Part IV

Commodity Futures Trading Commission

17 CFR Chapter I
Concept Release on Risk Controls and System Safeguards for Automated Trading Environments; Proposed Rule

COMMODITY FUTURES TRADING COMMISSION

17 CFR Chapter I

RIN 3038–AD52

Concept Release on Risk Controls and System Safeguards for Automated Trading Environments

AGENCY: Commodity Futures Trading Commission.

ACTION: Concept release; request for comments.

SUMMARY: U.S. derivatives markets have experienced a fundamental transition from human-centered trading venues to highly automated and interconnected trading environments. The operational centers of modern markets now reside in a combination of automated trading systems ("ATSs") and electronic trading platforms that can execute repetitive tasks at speeds orders of magnitude greater than any human equivalent. Traditional risk controls and safeguards that relied on human judgment and speeds, and which were appropriate to manual and/or floor-based trading environments, must be reevaluated in light of new market structures. Further, the Commission and market participants must ensure that regulatory standards and internal controls are calibrated to match both current and foreseeable market technologies and risks. This Concept Release on Risk Controls and System Safeguards for Automated Trading Environments ("Concept Release") reflects the Commission's continuing commitment to the safety and soundness of U.S. derivatives markets in a time of rapid technological change. The Concept Release serves as a platform for cataloguing existing industry practices, determining their efficacy and implementation to date, and evaluating the need for additional measures, if any. The Commission welcomes all public comments.

DATES: Comments must be received on or before December 11, 2013.

ADDRESSES: You may submit comments, identified by RIN 3038–AD52, by any of the following methods:

• *CFTC Web site, via Comments Online: http://comments.cftc.gov.* Follow the instructions for submitting comments through the Web site.

• *Mail:* Melissa D. Jurgens, Secretary of the Commission, Commodity Futures Trading Commission, Three Lafayette Centre, 1155 21st Street NW., Washington, DC 20581.

• *Hand Delivery/Courier:* Same as "mail," above.

• *Federal eRulemaking Portal: http:// www.regulations.gov.* Follow the instructions for submitting comments.

Please submit comments by only one method. All comments should be submitted in English or accompanied by an English translation. Comments will be posted as received to *http:// www.cftc.gov.* You should submit only information that you wish to make available publicly. If you wish the Commission to consider information that may be exempt from disclosure under the Freedom of Information Act ("FOIA"), a petition for confidential treatment of the exempt information may be submitted according to the procedures established in 17 CFR 145.9. The Commission reserves the right, but shall have no obligation, to review, prescreen, filter, redact, refuse, or remove any or all of your submission from *http://www.cftc.gov* that it may deem to be inappropriate for publication, such as obscene language. All submissions that have been redacted or removed that contain comments on the merits of the rulemaking will be retained in the public comment file and will be considered as required under the Administrative Procedure Act and other applicable laws, and may be accessible under FOIA.

FOR FURTHER INFORMATION CONTACT: Sebastian Pujol Schott, Associate Director, Division of Market Oversight, *sps@cftc.gov* or 202–418–5641; Marilee Dahlman, Attorney-Advisor, Division of Market Oversight, *mdahlman@cftc.gov* or 202–418–5264; Camden Nunery, Economist, Office of the Chief Economist, *cnunery@cftc.gov* or 202–418–5723; or Sayee Srinivasan, Research Analyst, Office of the Chief Economist, *ssrinivasan@cftc.gov* or 202–418–5309.

SUPPLEMENTARY INFORMATION:

I. Introduction

U.S. derivatives markets have experienced a fundamental evolution from human-centered trading venues to highly automated and interconnected trading environments. Traditionally, traders and market participants directly initiated, communicated and executed orders, while other personnel provided a range of order, trade processing and back office services. In contrast, automated trading environments are characterized precisely by their high degree of automation, and by the wide array of algorithmic and information technology systems that generate, risk manage, transmit and match orders and trades, as well as systems used to confirm transactions, communicate market data and link related systems through high-speed communication networks. Automated trading environments have conferred a number of benefits upon market participants, including an expanded range of potential trading strategies, and a surge in the speed, precision and tools

available to execute such strategies. In addition to these benefits, however, automated trading environments have also presented challenges unique to their speed, interconnectedness and reliance on algorithmic systems.

In recent years, a number of high-profile system events associated with automated trading have raised public, Commission and industry awareness. For example, on May 6, 2010, major equity indices in both the futures and securities markets lost more than 5% of their value in a matter of minutes when an automated order led to extreme downward price movement and a liquidity crisis in the Chicago Mercantile Exchange's ("CME") E-mini futures contract.[1] In August 2012, a trading firm in the securities markets—Knight Capital Group—submitted a significant number of errant proprietary orders to the New York Stock Exchange ("NYSE"), causing price swings in nearly 150 securities and costing the firm approximately $440 million in the process.[2] Most recently, in August 2013, trading on the Nasdaq stock market was disrupted for three hours due to malfunctions in quote dissemination systems and potential connectivity issues between it and another trading platform's systems. These and other recent events in automated trading environments are discussed in greater detail in section II.C., below.

The Commission has taken steps to address the transition to automated trading and require appropriate risk controls for designated contract markets ("DCMs"), swap execution facilities ("SEFs"), futures commission merchants ("FCMs"), swap dealers ("SDs"), major swap participants ("MSPs") and others. In April 2012, it

adopted final rules requiring FCMs, SDs and MSPs that are clearing members to establish risk-based limits based on position size, order size, margin requirements, or similar factors, and requiring those entities to use automated means to screen orders for compliance with the risk limits when such orders are subject to automated execution. Further, in June 2012, the Commission adopted final rules with respect to DCMs, including requirements that DCMs establish and maintain risk control mechanisms to prevent and reduce the potential for price distortions and market disruptions. Relevant controls cited in the rule include trading pauses and halts under conditions prescribed by the DCM. The Commission adopted similar requirements in its final rules for SEFs in 2013. Finally, the DCM final rules also require risk control requirements for exchanges that provide direct market access ("DMA") to clients.

The Commission has also adopted rules related to trading practices, including trading in automated environments. In July 2011, the Commission adopted final rules codified in 17 CFR Part 180 that, among other things, (i) broadly prohibit manipulative and deceptive devices, *i.e.,* fraud and fraud-based manipulative devices and contrivances employed intentionally or recklessly, regardless of whether the conduct in question was intended to create or did create an artificial price; and (ii) codify the Commission's long-standing authority to prohibit price manipulation by making it unlawful for any person, directly or indirectly, to manipulate or attempt to manipulate the price of any swap, or of any commodity in interstate commerce, or for future delivery on or subject to the rules of a registered entity. Further, section 747 of the Dodd-Frank Wall Street Reform and Consumer Protection Act (the "Dodd-Frank Act")[3] amended the Commodity Exchange Act ("CEA" or "Act") to make it unlawful for any person to engage in disruptive trading practices, and the Commission has provided guidance on the scope and application of the new statutory prohibitions. The Commission's measures to date are summarized in greater detail in section II.B., below. With respect to these measures and others discussed in this Concept Release, the Commission requests public comment regarding any

additional steps, guidance or rulemaking that it should undertake.

Derivatives market participants, including DCMs, FCMs, clearing members and others, have themselves taken a number of steps to manage risks associated with automated trading. The Commission acknowledges these efforts, and, through this Concept Release, seeks public comment on the extent to which measures already in place may be sufficient to safeguard markets in automated trading environments. In particular, section III below summarizes relevant risk controls implemented by one or more market participants; requests comment regarding the extent of their implementation to date; and seeks input regarding whether existing controls would benefit from additional granularity or regulatory standardization.

A. Design of Concept Release and Request for Comments

This Concept Release provides an overview of the automated trading environment, including its principal actors, potential risks, and preventative measures designed to promote safe and orderly markets.[4] The Concept Release was informed by controls already in use today by one or more market participants or exchanges, and best practices, recommendations and concepts developed by the CFTC's Technology Advisory Committee ("TAC"); the Futures Industry Association's ("FIA") Principal Traders Group and Market Access Working Group; the International Organization of Securities Commissions ("IOSCO"); the European Securities and Markets Authority ("ESMA"); and by existing CFTC regulatory requirements. It begins with an overview of automated trading, including the development of automated order generation and execution systems; advances in high-speed communication networks; the growth of interconnected automated markets; the changed role of humans in modern markets; and a discussion of

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[1] *See* "Findings Regarding the Market Events of May 6, 2010, Report of the Staffs of the CFTC and SEC to the Joint Advisory Committee on Emerging Regulatory Issues," September 30, 2010 [hereinafter, the "CFTC and SEC Joint Report on the Market Events of May 6, 2010"], available at *http://www.cftc.gov/ucm/groups/public/@otherif/documents/ifdocs/staff-findings050610.pdf.*

[2] *See* Jenny Strasburg & Jacob Bunge, "Loss Swamps Trading Firm," Wall St. J. (Aug. 2, 2012), available at *http://online.wsj.com/article/SB10000872396390443866640457756477 2083961412.html.*

On October 2, 2012, the Securities and Exchange Commission ("SEC") conducted a roundtable entitled "Technology and Trading: Promoting Stability in Today's Markets" ("SEC Roundtable"). *See* SEC, Notice of Roundtable Discussion: Technology and Trading Roundtable, 77 FR 56697 (Sept. 13, 2012). A transcript of the SEC Roundtable [hereinafter, the "SEC Roundtable Transcript"] is available at *http://www.sec.gov/news/otherwebcasts/2012/ttr100212.shtml.* At the SEC Roundtable, then-SEC Chairman Schapiro raised the Knight Capital incident and noted that "[e]vents like these demonstrate the core infrastructure and technology issues that can be problematic in any market structure." *See* SEC Roundtable Transcript at 11.

[3] *See* Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, Public Law 111–203, 124 Stat. 1376 (2010).

[4] Many of these concepts are in harmony with evolving views of groups responsible for setting standards and developing regulations for other markets around the world. *See, e.g.,* IOSCO Technical Committee, "Regulatory Issues Raised by the Impact of Technological Changes on Market Integrity and Efficiency: Consultation Report" (July 2011) [hereinafter "IOSCO Report on Regulatory Issues Raised by Technological Changes"], available at *http://www.iosco.org/library/pubdocs/pdf/IOSCOPD354.pdf.*

See also ESMA, "Final Report: Guidelines on Systems and Controls in an Automated Trading Environment for Trading Platforms, Investment Firms and Competent Authorities" (December 2011) [hereinafter, "ESMA Guidelines on Systems and Controls"], available at *http://www.esma.europa.eu/system/files/2011–456_0.pdf.*

recent disruptive events in automated trading environments. The Concept Release then addresses these developments through a series of (1) pre-trade risk controls; (2) post-trade reports and other post-trade measures; (3) system safeguards; and (4) additional protections (collectively, "risk controls") that could be implemented by one or more categories of Commission registrants or other market participants.

The Commission seeks extensive public comment regarding each risk control contemplated herein. Commenters should address the effectiveness of each measure, and the degree to which it may already be in use by industry participants. Each commenter should identify the specific risk controls that it already employs. For all measures discussed in this Concept Release, commenters should also address whether there is a need for regulatory action to provide more uniform risk mitigation across CFTC-regulated derivatives markets.[5] Comments that address this question with respect to each proposed risk control and system safeguard individually would be particularly helpful. In all cases, commenters should discuss, and quantify wherever possible, the costs and benefits of the pre-trade risk controls, post-trade reports and other post-trade measures, system safeguards, and other protections discussed in this Concept Release.

The Concept Release recognizes that orders and trades in automated environments pass through multiple stages in their lifecycle from order generation, to execution, to clearing and allocation in proprietary or customer accounts, and steps in between. Accordingly, the Commission requests

comment regarding the appropriate stage at which risk controls should be placed. Potential options include risk controls applicable to: (i) ATSs at the time of order generation; (ii) clearing firms during the order transmission process; (iii) trading platforms prior to exposing orders to the market; (iv) Derivatives Clearing Organizations ("DCOs"); and (v) other risk control focal points, including, for example, third-party "hubs" through which orders or order information could flow to uniformly mitigate risks across one or more trading platforms. Similarly, the Commission requests public comment regarding the appropriate focal point for system safeguards and testing and supervision standards for ATSs.

Finally, the Commission requests comment regarding a series of issues central to its improved understanding and surveillance of trading in automated environments. For example, the Commission requests comments regarding any surveillance tools that it should deploy specifically for the surveillance of automated trading and areas for academic research to improve its understanding of ATSs' impact on market microstructure. Section IV lists all questions raised in this Concept Release.

The Commission's Concept Release reflects fundamental statutory objectives under the CEA. Such objectives include fostering a system of effective self-regulation, deterring and preventing disruptions to market integrity, protecting market participants and "promot[ing] responsible innovation and fair competition among boards of trade, other markets and market participants."[6] Notably, the Commission must ensure that U.S. derivatives markets continue to serve as effective centers of price discovery and risk mitigation, regardless of the technologies employed by trading platforms, market participants, and others. The Commission must further ensure that its regulatory framework and industry practices are fully adapted to the automated technologies of modern derivatives markets.

II. Background

A. Characteristics of Automated Trading Environments

1. Automated Order Generation and Execution

Automated trading environments have developed in tandem with automated systems for both the generation and execution of orders. Systems related to the generation of

orders ("automated trading systems" or "ATSs")[7] operate at the beginning of the order and trade lifecycle; they reflect a set of rules or instructions (an algorithm) and related computer systems used to automate the execution of a trading strategy.[8] ATSs may operate as automated execution programs designed to minimize the price impact of large orders; achieve a benchmarked price (*e.g.,* volume-weighted average price and time-weighted average price algorithms); or otherwise execute instructions traditionally provided by a human agent.[9] They may be employed by a range of market participants, with varying degrees of sophistication, for both proprietary and customer trading. For example, buy-side firms (such as mutual funds and pension funds) may use automated systems and execution algorithms to "shred" one or more large orders (called "parent order") into a series of smaller trades ("child orders") to be executed over time. Such systems can include additional algorithms to micro-manage the size, frequency and timing (often randomized) of child orders. In addition to automated execution, ATSs may also operate market-making programs; opportunistic, cross-asset and cross-market arbitrage programs; and a number of other strategies.

In Commission-regulated markets, orders generated by ATSs are ultimately transmitted to DCMs that have themselves become automated systems for the matching and execution of orders. Broadly, these trading platforms consist of a front-end to which market participants connect and communicate using standardized messaging formats, a matching engine that automatically matches orders to buy and sell, and a back-end that automatically provides all market participants with a market feed. Trade flows may make use of straight-through processing, where the entire trade execution process occurs without intermediation from humans, thereby

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[5] In this regard, the Commission emphasized in the preamble to its final rules for part 38 that the efficacy of risk controls depends in part on the proper functioning of electronic systems, and that "the Commission may address electronic system testing, controls, and supervision-related issues in a subsequent proceeding." *See* Commission, Final Rule: Core Principles and Other Requirements for Designated Contract Markets, 77 FR 36612, 36638 n.298, 36648, n.389 (Jun. 19, 2012) [hereinafter, the "DCM Final Rules"].

Similarly, the system safeguards contemplated herein for ATSs are an outgrowth of the basic requirement in § 23.600(d)(9) that SDs and MSPs conduct testing and supervision of trading systems. There again, the Commission indicated that further measures would be forthcoming by stating that it "anticipate[d] addressing the related issues of testing and supervision of electronic trading systems and mitigation of the risks posed by high frequency trading." *See* Commission, Final Rule: Swap Dealer and Major Swap Participant Recordkeeping, Reporting, and Duties Rules; Futures Commission Merchant and Introducing Broker Conflicts of Interest Rules; and Chief Compliance Officer Rules for Swap Dealers, Major Swap Participants, and Futures Commission Merchants, 77 FR 20128, 20141 (Apr. 3, 2012).

