N/A | Y | N/A | N/A | Y | N/A |
| Download Previous Day Clearing Reports: Match Off, Report and SPAN Files | Y | N | Y | Y | N | Y | Y |
| All Production Systems Restored, Test Data Re-Set | Y | Y | Y | Y | Y | Y | Y |

EXCHANGE AND CLEARING HOUSE TESTING MATRIX

| Exchanges and Clearing Houses | MEFF | MGEX | NODAL | OCC | OCX | TMX/ CDCC | trueEX |
|--|-------|-----------------------|---------------|-------------------|---------------|--------------|--------------|
| Systems | SMART | GLOBEX TEMS FTP | Live Trade | ENCORE DDS | OCX delta1 | SOLA | DCM PTC |
| Pre-Test/Ping Testing Dates | N/A | Ad Hoc | Ad Hoc | 7/29, 8/5, 9/9 | 9/9 | 9/9 | 9/9, 9/23 |
| Successful Login from Members DR Site | Y | Y | Y | N | Y | Y | Y |
| Trade Date | 10/14 | 10/13 or 10/14 | 10/13 | 10/12 | 10/14 | 10/14 | 10/14 |
| Receipt of 10 Orders from Members Via Pre-Defined Scripts | Y | Y | Y | N | Y | Y | Y |
| Transmit 10 Fill Reports to Member Firms | Y | Y | Y | N | Y | Y | Y |
| Receipt of PCS and Large Trader Reports from Members | N/A | Y | N/A | N/A | N/A | N/A | N/A |
| Download Previous Day Clearing Reports: Match Off, Report and SPAN Files | N/A | Y | Y | Y | Y | Y | N/A |
| All Production Systems Restored, Test Data Re-Set | Y | Y | Y | Y | Y | Y | Y |

CREDIT HUBS TESTING MATRIX

| Credit Hubs | Traiana |
|---|-----------|
| Systems | Limit Hub |
| Pre-Test Ping Testing Dates | Ad Hoc |
| Successful Login from Members DR Site | Y |
| Trade Date | 10/14 |
| Forward limit check requests | Y |
| Receipt of drop copies | Y |
| Receipt of cleared trades and allocations | Y |
| Receipt of trade flow from CCPs | Y |
| Transmit bunched order flow allocation instructions to CCPs | Y |
| All Production Systems Restored, Test Data Re-Set | Y |

VII. TIMELINE AND KEY DATES

| | |
|-------------------|---|
| 9/16/2017 | MQ ping test date (CME Group) |
| 9/23/2017 | Pre-Test Communications Testing |
| 9/27/2017 | Weekly Committee Call |
| 10/4/2017 | Weekly Committee Call |
| 10/13/2017 | All-Hands Call - Day Before the Test |
| 10/14/2017 | Annual Industry Test Day |
| | |
| | |
| | |
| | |

4 WEEKS TO GO !