[6] *See* CEA section 3(b); 7 U.S.C. 5(b).

[7] While the Commission has no regulatory definition of ATS, the term is generally understood to mean a computer-driven system that automates the generation and routing of orders to one or more markets. Other elements of an ATS may also include systems for analyzing market data as a precursor to order generation, managing orders for conformance with established risk tolerances, receiving confirmations of orders placed and trades executed, etc. Section III.E.4. of this Concept Release seeks public input regarding whether the Commission should formally define ATS and if so, how ATS should be defined.

[8] *See* IOSCO Report on Regulatory Issues Raised by Technological Changes, *supra* note 4, at 10.

[9] *See* John Bates, "Algorithmic Trading and High Frequency Trading Experiences from the Market and Thoughts on Regulatory Requirements" (July 2010), available at *http://www.cftc.gov/ucm/groups/public/@newsroom/documents/file/tac_071410_binder.pdf.*

dramatically reducing the amount of time required to execute each transaction. The evolution from manual trading in open-outcry pits to electronic trading platforms is in many cases substantially complete.

An established body of data indicates the importance of electronic and algorithmic trading in U.S. futures markets. In 2012, approximately 91.50% of exchange trading volume in U.S. futures markets was executed electronically.[10] Estimates indicate that algorithmic trading first accounted for at least 50% of orders in 2009,[11] and accounted for over 40% of total trading volume in 2010.[12] By the end of the first quarter of 2010, ATSs accounted for over 50% of trading volume in a number of significant product categories at CME Group, Inc.'s ("CME Group") DCMs.[13] For example, ATSs accounted for approximately 51% of trade volume in E-mini S&P 500 futures and 69% of trade volume in EuroFX futures.[14] Increased automation in both order generation and matching, combined with the exponentially faster communication networks discussed in section II.A.2., below, has in many cases reduced the trade lifecycle to as little as a few milliseconds. As a result, high-frequency trading ("HFT") strategies have also become an increasingly important component of automated trading environments.

The Commission is working diligently to understand and keep pace with the growth of ATSs and HFT in its regulated markets. The TAC, for example, has worked to define HFT and received a definition of HFT from its working group panel of experts. The attributes of HFT, according to the TAC's working group, include:

(a) Algorithms for decision making, order initiation, generation, routing, or execution, for each individual transaction without human direction;

(b) low-latency technology that is designed to minimize response times,

including proximity and co-location services;

(c) high speed connections to markets for order entry; and

(d) recurring high message rates (orders, quotes or cancellations) determined using one or more objective forms of measurement, including (i) cancel-to-fill ratios; (ii) participant-to-market message ratios; or (iii) participant-to-market trade volume ratios.[15]

In addition, the TAC's working group described automated trading as "cover[ing] systems employed in the decision-making, routing and/or execution of an investment or trading decision, which utilizes a range of technologies including software, hardware, and network components to facilitate efficient access to the financial markets via electronic trading platforms." [16] Effectively, HFT is a form of automated trading, but not all automated trading is HFT.[17]

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[15] *See* TAC Subcommittee on Automated and High Frequency Trading, Working Group 1, Presentation to the TAC (Oct. 30, 2012), available at *http://www.cftc.gov/ucm/groups/public/@ newsroom/documents/file/tac103012_wg1.pdf.* In addition, the TAC Subcommittee on Automated and High Frequency Trading, Working Group 1, described high frequency trading as a mechanism used by a variety of trading strategies, including, but not limited to, liquidity provision and statistical arbitrage.

[16] *See id.*

[17] In March 2013, the German parliament approved legislation on high frequency trading (the "HFT Act"). *See* Hans-Edzard Busemann, "German upper house approves rules to clamp down on high-frequency trading," Reuters (March 22, 2013), available at *http://uk.reuters.com/article/2013/03/ 22/uk-germany-trading-idUKBRE92L0L820130322.* The legislation defines high frequency trading generally as follows: The sale or purchase of financial instruments for own account as direct or indirect participant in a domestic organized market or multilateral trading facility by means of a high-frequency algorithmic trading technique which is characterized by (i) the usage of infrastructures to minimize latency times, (ii) the decision of the system regarding the commencement, creation, transmission or execution of an order without human intervention for single transactions or orders, and (iii) a high intraday messaging volume in the form of orders, quotes or cancellations. *See* BaFin (Federal Financial Supervisory Authority), "High-frequency trading: new rules for trading participants" (March 26, 2013) (including Workshop on High Frequency Trading Act Presentations dated April 30, 2013 and Frequently Asked Questions Relating to the High Frequency Trading Act dated March 22, 2013) [hereinafter, the "BaFin HFT Materials"], available at *http:// www.bafin.de/SharedDocs/Veroeffentlichungen/ EN/Meldung/2013/meldung_130322_hft-gesetz_ en.html?nn=2821494.*

The German HFT Act also defines algorithmic trading. The HFT Act's definition is generally as follows: Trading with financial instruments such that a computer algorithm determines automatically the individual order parameters without being merely a system for the transmission of orders to one or several trading venues or to confirm orders. Order parameters within the meaning of the preceding sentence are decisions whether the order is given, the timing, price and quantity of an order

In this regard, the Commission is aware that instability in automated trading environments may be precipitated by ATSs regardless of whether they employ high-frequency or other trading strategies. Accordingly, the risk controls, system safeguards and other measures contemplated for ATSs in this Concept Release do not distinguish on the basis of ATSs' trading strategies. However, the Commission is interested in better understanding HFT and whether it should receive different regulatory attention than ATSs in general. The Commission requests comment on the following questions regarding HFT and related topics:

1. In any rulemaking arising from this Concept Release, should the Commission adopt a formal definition of HFT? If so, what should that definition be, and how should it be applied for regulatory purposes?

2. What are the strengths and weaknesses of the TAC working group definition of HFT provided above? How should that definition be amended, if at all?

3. The definition of HFT provided above uses "recurring high message rates (orders, quotes or cancellations)" as one of the identifying characteristics of HFT, and lists three objective measures (i) cancel-to-fill ratios; (ii) participant-to-market message ratios; or (iii) participant-to-market trade volume ratios) that could be used to measure message rates. Are these criteria sufficient to reliably distinguish between ATSs in general and ATSs using HFT strategies? What threshold values are appropriate for each of these measures in order to identify "high message rates?" Should these threshold values vary across exchanges and assets? If so, how?

4. Should the risk controls for systems and firms that engage in HFT be different from those that apply to ATSs in general? If so, how?

2. Advances in High-Speed Communication Networks and Reductions in Latency

Automated trading environments are also characterized by connectivity and infrastructure solutions that enable trading platforms to process orders and execute trades at ever increasing speeds, and enable market participants (including ATSs) to communicate with platforms at ever decreasing latencies.[18]

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[10] This figure represents transactions executed competitively on DCM trading platforms and not off-exchange transactions such as block trades.

[11] *See* Paul Zubulake & Sang Lee, *The High Frequency Game Changer* at 84, fig. 6.3 (John Wiley & Sons, Inc. 2011) (source of data: Aite Group).

[12] *See* Barry Johnson, *Algorithmic Trading & DMA: An Introduction to Direct Access Trading Strategies* at 78, fig. 3–11 (4Myeloma Press 2010) (source of data: Aite Group).

[13] *See* CME Group, "Algorithmic Trading and Market Dynamics" (July 15, 2010) at 2, available at *http://www.cmegroup.com/education/files/Algo_ and_HFT_Trading_0610.pdf.* At the time, the CME Group operated four DCMs: the Chicago Mercantile Exchange, the Chicago Board of Trade, the New York Mercantile Exchange ("NYMEX"), and the Commodity Exchange.

[14] *See id.*

or how the order will be executed with limited or no human interference. *See id.* As explained in footnote 103 below, the HFT Act also introduces a licensing requirement.

[18] Latency means "the time it takes to learn about an event (*e.g.,* a change in the bid), generate a

Notably, however, such capabilities require equally sophisticated risk management systems whose speeds are commensurate with those of low-latency order generation and trade execution systems. Public data from one exchange group, for example, indicates that roundtrip trade times on its trading platform fell from 127 milliseconds in 2004 to 4.2 milliseconds in 2011.[19] Another exchange group reported in 2010 that its average blended transaction time in futures and OTC markets was 1.25 milliseconds.[20] Advances in trading speeds are partly due to the development of dedicated fiber-optic and microwave communications networks that have dramatically reduced latency across large distances. As of 2012, networks were being developed to reduce roundtrip messaging between New York and London from 65 milliseconds to 60 milliseconds.[21] In March 2013, CME Group Inc. and Nasdaq OMX Group Inc. announced plans to launch a wireless network that will provide roundtrip messaging between New York and Chicago in 8.5 milliseconds.[22]

 Two common methods for reducing latency are co-location and proximity hosting, defined as the placement of a firm's trading technology in close proximity to the trading platform. They may be offered directly by an exchange or by a third-party service provider. Co-location denotes those connectivity solutions hosted by the exchange itself, while proximity hosting indicates services offered by third parties.[23] In

2010, the Commission published in the **Federal Register** a Notice of Proposed Rulemaking to require DCMs and others that offer co-location and/or proximity hosting to offer such services on an equal access basis, ensure that fees are uniform and non-discriminatory, and provide information about the latency for various connectivity options ("co-location rulemaking").[24] The Commission intends to finalize the co-location rulemaking by the end of the year.

Another important latency-reducing advance in connectivity is DMA. For purposes of this Concept Release, DMA is defined as a connection method that enables a market participant to transmit orders to a trading platform without reentry or prior review by systems belonging to the market participant's clearing firm. DMA can be provided directly by an exchange or through the infrastructure of a third-party provider. In all cases, however, DMA connectivity implies that a market participant's order flow is not routed through its clearing firm prior to reaching the trading platform.[25]

Investment in high-speed communication networks and other technologies to reduce latency reflects the premium that some market participants place on speed relative to their competitors. Reductions in latency may be appropriately achieved through improvements in a range of technologies for the generation, transmission and execution of orders or management of other data. However, there are also incentives for market participants to reduce latency by minimizing pre-trade risk controls and other safeguards that might otherwise introduce unwanted delays. While latency-based incentive structures have promoted evident technological innovation in many derivatives markets, they can also lead to a competitive race to the bottom—a concern already expressed by some market participants.[26] A separate

concern is that market participants may simply engage in trading at speeds greater than the speed of their risk management systems. In a trading environment where a single algorithm can submit hundreds of orders per second, risk management systems operating at slower speeds could allow an algorithm that is operating in unexpected ways to disrupt one or more markets.

5. Discussions on latency often focus on the how quickly an exchange processes orders, the time taken to submit orders, and how quickly a firm can observe prices of trades transacted on the exchange. The Commission is interested in understanding whether there are other types of messages transmitted between exchanges, firms and vendors wherein differences in latency could provide opportunities for informational advantage. Recent press reports have highlighted such advantages in the transmission of trade confirmations by a specific exchange.[27] Are there other exchanges and trading venues where similar differences in latency exist? The Commission is interested in understanding whether the extent of latency in any such message transmission process can have an adverse impact on market quality or fairness. Should any exchanges, vendors and firms be required to audit their systems and process on a periodic process to identify and then resolve such latency?

3. Rise of Interconnected Automated Markets

In addition to greater automation and decreased latency, derivatives markets are increasingly characterized by a high degree of interconnection. ATSs and algorithms deployed to trade particular products often interact directly and indirectly with ATSs and algorithms active in other markets and jurisdictions. Increased interconnectedness is facilitated by electronic access to real-time pricing information, automated order execution, and some standardization in communication protocols at various

response, and have the exchange act on the response.'' *See* Joel Hasbrouck & Gideon Saar, ''Low-Latency Trading'' (May 2013) at 1, available at *http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1695460.*

[19] *See* CME Group, ''Oversight of Automated Trading at CME Group'' (March 29, 2012) at 4, available at *http://www.cftc.gov/ucm/groups/public/@aboutcftc/documents/file/tacpresentation032912_cme.pdf.*

[20] *See* IntercontinentalExchange, ''2010 Annual Report,'' at 26, available at *http://files.shareholder.com/downloads/ICE/1747226327x0x456112/BF6F428C-F8B3-4835-B22C-3F350FF13B89/ICE_2010AR.pdf.* IntercontinentalExchange indicated that it measures round trip performance end to end within its data center and through its matching engine.

[21] *See* Matthew Philips, ''Stock Trading is About to Get 5.2 Milliseconds Faster,'' BloombergBusinessweek (Mar. 29, 2012), available at *http://www.businessweek.com/articles/2012-03-29/trading-at-the-speed-of-light.*

[22] *See* Jacob Bunge, ''CME, Nasdaq Plan High-Speed Network Venture,'' Wall St. J. (Mar. 28, 2013), available at *http://online.wsj.com/article/SB10001424127887324685104578388343221575294.html.*

[23] *See* FIA Market Access Working Group, ''Market Access Risk Management Recommendations'' (April 2010) at 4 [hereinafter, ''FIA Market Access Recommendations''], available at *http://www.futuresindustry.org/downloads/Market_Access-6.pdf.*

[24] *See* Commission, Notice of Proposed Rulemaking: Co-Location/Proximity Hosting Services, 75 FR 33198 (Jun. 11, 2010).

[25] The Commission has taken steps to mitigate the risk associated with DMA. Rule 1.73, passed by the Commission in April 2012, requires FCMs that are clearing members to pre-screen orders of DMA clients against risk limits that are established by the FCM. *See* 17 CFR 1.73(a)(2)(i). *See* additional discussion in section II.B.

[26] As noted by FIA's Market Access Working Group, for example: ''[p]re-trade risk controls have become a point of negotiation between trading firms and clearing members because they can add latency to a trade.'' *See* FIA Market Access Recommendations, *supra* note 23, at 8.

Similarly, the TAC's Pre-Trade Functionality Subcommittee noted that latency is a key area where trading firms and brokers are competing to gain an advantage. *See* TAC Pre-Trade

Functionality Subcommittee, ''Recommendations on Pre-Trade Practices for Trading Firms, Clearing Firms, and Exchanges Involved in Direct Market Access'' (March 1, 2011) at 2 [hereinafter, ''TAC Pre-Trade Functionality Subcommittee DMA Recommendations''], available at *http://www.cftc.gov/ucm/groups/public/@swaps/documents/dfsubmission/tacpresentation030111_ptfs2.pdf.*

[27] *See* Scott Patterson, Jenny Strasburg & Liam Pleven, ''High-Speed Traders Exploit Loophole,'' Wall St. J. (May 1, 2013), available at *http://online.wsj.com/article/SB10001424127887323798104578455032466082920.html.*

trading platforms.[28] ATSs can quickly execute strategies across multiple markets within very short periods of time. Often, cross-market activity is driven by latent arbitrage opportunities and faster access to multiple markets has led to a proliferation of strategies that seek to identify and trade on the basis of these relationships.[29]

Increased interconnectedness encourages price efficiencies when economically identical or related contracts are traded on multiple exchanges. However, it also increases the speed with which a disruption on one trading platform, or within one ATS or algorithm, can impact related markets. For example, a trading platform may experience changes in the prices, spreads or volatility of one or more of its products due to errors in an ATS or algorithm active in its markets. Even if this algorithm does not trade elsewhere, such changes are likely to quickly impact the prices, spreads, and volatility of related products on other platforms, as automated systems attempt to arbitrage price differences. The potential result is a cascading series of market disruptions, brought about by the malfunction of a single ATS or algorithm trading on a single platform.

Transmission effects such as this are illustrated by events like the May 6, 2010 "Flash Crash." On that day, major equity indices in both the futures and securities markets fell over 5% in minutes before recovering almost as quickly. After investigation by both the Commission and the SEC, it was found that a fundamental seller utilized an automated execution algorithm to sell 75,000 E-mini contracts (valued at approximately $4.1 billion) over an abbreviated time interval. The algorithm placed orders based on recent trading volume but was not programmed to take price or time into account; because of this lapse, a feedback loop triggered continued orders from the algorithm even as prices moved far beyond traditional daily ranges. Like the

hypothetical example provided above, these declines in the derivatives market quickly filtered over to different, but closely related, products on many other exchanges.[30] Soon after the initial moves in the E-mini contract, similar extreme volatility was experienced by the S&P 500 SPDR exchange traded fund and by many of the 500 underlying securities which make up the index itself.

In response to the May 2010 flash crash, regulatory authorities and market participants have taken steps to address volatility in U.S. markets, including trading pauses and halts that operate as "circuit breakers." For example, in May 2012, the SEC approved a "limit up-limit down" mechanism in which a price band is set at a percentage level above and below the average price of the stock over the immediately preceding five-minute trading period.[31] If the stock's price does not naturally move back within the price bands within 15 seconds, there will be a five-minute trading pause. The limit up-limit down mechanism began implementation in April 2013, beginning with all stocks in the S&P 500 and Russell 1000 and select exchange traded products.

In addition, the SEC approved updates to market-wide circuit breaker rules that, when triggered, halt trading in all exchange-listed securities in U.S. markets. Among other things, the new rules lower the percentage-decline thresholds for triggering a market-wide trading halt. The thresholds (Level 1 (7%), Level 2 (13%), and Level 3 (20%)) are set at levels calculated daily based on the prior day's closing price of the S&P 500 index.[32] To be consistent with these circuit breakers, the CME Group, effective April 8, 2013, reduced the price limit levels for CME and CBOT U.S. equity index futures to 7%, 13% and 20%.[33] When a trading halt is declared in the primary securities market in accordance with these levels, trading in the S&P 500 index futures contracts will be halted at the CME. When trading in the primary securities

market resumes after any such halt, trading in the S&P index futures contracts will resume. Similar rules apply to other equity index futures contracts listed on CME. In March 2012, ICE Futures U.S. introduced a circuit breaker functionality called Interval Price Limits, in which prices may not move more than a pre-determined amount away from the current market price within a pre-determined period.[34]

Throughout section III below, the Commission seeks public comment on the benefits of standardizing various risk controls and system safeguards, including through the uniform application of regulatory standards to help ensure an integrated risk management infrastructure in regulated derivatives markets. The Commission draws commenters' particular attention to the joint regulatory and industry response to the Flash Crash summarized above and seeks public input regarding the need for similar joint efforts with respect to the pre-trade risk controls, post-trade reports, and system safeguards contemplated in this Concept Release.

4. Manual Risk Controls and System Safeguards in Automated Trading Environments

Orders in automated trading environments may be initiated by ATSs and algorithms. Multiple other automated systems perform other processing, communicating, and other functions. The speed of such automated processes has necessarily shifted risk management functions to parallel automated risk management systems acting with equal speed.

Within this context, manual risk controls, and particularly systems safeguards, remain crucial to orderly markets. In many cases, manual risk controls have shifted "upstream" to system design and "downstream" to system management. In automated trading, humans design and test ATSs, establish decision criteria, manage implementation, and intervene when technology systems fail. ATS designers must identify the range of market conditions that an ATS could reasonably face, and determine the range of permissible responses by the ATS to each condition. Designers must also consider the array of information that ATS operators will need to effectively monitor their ATSs and the markets in which their ATSs operate. ATS operators, in turn, must be

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[28] For example, FIX language makes it possible for ATS to be "platform independent"—to incorporate interfaces to multiple brokers, ECNs, or exchanges. *See* Irene Aldridge, *High-Frequency Trading: A Practical Guide to Algorithmic Strategies and Trading Systems* at 31 (John Wiley & Sons, Inc. 2010). *See also* Cliff, Brown, & Treleaven, "Technology Trends in the Financial Markets: A 2020 Vision," United Kingdom Government Office for Science—Foresight, at 10, available at *http://www.bis.gov.uk/assets/foresight/docs/computer-trading/11-1222-dr3-technology-trends-in-financial-markets.pdf.*

[29] For example, "basis trading," and "futures/equity arbitrage" are statistical arbitrage strategies that seek to capitalize on deviations between prices on futures contracts and related securities contracts after macroeconomic news announcements. *See* Aldridge, *supra* note 28, at 197–98.

[30] *See* CFTC and SEC Joint Report on the Market Events of May 6, 2010, *supra* note 1, at 1–6; "Recommendations Regarding Regulatory Responses to the Market Events of May 6, 2010, Summary Report of the Joint CFTC-SEC Advisory Committee on Emerging Regulatory Issues" (February 18, 2011), available at *http://www.cftc.gov/ucm/groups/public/@aboutcftc/documents/file/jacreport_021811.pdf.*

[31] *See* SEC, "Investor Bulletin: New Measures to Address Market Volatility" (Apr. 9, 2013), available at *http://www.sec.gov/investor/alerts/circuitbreakersbulletin.htm.*

[32] *See id.*

[33] *See* CME Group, "Changes to CME and CBOT Equity Index Price Limits: Frequently Asked Questions," available at *http://www.cmegroup.com/education/files/faq-eq-hours-and-limits.pdf.*

[34] *See* IntercontinentalExchange, Inc., "ICE Circuit Breakers (IPL) Price Limits" (March 2012), available at *https://www.theice.com/publicdocs/technology/IPL_Circuit_Breaker.pdf.*

prepared to intervene when market conditions are outside of an ATS's design parameters, when an ATS's trading strategy must be modified, or when an ATS appears to be malfunctioning and must be shut down. Rapid decisions must be made while simultaneously digesting large quantities of information regarding multiple, fast-moving markets. Accordingly, this Concept Release contemplates a number of risk controls and system safeguards that emphasize the role and interaction of manual processes with automated trading environments, particularly ATSs.

B. The Commission's Regulatory Response to Date

The Commission has responded to the development of automated trading environments through a number of regulatory measures that address risk controls within both new and existing categories of registrants, including DCMs, SEFs, FCMs, SDs, MSPs and others. In April 2012, the Commission adopted rules requiring FCMs, SDs and MSPs that are clearing members to establish risk-based limits based on "position size, order size, margin requirements, or similar factors" for all proprietary accounts and customer accounts.[35] The rules, codified in §§ 1.73 and 23.609, also require these entities to "use *automated* means to screen orders for compliance with the [risk] limits" when such orders are subject to automated execution (emphasis added).[36] Such screening must, by definition, occur pre-trade. The Commission also adopted rules in April 2012 requiring SDs and MSPs that are clearing members to ensure that their "use of trading programs is subject to policies and procedures governing the use, supervision, maintenance, testing, and inspection of the program."[37] The specific content of those policies and procedures are left up to the SDs and MSPs.

The Commission has also adopted relevant rules with respect to exchange platforms, including rules with respect to DCMs (adopted in June 2012).[38] Regulation 38.255, for example, requires DCMs to "establish and maintain risk control mechanisms to prevent and reduce the potential risk of price distortions and market disruptions, including, but not limited to, market restrictions that pause or halt trading in market conditions prescribed by the

designated contract market." [39] In addition, the acceptable practices for DCM Core Principle 4 identify pre-trade limits on order size, price collars or bands, and message throttles as responsive measures that a DCM may implement to demonstrate compliance with elements of the core principle.[40] The Commission has adopted trading pause and halt requirements for SEFs similar to those for DCMs.[41]

In the DCM final rules, the Commission also adopted new risk control requirements for exchanges that provide DMA to clients. Regulation 38.607 requires DCMs that permit DMA to have effective systems and controls reasonably designed to facilitate an FCM's management of financial risk. These systems and controls include automated pre-trade controls through which member FCMs can implement financial risk limits.[42] As the Commission noted in the preamble to the DCM final rules, in DMA arrangements "it is impossible for an FCM to protect itself without the aid of the DCM." [43] The Commission also noted in the DCM final rules, however, that "the responsibility to utilize these [DCM-provided] controls and procedures remains with the FCM. Each FCM permitting direct access must use DCM-provided controls . . . ." [44] Accordingly, regulation 38.607 requires DCMs to implement and enforce rules requiring member FCMs to use these systems and controls.[45]

In addition to the foregoing, section 753 of the Dodd-Frank Act amended section 6(c) of the CEA to prohibit manipulation and fraud in connection with any swap, or a contract of sale of any commodity in interstate commerce, or for future delivery on or subject to the rules of any registered entity. In July 2011, the Commission adopted final rules implementing this new authority under the CEA. CFTC Regulation 180.1, among other things, broadly prohibits manipulative and deceptive devices, *i.e.,* fraud and fraud-based manipulative devices and contrivances employed intentionally or recklessly, regardless of whether the conduct in question was intended to create or did create an artificial price.[46] CFTC Regulation 180.2 codifies the Commission's long-standing authority to prohibit price manipulation by making it unlawful for any person, directly or indirectly, to manipulate or attempt to manipulate the price of any swap, or of any commodity in interstate commerce, or for future delivery on or subject to the rules of a registered entity.[47]

Finally, section 747 of the Dodd-Frank Act amended the CEA to make it unlawful for any person to engage in disruptive trading practices. Under section 4c(a)(5) of the CEA, it is unlawful for any person to engage in any trading, practice, or conduct on or subject to the rules of a registered entity that: Violates bids or offers, demonstrates intentional or reckless disregard for the orderly execution of transactions during the closing period, or is, is of the character of, or is commonly known to the trade as, "spoofing." In May 2013, the Commission provided guidance on the scope and application of these statutory prohibitions.[48] In July 2013, the Commission issued an order filing and settling charges against a high-speed trading firm for engaging in the disruptive practice of "spoofing" by utilizing a computer algorithm that was designed to illegally place and cancel bids and offers in futures contracts.[49]

C. Recent Disruptive Events in Automated Trading Environments

Recent malfunctions in ATS and trading platform systems, in both derivatives and securities markets, illustrate the technological and operational vulnerabilities inherent to automated trading environments. ATSs,

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[35] 17 CFR 1.73(a)(1) and 23.609(a)(1).

[36] 17 CFR 1.73(a)(2)(i) and 17 CFR 23.609(a)(2)(i).

[37] 17 CFR 23.600(d)(9).

[38] *See* DCM Final Rules, 77 FR 36612.

[39] 17 CFR 38.255.

[40] Part 38, Appendix B, Core Principle 4, section (b)(5), provides: *Risk controls for trading.* An acceptable program for preventing market disruptions must demonstrate appropriate trade risk controls, in addition to pauses and halts. Such controls must be adapted to the unique characteristics of the markets to which they apply and must be designed to avoid market disruptions without unduly interfering with that market's price discovery function. The designated contract market may choose from among controls that include: Pre-trade limits on order size, price collars or bands around the current price, message throttles, and daily price limits, or design other types of controls. Within the specific array of controls that are selected, the designated contract market also must set the parameters for those controls, so long as the types of controls and their specific parameters are reasonably likely to serve the purpose of preventing market disruptions and price distortions. If a contract is linked to, or is a substitute for, other contracts, either listed on its market or on other trading venues, the designated contract market must, to the extent practicable, coordinate its risk controls with any similar controls placed on those other contracts. If a contract is based on the price of an equity security or the level of an equity index, such risk controls must, to the extent practicable, be coordinated with any similar controls placed on national security exchanges. *See* DCM Final Rules, 77 FR at 36718.

[41] 17 CFR 37.405.

[42] *See* 17 CFR 38.607.

[43] *See* DCM Final Rules, 77 FR at 36648.

[44] *Id.*

[45] *See* 17 CFR 38.607.

[46] *See* 17 CFR 180.1.

[47] *See* 17 CFR 180.2.

[48] *See* Commission, Interpretive Guidance and Policy Statement, 78 FR 31890 (May 28, 2013).

[49] *See* Commission, Press Release No. 6649–13 (July 22, 2013), available at *http://www.cftc.gov/ PressRoom/PressReleases/pr6649-13.*

for example, are vulnerable to algorithm design flaws, market conditions outside of normal operating parameters, the failure of built-in risk controls, operational failures in the communication networks on which ATSs depend for market data and connectivity with trading platforms, and inadequate human supervision. Incidents involving an automated trading firm active in Commission-regulated markets are illustrative of these concerns. For example, in 2011 NYMEX fined a firm $350,000 for failing to adequately supervise, test, and have controls in place related to its ATS.[50] NYMEX cited a 2010 event where the firm launched an ATS after limited testing. The firm was also fined a total of $500,000 by CME for failure to effectively supervise its ATSs on multiple occasions.[51] A panel of the CME Business Conduct Committee found that the firm had experienced malfunctions with the same ATS multiple times, causing it to submit error trades.

In another example, in 2012 a securities trading firm, Knight Capital Group, launched new software on the NYSE that conflicted with already existing code.[52] At the time, the firm was one of the largest participants and a market maker on the NYSE. The firm's ATS inadvertently established larger positions than intended, resulting in a $440 million loss for the firm. The malfunction impacted the broader market, creating swings in the share prices of almost 150 companies, and the high volatility linked to the algorithm designed by the firm also triggered pauses in the trading of five stocks. In addition to the software malfunction itself, some have reported that there was a delay of approximately 40 minutes before humans intervened.[53]

A leading example of ATS malfunction that impacted both the derivatives and securities markets in the Flash Crash of May 2010. As described in detail in section II.A.3. above, the Flash Crash illustrates the potential consequences of ATS design flaws as an automated execution algorithm failed to take price or time variables into account, and feedback loops triggered

continued orders from the algorithm even as prices moved far beyond traditional daily ranges.[54] Finally, the Commission notes the recent systems malfunction at Goldman Sachs Group Inc. that inadvertently flooded U.S. options markets with a large number of unintended orders.[55]

In addition to ATSs, trading platforms have also suffered malfunctions and illustrate another area in which market disruptive events can occur. In November 2010, for example, untested code changes implemented by a U.S. stock exchange operator resulted in errors within its trading platforms. As a result, the platforms overfilled orders in over 1,000 stocks, resulting in $773 million of unwanted trading activity.[56] In March 2012, a software problem on BATS Global Markets, whose software had undergone testing, led to a disruption of the exchange's own IPO. The glitch caused opening orders for ticker symbols beginning within a certain letter range to become inaccessible on the platform.[57] Once the system failed, circuit breakers were triggered and erroneous trades were cancelled.[58] In May 2012, Facebook's IPO experienced significant problems as a result of technical errors on Nasdaq OMX Group Inc.'s U.S. exchange.[59] Many customer orders from both institutional and retail buyers were unfilled for hours or were never filled at all, while other customers ended up

buying more shares than they had intended. Finally, the Commission notes the recent three-hour halt in trading on the Nasdaq, which according to reports was caused when the exchange experienced a disruption in its stock quote dissemination systems and a disruption in its connectivity with another trading platform's systems.[60]

Taken together, these events illustrate the importance of effective testing, circuit breakers, and error trade policies as vehicles for reducing the likelihood of disruptive events and mitigating their impact when they occur.[61] A number of the risk controls contemplated in this Concept Release could help limit the extent of market disruption caused by ATS or trading platform malfunctions similar to those described above. For example, an order ''kill switch'' enables a market participant to immediately cancel all working orders generated by one or more of its ATSs, and prevents the submission of additional orders until the appropriate natural persons allow order placement to resume. Such a kill switch could be operated by the market participant generating orders, the clearing firm guaranteeing its trades, or the trading platform on which its orders would be executed. As another example, ATS monitoring and supervision standards, as well as pre-established crisis management protocols, could help ensure that human supervisors intervene quickly when ATSs experience degraded performance, and that supervision staff have the both the authority and knowledge to intervene as required. Further, requiring exchanges to calculate and disseminate market quality metrics could enable both exchanges and market participants to better anticipate and mitigate destabilizing events. In addition, the Commission believes that change management standards that are beneficial to ATSs could also be applied to trading platforms to help prevent operational or programming errors in that element of the automated trading environment. In section III below, the

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[50] *See* NFA, Case Summary: Infinium Capital Management, NYME 10–7565–BC (Nov. 25, 2011), available at *http://www.nfa.futures.org/basicnet/ Case.aspx?entityid=0338588&case=10-7565-BC+ INFINIUM+CAPITAL+MGMT&contrib=NYME.*

[51] *See* NFA, Case Summary: Infinium Capital Management, CME 09–06562–BC (Nov. 25, 2011), available at *http://www.nfa.futures.org/basicnet/ Case.aspx?entityid=0338588&case=09-06562-BC &contrib=CME.*

[52] *See* Strasburg & Bunge, *supra* note 2.

[53] *See* SEC Roundtable Transcript, *supra* note 2, at 55–56.

[54] *See* CFTC and SEC Joint Report on the Market Events of May 6, 2010, *supra* note 1.

[55] *See* Jacob Bunge, Kaitlyn Kiernan & Justin Baer, ''Bad Trades' Ripple Effect,'' W. St. J. (Aug. 21, 2013), available at *http://online.wsj.com/article/ SB100014241278873241652045790266114 10016876.html.*

[56] *See* Securities and Exchange Act Release No. 65556, In the Matter of EDGX Exchange, Inc., EDGA Exchange, Inc. and Direct Edge ECN LLC (Oct. 13, 2011), available at *http://www.sec.gov/litigation/ admin/2011/34-65556.pdf; see also* SEC News Release, 2011–208, ''SEC Sanctions Direct Edge Electronic Exchanges and Orders Remedial Measures to Strengthen Systems and Controls'' (Oct. 13, 2011), available at *http://www.sec.gov/ news/press/2011/2011-208.htm.*

[57] *See* Olivia Oran, Jonathan Spicer, Chuck Mikolajczak & Carrick Mollenkamp, ''BATS exchange withdraws IPO after stumbles,'' Reuters (Mar. 24, 2012), available at *http://uk.reuters.com/ article/2012/03/24/us-bats-trading-idUKBRE82 M0W020120324;* Michael J. De La Merced & Ben Protess, The N.Y. Times Dealbook (Mar. 25, 2012), available at *http://dealbook.nytimes.com/2012/03/ 25/little-fallout-expected-from-bats-trading-error/.*

[58] *See id.*

[59] *See* Jenny Strasburg and Jacob Bunge, ''Social network's debut on Nasdaq disrupted by technical glitches, trader confusion,'' Wall St. J. (May 18, 2012), available at *http://online.wsj.com/article/ SB100014240527023034484045774122517 23815184.html?mod=googlenews_wsj;* Jenny Strasburg, Andrew Ackerman & Aaron Lucchetti, ''Nasdaq CEO Lost Touch Amid Facebook Chaos,'' Wall St. J. (June 11, 2012), available at *http:// online.wsj.com/article/SB100014240527023037 3539045774546112524772388.html.*

[60] *See* Chris Dieterich & Jacob Bunge, ''Nasdaq Offers Details on Trading Outage,'' Wall St. J. (Aug. 23, 2013), available at *http://online.wsj.com/article/ SB1000142412788732416520457903068167 1164404.html.*

[61] In addition, although in some ways distinct from the events summarized above, the Commission notes the significant impact of Hurricane Sandy in October 2012. U.S. stock markets closed for two days partially in response to concerns over preparedness to trade exclusively on electronic venues while trading floors were potentially closed, as well as the availability of technology and other relevant personnel. *See* Jenny Strasburg, Jonathan Cheng & Jacob Bunge, ''Behind Decision To Close Markets,'' Wall St. J. (Oct. 29, 2012), available at *http://online.wsj.com/article/SB10001424052 9702047893045780087131092892180.html.*

Commission seeks public comment on these and other potential risk controls.

III. Potential Pre-Trade Risk Controls, Post-Trade Reports, System Safeguards, and Other Protections

A. Overview of Existing Industry Practices

The transition to automated trading in derivatives markets, as described above, has been followed by an evolution in what market participants, regulators and others understand to be necessary risk controls for various points in the order and trade lifecycle. Many of the measures identified herein are consistent with recommendations made by industry groups, other regulatory authorities, international standard setting bodies, and others. Certain measures, or variants of them, have been discussed within the futures industry for some time, or may already be in operation at one or more exchanges, clearing members, or market participants. For example, the system safeguards pertaining to the cancellation of orders or disconnecting a market participant in emergency situations are similar to proposals made separately by FIA's Principal Traders Working Group and Market Access Working Group in 2010 and the TAC's Pre-Trade Functionality Subcommittee in 2011.[62]

The Principal Traders Group also addressed the need to properly monitor ATSs in its 2010 recommendations by noting that "firms must ensure their [ATSs] are supervised at all times while operating in the markets. Staff must have training, experience and tools that enable them to monitor and control the trading systems and troubleshoot and respond to operational issues in a timely and appropriate manner. Firms should have processes and procedures to ensure trading operations staff is trained on the expected operating parameters of any [ATS] for which they are responsible."[63] ATS design and operation was addressed by FIA's Market Access Working Group and by ESMA, the latter requiring that market participants "make use of clearly delineated development and testing methodologies" for ATSs prior to their deployment or the deployment of

system updates.[64] Among other considerations, ESMA emphasized that ATS testing should address embedded compliance and risk management controls and operation during stressed market conditions.

As with the pre-trade and post-trade risk controls, certain system safeguards would be applicable to more than one entity or would require coordination between entities. For example, ATS design and operation tests will require that trading platform operators provide suitable test environments that accurately recreate the "live" trading platform. Similarly, safeguards that provide for the immediate disconnection of a market participant in the event of emergency or breach of tolerances should be available to the market participant, its clearing firm, and the relevant trading platform so that all parties have the capacity to initiate a disconnect when necessary. As with other overlapping measures contemplated in this Concept Release, the Commission requests public comment regarding the necessity of such overlaps and the most efficient way to administer them.

1. Existing DCM Risk Controls

Risk controls implemented by one or more exchanges broadly address market stability. One large DCM ("DCM A") employs price reasonability validation controls (aimed at preventing "fat finger" type errors) and position validation controls (both absolute limits and net long/short limits). In addition, DCM A has implemented a circuit breaker protection against price spikes. This control provides floor and ceiling price limits within a specific timeframe and market, and recalculates new floor and ceiling price limits based on current market prices for each new timeframe. If the floor or ceiling price is exceeded, the market is put in a "hold" state, although trading will not be halted in the opposite direction of the hold. The length of the hold varies depending on the market and orders submitted during the hold state will remain in the order book but will not be matched. DCM A has also implemented kill switches that provide it and risk managers at trading firms with the ability to halt trading.

Similarly, another large DCM ("DCM B") also employs a limit price to each market order and stop order to prevent orders from being filled at significantly aberrant price levels, and maximum order size protection to prevent entry of erroneous orders for quantities above a

designated threshold. DCM B employs a functionality that introduces a 5–20 second market pause when triggered stops would cause the market to trade outside of predefined values. This is designed to prevent excessive price movements caused by cascading stop orders. DCM B also employs a functionality that introduces a 5–20 second market pause when a sub-second, extreme market move occurs as a result of order entry. This functionality is designed to detect significant price moves of futures contracts occurring within a predetermined period of time, and triggers a pause in matching activity to provide time for additional resting orders to populate the order book.

DCM A seeks to optimize message flow through both hard limits and market incentives. It employs a message throttle limit which sets a maximum message rate per second for each user session and prevents the submission of messages in excess of the maximum rate. The second form of message control used by DCM A is a system of fees based on Weighted Volume Ratio ("WVR") calculations designed to discourage inefficient messaging among firms with high message volumes. The WVR is a ratio between the number of messages submitted by a market participant and the total volume of orders that it executes. The ratio of unfilled orders is also weighted based on how far away from the best bid or offer each unfilled order was when it was entered. Orders that are farther away from the best bid or offer when entered are weighted more heavily. The DCM assesses fees against market participants when they exceed WVR limits.

DCMs A and B both employ an "orders removed upon logout" function in which all orders are removed upon the user's logout or disconnection, and that they maintain error trade policies that incorporate a no cancellation range.

With respect to ATSs, DCMs A and B both employ a certification and testing process for connecting entities. For example, one DCM described this process as testing a firm's messaging ability (*i.e.,* that firm's ability to send and receive data). As part of the testing process, the DCM will transmit market data to the firm and this provides the firm with the opportunity to run its own algorithms and for that firm to determine if its algorithms are functioning as it intended. Firms must pass additional conformance tests when the exchange's own system functionality changes. DCM B indicated that its testing process allows customers to test

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[62] *See* FIA Principal Traders Group, "Recommendations for Risk Controls for Trading Firms," (November 2010) at 5 [hereinafter, "FIA Recommendations for Risk Controls"], available at *http://www.futuresindustry.org/downloads/ Trading_Best_Pratices.pdf*; FIA Market Access Recommendations, *supra* note 23, at 9; TAC Pre-Trade Functionality Subcommittee DMA Recommendations, *supra* note 26, at 5.

[63] *See* FIA Recommendations for Risk Controls, *supra* note 62, at 3.

[64] *See* FIA Market Access Recommendations, *supra* note 23; ESMA Guidelines on Systems and Controls, *supra* note 4, at 33.

new products prior to their production launch.

In addition to their internal risk mitigation programs, DCMs also provide risk mitigation tools to intermediaries such as FCMs, allowing the intermediaries to set risk control parameters on controls that reside at the trading platform level. Clearing firms, for example, are able to set risk tolerance levels for their customers based on position size, order activity, executions, among other variables.

2. Existing Trading and Clearing Firm Risk Controls

Risk controls at the level of individual market participant firms, whether trading firms or clearing firms, are necessarily entity specific. Accordingly, industry groups have collaborated to determine best practices for risk controls. As noted previously, other entities, including the TAC, have also developed best practices or recommendations. One goal of this Concept Release is to determine how consistently these, and other, recommendations are today being implemented by market participants. As noted by FIA, ''all principal traders have a vested interest in well-functioning markets with effective risk controls, clear error trade policies that focus on trade certainty, and a strong regulatory framework.'' [65] Comments to this Concept Release will allow the Commission to best ensure this strong framework. Questions about the general use of automated risk controls at the level of a firm are also informed by two reports prepared by authors affiliated with the Federal Reserve Bank of Chicago. One report details the current practices of nine proprietary trading firms, with special attention to risk mitigating practices currently applied to their automated systems.[66] Through interviews, the authors found that (1) all firms have maximum order sizes in place and intraday position limits; (2) all but one firm has credit limits by account, which monitor open positions, dollar value of positions and quantity of working orders; [67] (3) half of the firms have price protection points for orders; (4) most firms had message throttles, set at order volume per unit of time; and (5) all firms had kill buttons. The risk controls included in this list, and others

discussed within the report, are expanded upon in the below discussion. In its questions for comment, the Commission seeks to understand what types of risk controls are most commonly used throughout the industry, and the degree to which those risk controls are standardized across the industry.

A second report [68] summarized interviews with five Broker/Dealers (''B–Ds'') and FCMs, again detailing their current practices in automated risk controls. As at the trading level, some firms have implemented pre-trade and post-trade checks, along with other credit related controls to mitigate trading losses and resulting burdens on the clearing firm. The report details categories of risks considered by the B–D or FCM when signing on a new client, or updating controls as a client enters new businesses or expands on old ones. These include: Credit risks, market risks, counterparty risks, portfolio risks and regulatory risks. Through these assessments, clearing firms are able to determine appropriate risk thresholds for a given client, and apply them as necessary at multiple points in the trading chain. Specific controls come in forms quite similar to those outlined above in the case of the trading firm. Pre-trade risk controls span order size limits, intraday position limits, credit limits, and message throttles. These can vary by asset class, exchange, and other market factors, along with coincident market dynamics such as volatility levels and current positions of the trading firm. The monitoring done by the clearing firm is aided by post-trade measures such as the drop-copy of executions, which allows for the monitoring of positions and associated credit risks.

B. Overview of Risk Controls Addressed in This Concept Release

The risk controls presented below describe specific measures which could be taken by exchanges and participants in automated trading environments. To better understand current industry practices, the Commission is interested in determining, for each risk control: (1) Whether the entity commenting has implemented the control; (2) whether the entity believes implementation of the control within the marketplace is consistently applied; and (3) the benefits and costs of a regulatory mandate of the control. If the

Commission determines that the types of risk controls employed across the industry vary widely, the Commission would be aided by understanding the extent of this variance, the reasons for it, and whether regulatory standardization can be of benefit. By gathering this information, the Commission will be better informed regarding beneficial future regulation surrounding automated systems.

The Commission emphasizes that this Concept Release is intended to serve as a high-level enunciation of potential measures intended to reduce the likelihood of market disrupting events and mitigate their impact when they occur. Many of the risk controls listed below are in effect, in part or in full, across multiple entities. Others have been included in recommendations by industry groups and standard-setting bodies, or addressed by foreign regulatory authorities. The Commission also notes that a number of the measures described below offer similar risk controls at various stages in the life of an order (*e.g.,* a safeguard applicable to the ATS generating an order and a similar safeguard applicable to the trading platform receiving such order). Added security through redundancy of risk controls is a feature of safeguard documents reviewed by the Commission in preparing this Concept Release. The Commission seeks public comment on merits of single versus redundant risk control models. Market participants and members of the public are encouraged to comment on the potential risk controls, and the Commission anticipates further refinement of the measures described herein based on the comments received.

The discussion of risk controls below is followed by a number of general questions on which the Commission requests comment (see section III.G. below). These questions are applicable to all the risk controls discussed below.

C. Pre-Trade Risk Controls

The Commission includes below a set of pre-trade risk controls aimed at reducing market disruptions related to automated trading due to errors, system malfunctions or other events with similar effects. In general, pre-trade risk controls seek to protect against the accumulation of a large volume of orders, executions, or positions over an abbreviated period of time. Some market participants are currently using controls which address this accumulation, including maximum order size limits, message rate limits, and similar measures. Pre-trade risk controls can also promote fair and orderly markets, through the use of circuit breakers, execution throttles and self-trade

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[65] *See* FIA Recommendations for Risk Controls, *supra* note 62, at 2.

[66] *See* Carol Clark & Rajeev Ranjan, ''How Do Proprietary Trading Firms Control the Risks of High Speed Trading?'' (March 2012), available at *http:// www.chicagofed.org/digital_assets/publications/ policy_discussion_papers/2012/PDP2012-1.pdf.*

[67] The final firm also sets credit limits, but only for new traders. *See id.* at 7.

[68] *See* Carol Clark & Rajeev Ranjan, ''How Do Broker-Dealers/Futures Commission Merchants Control the Risks of High Speed Trading?'' (June 2012), available at *http://www.chicagofed.org/ Webpages/publications/policy_discussion_papers/ 2012/pdp_3.cfm.*

monitoring. Finally, the pre-trade risk controls also include pre-trade credit limits designed to protect clearing firms, and their clients, with respect to customer and proprietary orders.[69] Each of these groups is discussed below in greater detail.

In order to fully address possible disruptions, the pre-trade risk controls apply at one or more of three points in the execution chain: (1) Individual firms; (2) intermediaries of many forms (including SDs, MSPs, FCMs, Floor Traders, Commodity Pool Operators ("CPOs") and DCOs); and (3) exchanges (including DCMs and SEFs). In many cases, the same or similar risk controls are implemented at more than one point in the execution chain, such as first at the firm, then perhaps at the clearing firm, and then finally at the DCM. The Commission believes that this approach offers a number of advantages.[70] First, it allows individual entities to calibrate the relevant risk control in accordance with their own objectives and risk tolerances. For example, an exchange may set a per-product maximum order size to ensure orderly trading in its markets, with the same limit applying equally to all market participants. A clearing firm, however, may wish to address its customers' distinct risk profiles by setting different maximum order sizes for different customers.

Second, by indicating that some risk controls should reside at the exchange level in addition to the market participant and clearing firm levels, the Commission is responding to competitive and "race to the bottom" concerns raised by several observers. FIA's Market Access Working Group, for example, noted that "[p]re-trade risk controls have become a point of negotiation between trading firms and clearing members because they can add

latency to a trade. To avoid such negotiations, the Market Access Working Group believes that certain risk controls should reside at the exchange level and be required for all trading to ensure a level playing field." [71]

Third, the risk controls listed below acknowledge a variety of industry practices with respect to order generation, such as whether the order passes through intermediaries prior to execution. The Commission seeks to understand how increased standardization in risk controls at the level of exchanges or exchange members could provide strengthened protection for the markets and the public.[72] Notably, if the Commission were to require the placement of credit controls, maximum order size limits, and maximum message rate limits at both exchanges and clearing members, it could address both traditional means of order flow (*i.e.,* through a clearing firm) and newer DMA practices, which require controls at the exchange set by the relevant clearing firm. In combination, these reasons demonstrate the strength, in certain cases, of putting into practice standardized risk controls,

with similar goals, at multiple entity types.[73]

Finally, the Commission notes the importance of risk controls designed to protect the financial integrity of DCOs, and to address risks posed by market participants utilizing DMA. Throughout the range of pre-trade risk controls discussed below, and other measures discussed later in this Concept Release, the Commission specifically solicits public comment regarding the following questions:

6. Are there distinct pre-trade risk controls, including measures not listed below, or measures in addition to those already adopted by the Commission, that would be particularly helpful in protecting the financial integrity of a DCO?

7. Are there distinct pre-trade risk controls, including measures not listed below, or measures in addition to those already adopted by the Commission, that should apply specifically in the case of DMA?

The following sections describe the pre-trade risk controls inquired about in this Concept Release, and present a series of questions to assist the Commission in determining the effectiveness, adoption rate, and need for any additional action with respect to these pre-trade risk controls or others that commenters may think advisable.

1. Message and Execution Throttles

The Commission seeks public comment regarding the potential benefits and existing use of maximum message rate and execution rate throttles ("execution throttles"). The Commission also seeks public comments regarding the types of execution throttles that would be most effective at alerting market participants to potential algorithm malfunctions and limiting the extent of market disruption when there is a malfunction.[74]

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[69] The pre-trade risk controls contemplated herein are consistent with general principles or specific recommendations (in DMA context) expressed in the TAC Pre-Trade Functionality Subcommittee DMA Recommendations, *supra* note 26, at 2–5; IOSCO Technical Committee, Final Report on Principles for Direct Electronic Access to Markets (August 2010) at 20, available at *http://www.iosco.org/library/pubdocs/pdf/IOSCOPD332.pdf*; and the FIA Recommendations for Risk Controls, *supra* note 62, at 4. The pre-trade risk controls described herein are also consistent with the principles included in the ESMA Guidelines on Systems and Controls, *supra* note 4.

[70] In this regard, the Commission notes that the TAC's Pre-Trade Functionality Subcommittee described "three levels in the electronic trading 'supply chain' where pre-trade risk safeguards could happen: Trading firms (as principal or agent), clearing firms (as principal or agent), and exchanges." The Subcommittee's recommendations to the TAC noted that it "believe[s] strongly that all three levels of the supply chain should institute pre-trade risk management measures." *See* TAC Pre-Trade Functionality Subcommittee DMA Recommendations, *supra* note 26, at 1.

[71] *See* FIA Market Access Recommendations, *supra* note 23, at 8. *See also* TAC Pre-Trade Functionality Subcommittee DMA Recommendations, *supra* note 26, at 2. The TAC Pre-Trade Functionality Subcommittee called for a "realistic view" of the incentives under which market participants, clearing firms, and exchanges operate. The Subcommittee identified these incentives as follows:

• "Trading firms are competing with one another to have the smallest time delays (lowest latency) in getting their orders into the exchange's matching engine, and are thus negotiating with brokers to reduce latency. At the same time they are trying to protect their capital from rogue trading, technological deficiencies or other adverse, unintended events.

• Brokers (clearing FCMs) are competing with one another to attract the business of these high-volume, speed-seeking trading firms, and are thus trying to reduce latency. At the same time, they are trying to protect themselves from loss due to unauthorized trading by their trading firm clients or other adverse, unintended events.

• Exchanges (Designated Contract Markets, or DCMs, and Foreign Boards of Trade, or FBOTs) are competing with one another to provide low latency execution, and will soon be competing with Swaps Execution Facilities (SEFs), to attract the business of these trading firms."

The Subcommittee expressed its concern that risk controls should ensure fairness so that one trading firm is not disadvantaged relative to another "because its clearing firm chose to act more responsibly."

[72] For example, trading platforms provide a range of risk controls, but there is limited standardization in the types of risk controls available to customers from one exchange to the next. The Commission seeks to understand whether diverse risk management tools and policies at various exchanges complicate risk management for intermediaries and traders.

[73] The Commission notes that some existing regulations address pre-trade risk controls. *See supra* section II.B.

[74] The Commission understands that some trading firms and several exchanges already have limits on the number of orders that can be sent to a trading venue during a specified period of time. *See* Clark & Ranjan, "How Do Proprietary Trading Firms Control the Risks of High Speed Trading," *supra* note 66, at 7; Oliver Linton & Maureen O'Hara, "Economic impact assessments on MiFID II policy measures related to computer trading in financial markets," United Kingdom Government Office for Science—Foresight (August 2012) at 24–25, available at: *http://www.futuresindustry.org/epta/downloads/Economic-Impact-assessments-on-MiFID-2-policy-measures_083012.pdf.* However, the Commission would like to understand whether requiring some measure of standardization and the use of such tools among exchanges, FCMs, and trading firms would provide additional protection for the market.

Execution throttles prevent an algorithm from exceeding its expected message rate or rate of execution, and when tripped, can alert monitors at both the exchange and the trading firm. Such alerts can facilitate rapid detection of malfunctioning algorithms. Depending on the nature of the malfunction, execution throttles may also reduce the damage and monetary losses caused by the disruptive algorithm during the time when it is being investigated. The Commission understands that trading firms [75] and exchanges [76] employ individual variants of throttles to limit the number of orders that can be transmitted to or processed by an exchange. The Commission requests public comment regarding the extent to which market participants that already utilize execution throttles apply them in a static manner (*i.e.,* a fixed threshold, beyond which notifications are generated), or dynamically (*i.e.,* dependent on the time of day or the previous activity of the algorithm).[77] The Commission also requests public comments regarding the extent to which throttles are applied by trading firms on a per-algorithm basis, calibrated to take into account the expected message and execution rates of each algorithm for a given time period.

In addition, the Commission asks whether maximum message rates and execution throttles could be used as a mechanism to prevent individual entities from submitting messages or executing orders at speeds that are misaligned with their risk management capabilities. Execution throttles of this type would be unique to individual firms or accounts, and could be set by the exchange or clearing firm after reviewing the risk management capabilities of the entity to which the throttle will apply. For some firms,

there may be a delay before effective risk management begins; in these cases, execution throttles may mitigate harm to the firm or other market participants prior to the firm's response to a malfunction. Last, message rate limits could be used to mitigate the risk of manipulative or disruptive messaging strategies such as ''order stuffing,'' where firms use ATSs to submit large numbers of orders that are cancelled before execution in order to slow down the matching engine and create arbitrage opportunities in or across products.

8. If, as contemplated above, maximum message rates and execution throttles were used as a mechanism to prevent individual entities or accounts from trading at speeds that are misaligned with their risk management capabilities, how should this message rate be determined?

9. Message and execution throttles may be applied by trading firms (FCMs and proprietary trading firms), clearing firms, and by exchanges. The Commission requests public comment regarding the appropriate location for message and execution throttles.

a. If throttles should be implemented at the trading firm level, should they be applied to all ATSs, only ATSs employing HFT strategies, or both?

b. What role should clearing firms play in the operation or calibration of throttles on orders submitted by the trading firms whose trades they guarantee?

10. Should the message and execution throttles be based on market conditions, risk parameters, type of entity, or other factors?

11. What thresholds should be used for each type of market participant in order to determine when a message or execution throttle should be used? Should these thresholds be set by the exchange or the market participant?

12. Are message and execution thresholds typically set by contract, or by algorithm? What are the advantages and disadvantages to each method?

13. Who should be charged with setting message rates for products and when they are activated?

14. Would message and execution throttles provide additional protection in mitigating credit risk to DCOs?

2. Volatility Awareness Alerts

Automated volatility awareness alerts implemented by trading firms are another form of risk control contemplated in this Concept Release. Volatility awareness alerts could be triggered when price movements in a given product move beyond a certain threshold within a previously specified time period. Such alerts could assist in

identifying market conditions that may exceed an algorithm's parameters, or may highlight unintended effects of an algorithm's orders. Given an alert, human monitors at the trading firm could then intervene either by halting the relevant algorithms under their control, or by conveying the information to other relevant parties. Unlike exchange trading pauses and halts, volatility awareness alerts inform firm personnel as to changes in market conditions that may disrupt the parameters within which their ATSs and algorithms were programmed to operate, rather than immediately triggering a pause in trading.

15. The Commission is aware that alarms can be disruptive or counterproductive if ''false alarms'' outnumber accurate ones. How can volatility alarms be calibrated in order to minimize the risk that false alarms could interrupt trading or cause human monitors to ignore them over time?

3. Self-Trade Controls

A trade that results from the matching of opposing orders between a firm or a single or commonly owned account, such as a wash trade, does not shift risk between different market participants. In addition, such trades may inaccurately signal the level of liquidity in the market and may result in a non-bona fide price. Risk controls that identify and limit self-trading may result in more accurate indications of the level of market interest on both sides of the market and help ensure arms-length transactions that promote effective price discovery. Some regulated exchanges have tools specifically designed to identify and limit self-trading. The Commission is interested in better understanding those risk controls and how widespread their use may be.

For example, the Commission understands that in June 2013, CME Group introduced a voluntary self-match prevention functionality that allows market participants to prevent buy and sell orders for the same account (or for an account with common beneficial ownership) from matching with each other.[78] Market participants

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[75] *See* Clark & Ranjan, ''How Do Proprietary Trading Firms Control the Risks of High Speed Trading,'' *supra* note 66, at 7.

[76] *See* Carol Clark & Rajeev Ranjan, ''How Do Exchanges Control the Risks of High Speed Trading?'' (November 2011) at 3, available at *http://www.chicagofed.org/digital_assets/publications/policy_discussion_papers/2011/PDP2011–2.pdf.*

[77] The Commission notes that the Futures and Options Association (''FOA'') expressed the opinion that throttles may hinder price formation and market integrity if applied dynamically during a period of market stress. However, the FOA generally supported the use of throttles that are ''pre-defined, transparent and certain (*i.e.,* the member obtains connections with a specified bandwidth in terms of maximum messages per second).'' *See* FOA, ''ESMA's Consultation Paper: Guidelines on Systems and Controls in a highly automated trading environment for trading platforms, investment firms and competent authorities: A response paper by the Futures and Options Association'' (October 2011) at 2, available at *http://www.esma.europa.eu/system/files/11-FOA.pdf.*

[78] *See* CME Group, ''CME Globex Self-Match Prevention Functionality FAQ'' (2013), available at *http://www.cmegroup.com/globex/resources/smpfaq.html.* On July 9, 2013, CME Group requested Commission approval to issue a market regulation advisory notice intended to provide guidance with respect to the types of activity that may constitute a violation of the exchange's wash trades rule and to provide additional information concerning its self-match prevention technology. This notice, which is under review by the Commission, is available at *http://www.cftc.gov/*

that wish to opt-in to this functionality populate a new FIX tag on all orders with a "Self Match Prevention Identifier," in addition to an executing firm number. When the exchange's matching engine detects buy and sell orders at the same executable price level in a particular contract and both orders have the same Self Match Prevention Identifier and the same executing firm number, the engine will automatically cancel the resting order(s) on one side of the market and process the incoming order on the other side of the market.

In addition, the Commission understands that ICE Futures U.S. ("ICE") offers voluntary self-trade prevention functionality for preventing inter- and intra-company orders from matching in the exchange's matching engine. This functionality was initially designed to prevent the matching of inter- and intra-company trades by automatically rejecting the taking order. The Commission understands that in May 2013, this functionality was expanded to allow for the rejection of the resting order.

16. What specific practices or tools have been effective in blocking self-trades, and what are the costs associated with wide-spread adoption of such practices or tools?

17. Please indicate how widely you believe exchange-sponsored self-trading controls are being used in the market.

18. Should self-trade controls cancel the resting order(s)? Or, instead, should they reject the taking order that would have resulted in a self-trade? If applicable, please explain why one mechanism is more effective than the other.

19. Should exchanges be required to implement self-trading controls in their matching engines? What benefits or challenges would result from such a requirement?

20. Please explain whether regulatory standards regarding the use of self-trading control technology would provide additional protection to markets and market participants.

21. If you believe that self-trading controls are beneficial, please describe the level of granularity at which such controls should operate (*e.g.,* should the controls limit self-trading at the executing firm level? At the individual trader level?) What levels of granularity are practical or achievable?

22. If you believe that self-trading controls are beneficial, please explain whether exchanges should require such controls for market participants and

identify the categories of participants that should be subject to such controls. For example, should exchanges require self-trading controls for all participants, some types of participants, participants trading in certain contracts, or participants in market maker and/or incentive programs? What benefits or challenges would result from imposing such controls on each category of participant?

4. Price Collars

The Commission is also inquiring about price collars for both orders and executions. Price collars on orders prevent orders outside of acceptable price ranges from either entering the order book or executing at extreme levels; in effect, collars prevent market or stop orders (which execute as market orders) from trading at levels far beyond that expected at order entry. Similarly, price collars for execution prevent an order that is already in the book from being executed by the matching engine if it is outside of the acceptable range. Price collars can be contract specific and dynamic, responding to changes in market prices and market volatility for each contract. Price collars may reduce realized volatility by preventing a large, aggressive order from sweeping the book and matching at prices outside the range allowed by the collar, or allowing isolated market orders to execute during periods when one-sided liquidity is extremely low.[79]

23. The Commission is aware that some exchanges already have price collars in place for at least a portion of the contracts traded in their markets. Please comment on whether exchanges should utilize price collars on all contracts they list.

24. Would price collars provide additional protection in mitigating credit risk to DCOs?

5. Maximum Order Sizes

Maximum order sizes are intended to protect against execution of orders for a quantity larger than a predetermined "fat finger" limit. Like other controls, these limits can function at multiple levels; for example, at the firm level, in which firms prevent the submission of orders beyond certain limits, or at the clearing level, in which clearing

members prohibit transmission of customer orders in excess of predetermined limits.

The Commission believes that most, if not all, exchanges currently have the capability to set maximum order sizes, but understands that such controls may vary among exchanges in their ability to set limits by product, product class, customer, or clearing member.[80] The Commission is interested to understand the following:

25. Are such controls typically applied to all contracts and customers, or on a more limited basis?

26. Do exchanges allow clearing members to use the exchange's technology to set maximum order sizes for specific customers or accounts?

27. Would additional standardization in the capabilities of this technology or more uniform application of this technology to all customers and contracts improve the effectiveness of such controls?

The Commission understands that some, but perhaps not all clearing firms may utilize the exchange's systems, and possibly their own systems, in order to conduct pre-trade maximum order size screens.[81] The Commission is interested to understand the following:

28. To what extent are clearing firms and trading firms conducting pre-trade maximum order size screens? Please explain whether firms are conducting such screens by utilizing: (1) Their own technology; (2) the exchange's technology, or (3) a combination of both.

29. Would regulatory standards regarding the use of such technology provide additional protection to the markets?

6. Trading Pauses

The Commission wants to better understand the existing implementation of trading pauses for trading platforms, and whether any additional types of pause mechanisms would be beneficial. A wide range of pause methodologies are currently in effect at exchanges, such as stop-logic functionality and interval price limits. These methodologies include market pauses when the execution of resting stop orders would cause excessive price movements, when prices move in excess of a dynamic threshold over a given time period, or simply when prices have

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stellent/groups/public/@rulesandproducts/ documents/ifdocs/rul070913cmecbotnymexcom andkc1.pdf.

[79] The Commission currently estimates that about half of the trading firms operating ATS have limits that check orders against a specific price range before sending them to the exchange. *See* Clark & Ranjan, "How Do Proprietary Trading Firms Control the Risks of High Speed Trading," *supra* note 66, at 7. However, the Commission would like to better understand whether standardizing such controls at the level of exchanges or requiring such controls at the level of trading firms would further promote stable and reliable markets.

[80] *See* Carol Clark & Rajeev Ranjan, "How Do Exchanges Control the Risks of High Speed Trading?" *supra* note 76, at 3.

[81] *See, e.g.,* Carol Clark, Rajeev Ranjan, John McPartland, & Richard Heckinger, "What Tools Do Vendors Provide to Control the Risks of High Speed Trading?" (October 2011) at 2–3, available at *http:// www.chicagofed.org/digital_assets/publications/ policy_discussion_papers/2011/PDP2011-1.pdf.*

moved more than a given amount during the trading day.[82] Often, the market will monitor the order book during the pause, and determine when it is "safe" to re-open the market to further executions or re-open after a specified interval. Trading pauses have mitigated price movements during particularly volatile times in the past.[83]

The Commission is interested in better understanding the relative costs and benefits of each type of pause functionality and whether certain types of pause mechanisms are more effective than others with respect to ATS trading. The Commission is also interested to understand whether additional types of pause triggers would be advisable. These might cover a wider array of adverse states of an automated central limit order book, including, for example, significant depth imbalance, a significant number of aggressive orders, or a significant number of cancelled orders.

30. Trading pauses, as currently implemented, can be triggered for multiple reasons. Are certain triggers more or less effective in mitigating the effects of market disruptions?

31. Are there additional triggers for which pauses should be implemented? If so, what are they?

32. What factors should the Commission or exchanges take into account when considering how to specify pauses or what thresholds should be used?

33. How should the re-opening of a market after a trading pause be effected?

7. Credit Risk Limits

Credit risk limits are a valuable protection for limiting the activity of malfunctioning ATSs. Risk limits are most valuable when implemented as a pre-execution filter. Alternatively, low-latency post-trade risk limits may also provide some risk mitigation. Credit risk controls may be implemented by different entities, including the trading firms that originate orders, the clearing firms that guarantee the orders, the trading platforms matching the orders,

and the DCOs that clear the orders. The Commission acknowledges that some trading firms and FCMs conduct post-trade credit checks with varying degrees of latency and that pre-trade credit risk screens are already required pursuant to §§ 1.73 and 23.609.[84] As noted above, however, the Commission seeks public comments regarding any additional measures that could help protect the financial integrity of DCOs, including measures discussed in this Concept Release or other measures that may be recommended by interested parties.

The TAC has received proposed models for implementing certain pre-trade risk controls for swaps, particularly those pertaining to credit risk.[85] Relevant solutions for implementing credit-based pre-trade risk controls include those in which credit limits reside at the FCM, at the trading platform (based on instruction from the clearing firm), or, for example, at a "hub" which applies credit controls on a per-order basis.[86] The Commission is interested to understand whether the "hub" model, one of several proposed solutions received by the TAC, could be usefully applied to futures markets.

The Commission is also interested in credit risk limits as a mechanism for limiting the disruptive activity of a malfunctioning ATS. Therefore, the Commission requests comment on the following:

34. What positions should be included in credit risk limit calculations in order to ensure that they are useful as a tool for limiting the activity of a malfunctioning ATS? Is it adequate for such a screen to include only those positions entered into by a particular ATS or should it include all the firm's positions?

35. Should pre-trade credit screens require a full recalculation of margin based on the effect of the order?

36. In light of your answers to the previous two questions, where in the lifecycle of an order should the credit limits be applied and what entity should be responsible for conducting such checks?

37. If credit checks are conducted post-trade, what should be done when a trade causes a firm to exceed a limit?

38. Please describe any technological limitations that the Commission should be aware of with respect to applying credit limits.

39. The Commission is particularly interested to receive public comment on the "hub" model and its applicability to different types of pre-trade risk controls. What are the strengths and weaknesses of this approach relative to other pre-trade or post-trade approaches to checking trades against credit limits? How would the latency between the "hub" and the exchanges be managed to provide accurate limits for high frequency ATS?

40. If you believe that post-trade credit checks would be an effective safeguard against malfunctioning ATSs, what is the maximum amount of latency that should be allowed for conducting such checks? What technological or information flow challenges would have to be addressed in order to implement post-trade checks with that degree of latency?

41. With respect to any entity that you believe should be responsible for applying credit risk limits, please describe the technology necessary to implement that risk control and the cost of such technology.

The pre-trade risk controls described above are summarized in Appendix A.

D. Post-Trade Reports and Other Post-Trade Measures

The Commission understands that, even with the presence of the most robust set of pre-trade risk controls, unanticipated events occur within a complicated marketplace. For example, the emergence of unexpected feedback loops between multiple algorithms, or malfunctioning pre-trade risk controls can lead to unintended order submissions that adversely impact market quality and investor confidence. Post-trade reports have the potential to mitigate the impact of such events, particularly if the post-trade reports are made available and utilized on a low-latency basis, such that market participants are quickly aware of any malfunction. Other post-trade measures, including enhanced error trade policies, may help counterparties to errant trades to better anticipate and address risk associated with trade uncertainty when such events occur. The post-trade reports and other measures are summarized below.

1. Order, Trade, and Position Drop Copy

The Commission is inquiring about the potential advantages of increased

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[82] The Commission understands that some triggers leading to a market pause are not necessarily best classified as "pre-trade" risk controls. Some pauses, as described, may be in anticipation of a certain set of executions, and are pre-trade, while others may be in response to a given execution. The discussion here implicitly includes all of the above, and the Commission requests comment on the full range of pause types.

[83] See CFTC and SEC Joint Report on the Market Events of May 6, 2010, *supra* note 1, at 6 (noting that CME's stop logic functionality that triggered a halt in E-Mini trading shows that pausing a market can be an effective way of providing time for market participants to reassess their strategies, for algorithms to reset their parameters, and for an orderly market to be re-established).

[84] See Commission, Final Rule: Customer Clearing Documentation, Timing of Acceptance for Clearing, and Clearing Member Risk Management, 77 FR 21278 (Apr. 9, 2012).

[85] See, e.g., "Managing Credit Lines in a SEF/Cleared World," a presentation by MarkitServ at the March 29, 2012 TAC meeting [hereinafter, the "MarkitServ Presentation"]. Available at: http://www.cftc.gov/ucm/groups/public/@aboutcftc/documents/file/tacpresentation032912_markitse.pdf.

[86] See id. The presentation also noted that post-trade checks at the DCO is another form of risk control based on end-customer position or credit limits. See section III(D) for additional discussion of post-trade reports and other post-trade measures.

standardization of real-time order, trade, and position reports for use by clearing firms and market participants. Real-time information is critical to market participants managing the risk of their own, and their customers' trades. The Commission is inquiring as to the advisability of requiring all exchanges and DCOs to provide real-time order and trade reports to each market participant, and the clearing firm serving that client for that particular trade. This information would give clearing firms real-time updates of their customers' order and trading activities.

These reports could improve the effectiveness of automated credit risk limits, which require current order and trade information in order to calculate current positions and monitor credit risk effectively. In some cases order information may be available to a trading platform before it is available to the relevant clearing member (*e.g.,* in the case of DMA-enabled participants), and trade information is always available first to the trading platform. Therefore, there is a strong interdependency between exchanges, DCOs and clearing firms as the latter seek to manage their credit risk.

Any time lag in the clearing firm's ability to construct a retrospective view of their customers' positions could diminish a clearing firm's ability to assess its customer's risk profile before such customer enters additional orders or establishes additional positions and accumulates greater risk.

More generally, widespread use of order and trade reports may be beneficial in both DMA and non-DMA situations to help market participants to track all order and trade activity quickly and efficiently. The Commission notes that some or all DCOs already provide post-trade information to clearing members, and that some DCOs charge for that information and others do not.[87] However, the Commission believes that the content of the data vary among DCOs and that not all market participants choose to purchase data when it is available. As described above, the Commission preliminarily believes that more standardized access to real-time data from exchanges and DCOs could be valuable to clearing firms, and possibly to trading firms, as they manage their risks. The Commission encourages interested parties to comment, again, on the current use of real-time reports, the consistency of this use, and the potential benefits and

nature of additional order and trade reports.

42. What order and trade reports are currently offered by DCMs and DCOs? What aspects of those reports are most valuable or necessary for implementing risk safeguards? Please also indicate whether the report is included as part of the exchange or clearing service, or whether an extra fee must be paid.

43. If each order and trade report described above were to be standardized, please provide a detailed list of the appropriate content of the report, and how long after order receipt, order execution, or clearing the report should be delivered from the trading platform to the clearing member or other market participant.

2. Trade Cancellation or Adjustment Policies

The Commission is interested to know whether it would be beneficial for exchanges to develop more uniform and objective trade cancellation or adjustment policies. These policies should apply to cancellation or adjustment of individual trades, as well as to cancellation or adjustment of a large quantity of trades in response to a disruptive market event at the direction of a regulatory body or in accordance with the exchange's own determination that such cancellation or adjustment of a large quantity of trades is necessary. The policies could include (1) Clear principles on when trades will be cancelled or adjusted; (2) a requirement that traders notify the exchange of error trades within a specified number of minutes; and (3) a requirement that the exchange notify market participants of possible adjusted or busted trades immediately. Requiring traders to notify the exchange quickly and requiring the exchange to communicate the situation to market participants immediately helps to ensure that any market participants potentially affected by impending adjustment or cancellation actions are made aware of the additional risk they bear and can take steps to mitigate that risk.

It may be advisable to base cancellation and adjustment policies on pre-defined, objective criteria in order to minimize the time for identification and notification. Such criteria may include the minimum trade size for which cancellation will be considered, the minimum and maximum range in which a trade will be adjusted, the time a market participant has to request the cancellation or adjustment, the specific circumstances under which trades will be adjusted or canceled (*e.g.,* an exchange system error, specific types of human errors) and factors to be taken

into account (*e.g.,* market conditions, whether other market participants have relied on the price). Last, the Commission is inquiring as to the advisability of policies to favor trade adjustment over trade cancellation in order to help ensure that market participants are able to keep the positions they have entered into, even if the prices are adjusted. The Commission is interested in receiving comments on whether additional standardization in error trade policies would be beneficial, and whether this prioritization scheme is appropriate.[88]

44. Is a measure that would obligate exchanges to make error trade decisions (*i.e.,* decisions to cancel a trade or to adjust its price) within a specified amount of time after an error trade is reported feasible? If so, what amount of time would be sufficient for exchanges, but would be sufficiently limited to help reduce risk for counterparties to error trades?

45. Should exchanges develop detailed, pre-determined criteria regarding when they can adjust or cancel a trade, or should exchanges be able to exercise discretion regarding when they can adjust or cancel a trade? What circumstances make pre-determined criteria more effective or necessary than the ability to exercise discretion, and vice versa?

46. Do error trade policies that favor price adjustment over trade cancellation effectively mitigate risk for market participants that are counterparties to error trades? Are there certain situations where canceling trades would mitigate counterparty risk more effectively? If so, what are they and how could such situations be identified reliably by the exchange in a short period of time?

47. Should error trade policies be consistent across exchanges, either in whole or in part? If so, how would harmonization of error trade policies mitigate risks for market participants, or contribute to more orderly trading?

E. System Safeguards

In this Concept Release, the Commission inquires about a range of system safeguards for trading platforms,[89] clearing firms, and market participants (including ATSs). Those system safeguards are intended to address a number of operational, market

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[87] *See* Carol Clark & John McPartland, ''How Do Clearing Organizations Control the Risks of High Speed Trading?'' (May 2012) at 6–7, available at *http://www.chicagofed.org/Web pages/publications/ policy_discussion_papers/2012/pdp_2.cfm.*

[88] The Commission notes that error trade policies may vary for different exchanges and for different products at each exchange. *See id.* at 7.

[89] The Commission notes that the system safeguards contemplated herein for DCMs address trading-related risks, and are therefore distinct from the requirements of DCM Core Principle 20 and SEF Core Principle 14, which address business continuity and disaster recovery capabilities.

abuse and transmission risks, and may protect against potential disruptions and abuses that are unique to electronic trading. The potential system safeguards are broadly grouped into those that address (1) Controls related to order placement; (2) policies and procedures for the design, testing and supervision of ATSs; (3) self-certifications and notifications; (4) ATS or algorithm identification; and (5) data reasonability checks. Each system safeguard is summarized below.

1. Controls Related to Order Placement

a. Order Cancellation Capabilities

The Commission is inquiring about various standards related to order cancellation capabilities. Auto-cancel on disconnect requirements would ensure that working orders do not remain in the limit order book when a firm loses connectivity with the exchange, ensuring that unwanted trades avoid execution even if the firm is unable to cancel them. The speed of disconnect notification and the cancellation of orders on disconnect can be helped by the exchange of ''heartbeat'' messages between exchange and user which continuously monitor the response ability of a given algorithm. In addition, by requiring exchanges to develop and maintain the capacity to selectively cancel working orders at the level of individual algorithms, individual accounts, or individual firms, as deemed necessary in an emergency, the trading platform would be able to mitigate the risk or quantity of error trades due to a malfunction.[90]

The Commission is also inquiring as to the advisability of requiring market participants operating ATSs, clearing members, and exchanges to develop and maintain ''kill switch'' capabilities. A market participant's kill switch could immediately cancel all working orders from that firm to the exchange and could prevent them from submitting further orders until natural persons with the proper authority at both the firm and the exchange allow the firm to resume trading. A kill switch at clearing members could cancel all working orders attributable to the clearing member, including both proprietary

orders and orders placed on behalf of their clients, and prevent the clearing member from transmitting additional orders until natural persons at both the clearing firm and the exchange allow the clearing member to resume trading. An exchange's kill switch could cancel all working orders from an individual market participant or clearing firm and could prevent additional orders from the same market participant or clearing firm from being accepted at the exchange until authorized natural persons at both the exchange and affected market participant or clearing firm allow trading to resume.

48. The Commission's discussion of kill switches assumes that certain benefits accrue to their use across exchanges, trading and clearing firms, and DCOs. Please comment on whether such redundant use of kill switches is necessary for effective risk control.

49. What processes, policies, and procedures should exchanges use to govern their use of kill switches? Are there any different or additional processes, policies and procedures that should govern the use of kill switches that would specifically apply in the case of DMA?

50. What processes, policies, and procedures should clearing firms use to govern their use of kill switches when using such a safeguard to cancel and prevent orders on behalf of one or more clients?

51. What objective criteria regarding kill switch triggers, if any, should entities incorporate into their policies and procedures?

52. What benefits or problems could result from standardizing processes, policies, and procedures related to kill switches across exchanges and/or clearing firms?

53. Please explain how kill switches should be designed to prevent them from canceling or preventing the submission of orders that are actually risk reducing or that offset positions that have been entered by a malfunctioning ATS.

54. The Commission requests comment regarding whether kill switches used by clearing firms already have or should have the following capabilities: (a) Distinguish client orders from proprietary orders; (b) distinguish among orders from individual clients; and (c) cancel working orders and prevent additional orders from one or more of the clearing firm's clients, or for all the clearing firm's proprietary accounts, without cancelling and preventing all orders from the clearing firm.

55. The Commission is aware of proposals that would enable FCMs to

establish credit limits for customers that are stored at a central ''credit hub'' for the purpose of pre-trade credit checks.[91] If such a model were implemented, is it possible that it could also be enabled with kill switches that cancel existing working orders and prevent additional orders from being submitted by one or more market participants? Should such an approach be designed to complement kill switches that are controlled by exchanges, clearing members, and trading firms, or to replace these kill switches? What benefits and drawbacks would result from each approach?

b. Repeated Automated Execution Throttle

A further potential risk control of interest to the Commission is a ''Repeated Automated Execution Throttle.'' This risk control was highlighted in FIA's Principal Traders Group recommendations regarding risk controls.[92] For this control, ATSs would be required to monitor the number of times a strategy is filled and then re-enters the market without human intervention. After a configurable number of repeated executions the system should be disabled until a human re-enables it. The Commission would like to better understand the value of this safeguard. The Commission understands that it would disable automated systems which have experienced activity levels far beyond that anticipated by its designers, and then notify monitors regarding this activity. Through this, human review would independently verify the operation of an ATS at regular intervals, and in doing so, could help to ensure that an algorithm's strategy is currently acting as anticipated and that it is appropriately responding to current market conditions. The Commission requests comments as to whether there could be adverse effects of automatically disabling an ATS after a given number of order executions, and also requests comment regarding the potential value, proper use, and limitations of this safeguard.

2. Policies and Procedures for the Design, Testing and Supervision of ATSs; Exchange Considerations

Taken as a whole, the ATS monitoring and supervision standards, ATS design and testing standards, ATS crisis management procedures standards, and ATS monitoring staff training standards inquired about in this Concept Release constitute a set of standards related to

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[90] In addition to order cancellation capabilities, the Commission is inquiring about various related measures that concern connectivity testing, including that trading platforms and all entities connected to a trading platform for purposes of transmitting orders together must test that the systems of all such entities are properly connected to and communicating with the trading platform, and that trading platforms must provide, and market participants operating ATSs must utilize, heartbeats that indicate proper connectivity between the trading platform and an ATS.

[91] *See* MarkitServ Presentation, *supra* note 85.

[92] *See* FIA Recommendations for Risk Controls, *supra* note 62, at 4.

policies and procedures for firms operating ATSs. Existing rules require SDs and MSPs to ensure that their "use of trading programs is subject to policies and procedures governing the use, supervision, maintenance, testing, and inspection of the program," [93] but there is no corresponding rule for FCMs or other market participants operating ATSs. Moreover, even when applied to SDs and MSPs, section 23.600(d)(9) does not have any prescriptive requirements related to supervision and testing and does not require formal review or approval of each firm's policies and procedures by an informed, independent party other than at the time of registration.[94] As a consequence, there is no minimum amount of testing that SDs and MSPs or other market participants operating ATSs are required by the Commission to perform before deploying an algorithm or before re-deploying an algorithm that has been altered. Nor are there any minimum standards for training or sophistication in the areas of supervision, maintenance, and inspection of the ATS.[95] Because of this, the Commission is interested in better understanding whether more standardized requirements, or clearer minimum standards, related to policies and procedures for firms operating ATSs would benefit the markets and the public. The policies and procedures relating to the design, testing and supervision of ATSs are summarized below, and addressed in greater detail in Section V, Appendix C.

a. ATS Development, Change Management, and Testing; Development, Change Management, and Testing of Exchange Systems

The Commission requests public comment regarding the necessity for ATS development, change management and testing standards in CFTC-regulated markets. Potential benefits to such standards include ensuring that ATSs are designed and modified in an environment where there is no risk that the ATS could interfere with activity in or related to the live market and ensuring that appropriate personnel

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[93] *See* 17 CFR 23.600(d)(9).

[94] 17 CFR 23.600(b)(4) requires SDs and MSPs to "furnish a copy of its written risk management policies and procedures to the Commission, or to a futures association registered under section 17 of the Act, if directed by the Commission, upon application for registration and thereafter upon request."

[95] It is also possible that SDs and MSPs could fail to incorporate emerging industry best practices for managing operational risk of ATSs into their policies and procedures as effective risk management technology and practices are introduced to the market.

have approved changes and verified proper testing before a system is moved to the production environment. Standards concerning the retention and control of access to current and historical versions of source code may help to ensure that changes are only made by appropriate personnel and reviewable when necessary. Finally, audit trail material may assist regulators when investigating problems.

With respect to testing, a firm's ATS testing standards could require it to test an ATS on the trading platform(s) where it will trade, prior to deploying such ATS into the live environment. Such testing standards may reduce the incidence of technical errors at the level of individual algorithms and firms. In addition, a firm's ATS testing standards may require it to test an ATS on the trading platform(s) after modifying the underlying algorithms or other system components to a degree subject to further definition. ATS testing could include tests against historical data, especially periods for which the relevant algorithm would likely have been stressed, or would have been active during periods with unanticipated market activity. In addition, exchanges could also be required to provide a test environment to simulate production trading so that market participants can conduct exchange-based conformance testing, which would include tests of compatibility with the matching engine (including initiation and cessation of the ATS connection) and verification of risk controls required by the trading platform.

The Commission is particularly interested to understand when it is most beneficial for firms to test an ATS after it has been modified. Some have asserted that the amount of testing should be calibrated to the significance of the change and the risk it poses to the proper function of the ATS.[96] The Commission would like to better understand how market participants estimate the significance of a change and the risk that a given change might pose to the proper function of an ATS. Also, the Commission would like to understand what current best practices are for testing ATSs and how those practices are tailored to the extent of the modification.

56. Please describe the necessary elements of an effective ATS testing regime, in connection with both the initial deployment and the modification of an ATS.

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[96] *See* SEC Roundtable Transcript, *supra* note 2, at 49–51.

57. With respect to testing of modifications, how should the Commission and market participants distinguish between major modifications and minor modifications? What are the objective criteria that can be used to make such distinctions? Should any testing regime applicable to ATS modifications distinguish between major and minor modifications, and if so, how?

58. What challenges or benefits may result from exchanges implementing standardized procedures regarding the development, change management, and testing of exchange systems? Please describe, if any, the types of standardized procedures that would be most effective.

b. ATS Monitoring and Supervision

The Commission is aware that many exchanges and software design firms offer extensive testing platforms to validate algorithm functionality before deployment in a live trading environment. The Commission wants to better understand the extent to which testing is utilized and would like to better understand the methodology supporting these test environments. Further, the Commission believes that many, if not all, firms operating ATSs have human monitors supervising ATSs when they are operating. However, the Commission is uncertain to what degree such monitors have been sufficiently trained in how to respond to unexpected problems, and been given the requisite authority to intervene at these times.[97] A firm's ATS training standards could require that relevant staff members be able to understand how to identify malfunctions, evaluate the risk resulting from those malfunctions, and respond constructively to those malfunctions, including elevating the problem to the attention of more senior personnel. The Commission would like to better understand whether regulatory measures or new standards in this area would promote more effective ATS monitoring and supervision.

c. Crisis Management Procedures

Well-designed crisis management procedures may help to ensure that

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[97] The Commission would like to better understand what sorts of training and policies market participants use in order to ensure that human monitors have the capability to respond to operational issues in a timely way. In particular, the Commission is interested in better understanding what training monitors receive in the rationale for the trading patterns executed by the ATS, the scope of intervention authority given to human monitors, and the procedures firms use to escalate questions or decisions from such human monitors to more senior personnel during a crisis.

firms are prepared to conduct rapid triage in the event of a problem, including the ability to escalate decisions quickly to the proper individuals or provide notification to their clearing firms, exchanges, or the Commission.[98] Such procedures may promote common expectations among monitoring staff, firm leadership, and exchange leadership about basic procedures in the event of market destabilizing events, facilitating more rapid intervention and mitigating the effects of an individual disruption.

59. Should basic crisis management procedures be standardized across market participants? If so, what elements should be addressed in an industry-wide standard?

60. Are there specific, core requirements that should be included in any crisis management procedures? Similarly, are there specific types of crisis events that should be addressed in any crisis management procedures? If so, please identify such requirements and/or crisis events and the level of granularity or specificity that the procedures should have with respect to each.

3. Self-Certifications and Notifications

a. Self-Certification and Clearing Firm Certification

To ensure that market participants employ the pre-trade risk controls, post-trade reports and other measures, and system safeguards described herein, the Commission is inquiring whether it would be appropriate to require a periodic self-certification program for all market participants operating ATSs and for clearing firms providing services to those market participants. These certifications could refer to the extent of implementation of those risk control mechanisms discussed in the other sections of this Concept Release. With respect to ATSs, an acceptable certification might attest that: (1) The ATS contains structural safeguards to provide reasonable assurance that the trading system will not be disruptive to fair and equitable trading; (2) the market participant's ATSs have been designed to avoid violations of the CEA, Commission regulations, or exchange rules related to fraud, disruptive trading practices, manipulation and trade practice violations; and (3) such systems have been sufficiently tested and documented in a manner that is appropriate to the intended design and use of that system. Additionally, the Commission asks whether the chief executive officer, chief compliance

officer, or similar ranking official of each market participant should attest to the certification. The Commission is interested in receiving comment on the costs and benefits of a certification program, what elements should be included in the program, and whether that program should be self-executed, or, if not, overseen by what authority.

61. How often should a market participant certify that their pre-trade risk controls, post-trade reports and other measures, and system safeguards meet the necessary standards?

62. Which representative of the market participant should be required to attest that the certification standards have been met? Should it be the market participant's chief executive officer, chief compliance officer, or similar high-ranking corporate official, or some other individual?

63. Which entity(ies) should receive certifications from market participants? For example, should it be the market participant's clearing firm, its designated self-regulatory organization (if applicable), one or more trading platforms, a registered futures association, the Commission, or other entity?

64. Should DCMs, SEFs or clearing member firms be required to audit market participant certifications? What would be covered in an audit and how often should these audits occur? Should the same entity that receives the certification be required to perform the audit?

b. Risk Event Notification Requirements

The Commission also seeks information as to whether it would be beneficial for market participants operating ATSs to notify one or more of trading platforms, their clearing firms, the Commission, or others of risk events.[99] Entities receiving notifications could, when they deem it appropriate based on the magnitude of a single event or a pattern of smaller related events,

review further with the market participant to remedy the underlying cause(s) of the risk event. Such reviews would allow market participants, clearing firms, trading platforms, and the Commission to respond and proactively reduce risk in automated trading environments.

The Commission seeks comment on the types of risk events that should be reported. For example, reportable risk events generally could include any instances where design parameters of an ATS are violated and where risk control processes or technologies do not function as anticipated, regardless of whether these events lead to error trades or market destabilization. Violated design parameters and unanticipated lapse of risk management processes and technology create conditions that may presage future malfunctions, even absent a current disruption.

65. Do commenters believe that risk event notifications would help to better understand and ultimately reduce sources of risk in automated trading environments? What information should be contained in a risk event notification to maximize its value?

66. What types of risk events should trigger reporting requirements, and what entities should receive risk event notifications from market participants operating ATSs?

67. Which entities should receive risk event notifications?

4. ATS or Algorithm Identification

The Commission is considering measures to improve the identification of ATS or their underlying algorithms in messages generated by ATSs. The Commission believes that identification of ATSs or underlying algorithms could help both firms and trading platforms to more quickly identify malfunctioning systems that could disrupt markets. Fuller identification of automated systems may also improve oversight by the Commission, including the ex post analysis of disruptive events aimed at preventing or mitigating similar recurrences.

The Commission is aware of the inherent complexity in any ATS or algorithm identification system and seeks public comment on this potential measure. Specific questions of interest to the Commission include:

68. Should the Commission define ATS or algorithm for purposes of any ATS identification system that may arise from this Concept Release? If so, how should ATS or algorithm be defined? Should a separate designation be reserved for high frequency trading algorithms and if so, what is the threshold difference?

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[98] *See* SEC Roundtable Transcript, *supra* note 2, at 133–34.

[99] The SEC is presently considering a set of rules that would require self-regulatory organizations, significant alternative trading systems, certain disseminators of market data, and exempt clearing agencies to notify SEC staff of events including systems disruptions, compliance issues, or intrusions. *See* SEC, Notice of Proposed Rulemaking: Regulation Systems Compliance and Integrity, 78 FR 18084 (Mar. 25, 2013). Under the proposed rules, these entities would be required to notify and provide the SEC with detailed information when such systems issues occur as well as when there are material changes in its systems. *Id.* The Commission notes that it may consider distinctive aspects of the SEC's proposed rules, and public comments with respect to it, when developing any future proposals arising from this Concept Release. Commenters with respect to this Concept Release are encouraged to indicate in their comments any elements of the SEC's proposed rules that they believe are relevant.

69. What are the existing practices within trading firms for internally identifying ATSs or algorithms and for tracking their performance, including profit and loss? What elements of existing practices could be leveraged in any ATS or algorithm identification system proposed by the Commission in the future?

70. The Commission understands that an ATS may consist of numerous algorithms, each of which contributes to a trading decision. If an algorithm-based identification system is proposed, which of the potentially multiple algorithms that constitute an ATS should carry the ID? In addition, what degree of change to an algorithm should necessitate the use of a new ID, and how often does this change typically occur? What is the appropriate definition of ''algorithm'' for purposes of an algorithm identification system?

71. If the identification system resides at the ATS level, how should such IDs be structured to ensure that they are nonetheless sufficiently granular to identify components that may be leading or have led to unstable market conditions?

72. What message traffic between an ATS and a trading platform should include the ATS or algorithm ID (all messages, orders only, etc.)?

73. What relationship should this ATS ID have to the legal entity identifier (LEI)?

5. Data Reasonability Checks

The Commission is interested in the range of information sources used by ATSs to inform their trading decisions, and in how market participants form reasonable beliefs as to the accuracy of such data. For example, following recent media reports regarding the adverse market impact of false information distributed through unauthorized use of a social media outlet used by the Associated Press, the Commission is asking questions to broaden its understanding of the extent to which ATSs in derivatives markets use social media to inform their trading decisions, and the extent to which information derived from social media is verified by the ATS prior to its use. One potential risk control of interest to the Commission is the ''market data reasonability check,'' which was included in FIA's Principal Traders Group recommendations regarding risk controls.[100] In those recommendations, the FIA recommended that trading

firms' systems have ''reasonability checks'' on incoming market data.

74. Please describe existing practices in the industry concerning how and the extent to which ATSs use (1) market data; and (2) news and information providers, including social media, to inform trading decisions.

75. The Commission requests comment regarding any risk controls, including reasonability checks, currently being used by market participants operating ATSs to review market data and news and information providers, including social media. Please describe the risk control, including the purpose of the control, the extent of its use among derivatives market participants, and any other aspects of the risk control that you believe would be helpful for the Commission to understand.

In addition, the data analyzed by trading algorithms can include government economic reports (*e.g.,* GDP, unemployment, and inflation data), as well as economic reports from non-governmental organizations such as universities, trade groups, and other sources. While government reports are released pursuant to a lock-up process that is intended to ensure that no entity receives them ahead of others, it has been reported that early access to some non-government economic reports is available for a fee. For example, according to recent reports, the University of Michigan's consumer report was available to certain investors two seconds ahead of the rest of the market.[101]

76. The Commission requests public comment concerning the lock-up process for government economic reports, and any additional measures that might be taken to protect against inappropriate disclosure.

77. Please describe the extent to which potentially market-moving data from non-governmental economic reports can be obtained prior to its public release for a fee. Are there specific reports or types of reports for which early disclosure should not be permitted? What process should be used for identifying non-governmental economic reports whose early release should not be permitted? Should the data release process for such reports be similar to the data lock-up process implemented for the release of government economic data?

The system safeguards described above are also listed in Appendix C.

[100] *See* FIA Recommendations for Risk Controls, *supra* note 62, at 4.

[101] *See* Brody Mullins, Michael Rothfeld, Tom McGinty & Jenny Strasburg, ''Traders Pay for Early Peek at Key Data,'' Wall St. J. (June 12, 2013), available at *http://online.wsj.com/article/SB100 01424127887324682204578515963191421602.html.*

F. Other Protections

1. Registration of Firms Operating ATSs

Although the Commission can currently take several actions to seek information from firms, such as the issuance of subpoenas to investigate a firm's trading activities on a registered exchange or to compel a firm to provide books and records, some have suggested that a registration requirement for firms operating ATSs and not otherwise registered with the Commission would enhance the Commission's oversight capabilities. Additionally, a registration requirement may allow for wider implementation of some or all of the pre-trade controls and risk management tools discussed in this Concept Release and currently deployed in various degrees in the market today.

In considering the registration of specific entities using ATSs and not otherwise registered with the Commission, the ''floor broker'' definition in CEA 1a(23), in pertinent part, states that, in general, the term ''floor trader'' means any person who, in or surrounding any pit, ring, post *or other place* provided by a contract market for the meeting of person similarly engaged, purchases, or sells solely for such person's own account.[102]

In addition to seeking input on whether it would be beneficial to require registration, the Commission also requests specific public comments in response to the following questions:[103]

78. Should firms operating ATSs in CFTC-regulated markets, but not otherwise registered with the Commission, be required to register with the CFTC? If so, please explain.

79. Please identify the firm characteristics, trading practices, or technologies that could be used to trigger a registration requirement.

80. Should all firms deploying ATS be required to register, and should there be different standards for firms deploying

[102] *See* CEA section 1a(23), as amended by section 721 of the Dodd-Frank Act; 7 U.S.C. 1a(23) (emphasis added).

[103] In March 2013, the German parliament approved the HFT Act, which requires any firm using HFT strategies to become licensed as a financial services institution subject to the supervision of BaFin (Germany's banking regulator) or to passport an existing license granted by another member state of the European Economic Area. The licensing requirement includes ''indirect'' trading, meaning that it applies to foreign firms that are trading through a direct exchange member on a German-regulated market or a German multilateral trading facility. As a result of becoming licensed, HFT firms become subject to a general regulatory framework applicable to investment firms under German statutes, and specific organizational requirements applicable to HFT firms imposed by the HFT Act. *See* BaFin HFT Act Materials, *supra* note 17.

HFT strategies? What are the appropriate thresholds levels below which registration would not be required?

81. Since the floor trader distinction only addresses proprietary traders, please explain whether there is any other category of market participant, such as those deploying ATS or HFT strategies and trading on behalf of clients (aside from market participants already subject to Commission jurisdiction, such as Introducing Brokers and FCMs) that the Commission should consider with respect to potential registration requirements.

82. Should software firms providing algorithms be required to register, and under what authority? What standards should apply to such firms?

83. Please identify the functionalities discussed in this Concept Release that could be applied to floor brokers that operate ATSs. Are there any other controls not mentioned in this Concept Release that should be under consideration?

84. Please supply any information or data that would help the Commission in deciding whether firms may or may not meet the definition of ''floor trader'' in § 1a(23) of the Act.

85. Do you believe that the registration of such firms as ''floor traders'' would effectuate the purposes of the CEA to deter and detect price manipulation or any other disruptions to market integrity?

86. Considering the broad deployment of automated trading systems across both equities and derivatives markets, the Commission seeks to understand the appropriate level of coordination between itself and the SEC in defining and applying possible standards to the ATS and HFT trading space. How closely should the CFTC and SEC coordinate on possible rules and requirements for trading firms? The Commission also seeks public comment on the appropriate level of coordinated oversight between itself and relevant Self-Regulatory Organizations such as National Futures Association and FINRA.

87. Using the Flash Crash as an example, is it important to have identical definitions and remedies in the case of ATS and HFT registration requirements or do the existing market controls, such as circuit breakers, provide the necessary market protections in both the equities and derivatives markets? If the rules are not coordinated, what impact would this have on market interaction and oversight?

88. If trading venues apply mandatory functionalities to access derivatives

markets, what benefit would a registration requirement provide to the Commission?

2. Market Quality Data

The Commission is inquiring as to the advisability of requiring each trading platform to provide market quality indicators for each product traded on its platform at a regular frequency. Some metrics of the type below are currently calculated by exchanges, often at an account level, and provided to market participants. Some metrics are currently used in aid of various exchange programs (such as order efficiency programs). Other metrics are not currently used but may, nonetheless, provide the Commission and the public potentially useful information.

The Commission envisions that increased transparency through the regular disclosure of market quality indicators will allow the Commission and market participants to better understand, among other things (1) The stability and efficiency of each market, (2) the degree of informed versus uninformed order flow, and (3) the nature and degree of liquidity in each market. In addition, the transparency provided by these metrics may better enable market participants to manage their ATSs in ways that further promote market stability and integrity.

The Commission is interested in receiving comment on the usefulness of various market indicators that could be prepared for each contract. The list of indicators would, for a given product and tenor, include measures of: (1) Effective spreads; (2) order-to-fill ratios; (3) execution speeds by order type and order size; (4) average aggressiveness imbalances; (5) price impact for given trade sizes; [104] (6) average order duration; [105] (7) order efficiency; [106] (8) rejection order ratios; (9) net position changes versus volume; [107] (10) branching ratios; [108] (11) volume imbalance and trade intensity; [109] (12)

Herfindahl-Hirschman Indexes based on market share of open positions under common control; and (13) metrics on the number of price changing trades involving ATSs.[110] Calculation methodologies for each of the measures would be consistent across exchanges in order to ensure compatibility and comparability across market venues.[111]

Several of the measures described in this Concept Release would provide additional information about market quality that market participants cannot derive exclusively from real-time order book information provided by each exchange. The Commission expects that market participants could use this additional information, together with information currently available in the order book, in order to better inform their trading efficiency and strategies and to mitigate adverse effects of their actions and other market participants' on the market. Further, the Commission expects that these measures could be used to help understand changes in market quality. In addition, the Commission believes that providing consistent measures of market quality across exchanges would promote market efficiency through transparency and market competition.

To clarify what costs and benefits these market metrics may provide to participants, the Commission requests comment to the questions below, including that, if these metrics are beneficial, the appropriate frequency of publication.

89. What market quality indicators are in place today? Please describe the metrics, how and where they are deployed, and how market participants access these indicators and at what cost.

90. What value would each of the market quality metrics described above provide to market participants receiving them? If possible, please be specific about how each market quality measure could be used to enhance reliability and risk management of ATSs.

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[104] The size of the price change that would occur if specific sizes of market orders were executed at that instant.

[105] Average length of time that orders for a specific instrument remain in the book before being modified, filled, or cancelled.

[106] Notional value executed vs. notional value entered or modified.

[107] See CFTC Net Position Changes Data, available at *http://www.cftc.gov/MarketReports/ NetPositionChangesData/index.htm.*

[108] See Vladimir Filimonov, David Bicchetti, Nicolas Maystre, & Didier Sornette, ''Quantification of the High Level of Endogeneity and of Structural Regime Shifts in Commodity Markets'' (Mar. 20, 2013), available at *http://papers.ssrn.com/sol3/ papers.cfm?abstract_id=2237392.*

[109] See David Easley, Marcos M. Lopez de Prado & Maureen O'Hara, ''Flow Toxicity and Liquidity in a High Frequency World'' (Feb. 20, 2012), available

at *http://papers.ssrn.com/sol3/papers.cfm?abstract_ id=1695596.*

[110] For a given market, such metrics would be calculated by identifying the relevant category of trader on trades that result in a price move from a previous trade and determining the percentage of those trades where an ATS was on one or both sides of the trade.

[111] SEC Rules 605 (Disclosure of Order Execution Information) and 606 (Disclosure of Order Routing Information) of Regulation NMS respectively require market centers (as defined in the rules) to make publicly available standardized, monthly reports of statistical information concerning their order executions and broker-dealers to make publicly available quarterly reports that, among other things, identify the venues to which customer orders are routed for execution. *See* 17 CFR 242.605 *(formerly Securities Exchange Act Rule 11Ac1–5) and* 17 CFR 242.606 (formerly Securities Exchange Act Rule 11Ac1–6).

91. Conversely, could any of the market quality metrics described above be used by market participants to manipulate the order book,[112] to identify competitors' trading strategies, or to engage in other trading activities that do not contribute to effective risk management and efficient discovery the traded asset's economic value? If so, please provide specific information regarding how such information could be misused. If possible, please provide recommendations regarding steps the Commission could take to prevent misuse.

92. Are there additional market quality metrics that the Commission should contemplate requiring exchanges to provide? If so, what value would they provide and how would they be used?

93. If the Commission determines that measures should be calculated in the same way by various exchanges in order to provide comparable measures of market quality, then how, specifically, should each of the above mentioned metrics be calculated in order to ensure that they are most valuable to market participants?

94. What timing and mode of dissemination is appropriate for each metric? For example, should measures be provided as daily averages?

95. Does the liquidity of a given market impact which market quality metrics would be reliable and useful when calculated for that market? If so, which metrics are inapplicable in less liquid markets, and why? What liquidity measures and thresholds are relevant to determining which metrics should apply to a given market?

3. Market Quality Incentives

The impact of ATSs, and particularly those implementing HFT strategies, is a topic of ongoing interest among researchers, market participants and others. Several studies have found that increases in automated trading are associated with improved market quality.[113] Some researchers and market participants, however, have also noted that the presence of HFT has the potential to shape the types of liquidity

providers available in a market,[114] may discourage ATSs from submitting resting orders that remain in the order book long enough for humans to react, and may also be associated with undesirable trading practices that are more easily implemented by automated systems.[115] Various recommendations have been advanced to promote the benefits of HFT while simultaneously disincentivizing trading strategies that do not contribute to efficient price discovery.[116]

Those recommendations include for example, utilizing a trade allocation formula that is an intermediate between a cardinal ranking (time-weighted), Pro Rata allocation formula and a Price/Time allocation formula. This would be intended to reward market makers for leaving resting orders in the order book for a longer period of time, rather than simply for being first in the order book at a given price. Second, create a new limit order type that would prioritize orders that remain resting in the order book for some minimum amount of time. Third, require orders that are not fully visible in the order book (*e.g.,* iceberg orders) to go to the end of the queue (within limit price) with respect to trade allocation. Fourth, aggregate multiple, small orders from the same legal entity entered contemporaneously at the same price level and assign them the lowest priority time stamp of all such. Fifth, require exchanges to use batch auctions once per half second at random times rather than use continuous trade matching.[117] Lastly,

limit visibility into the order book to aggregate size available at a limit price. This would help to ensure that automated traders are placing orders based on their knowledge of the economic value of the asset being traded rather than their knowledge of order book dynamics or of other market participants' trading patterns.

96. Should exchanges impose a minimum time period for which orders must remain on the order book before they can be withdrawn? If so, should this minimum resting time requirement apply to orders of all sizes or be restricted to orders smaller than a specific threshold? If there should be a specific threshold, how should that threshold be determined?

97. The Commission seeks to understand where time-weighted Pro Rata trade allocation is currently being utilized and what the effects have been. Please note examples from exchanges and, to the extent possible, please comment on the impact that such matching algorithms have had on the amount of time resting orders are left in the order book, as well as on other aspects of market quality.

98. If exchanges aggregated multiple, small orders entered by the same entity with the intent of abusing rounding conventions to gain a disproportionate share of allocations, what criteria should exchanges use to distinguish such orders from those that are entered by the same legal entity for legitimate trading purposes? Are there empirical patterns that could be used to reliably identify such manipulative intent?

99. Would batched order processing increase the number of milliseconds that are necessary for correlations among related securities to be established? If so, what specific costs would result from this change and how do those costs compare to the potential benefits described in recent research?

100. What costs and benefits result from providing market participants with real-time access to information about the order book that extends beyond aggregate size available at a limit price? Is there a legitimate economic benefit that results from market participants (both human participants, and ATSs) accessing such information? Is it possible for market participants to use such information to manipulate the order book?

101. The Commission seeks to understand whether any of the recommendations above are inapplicable or irrelevant to markets subject to the CEA. If so, please indicate which recommendation(s) and what makes it inapplicable or irrelevant to those markets.

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[112] Meaning, behaviors that, while not strictly illegal, are used to advantage one's own orders in ways that do not contribute to efficient price discovery.

[113] *See* Jonathan Brogaard, Terrence Hendershott & Ryan Riordan, "High Frequency Trading and Price Discovery" (Apr. 22, 2013), available at *http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1928510*; Hasbrouck & Saar, *supra* note 18; Terrence Hendershott, Charles Jones & Albert Menkveld, "Does Algorithmic Trading Improve Liquidity?" Journal of Finance, Vol. 66 at 1–33 (August 30, 2010), available at *http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1100635*.

[114] *See* J. Doyne Farmer & Spyros Skouras, "An Ecological Perspective on the Future of Computer Trading," Quantitative Finance (2013); IOSCO Report on Regulatory Issues Raised by Technological Changes, *supra* note 4; William Barker & Anna Pomeranets, "The Growth of High-Frequency Trading: Implications for Financial Stability," Bank of Canada Financial System Review (June 2011), available at *http://www.bankofcanada.ca/2012/01/publications/periodicals/fsr-article/the-growth-of-high-frequency-trading/*.

[115] *See* Farmer & Skouras, *supra* note 114; Eric Budish, Peter Cramton & John Shim, "The High-Frequency Trading Arms Race: Frequent Batch Auctions as a Market Design Response" (July 7, 2013), available at *http://faculty.chicagobooth.edu/eric.budish/research/HFT-FrequentBatchAuctions.pdf*; John McPartland, "Recommendations for Equitable Allocation of Trades in High Frequency Trading Environments" (July 25, 2013), available at *http://www.chicagofed.org/Webpages/publications/policy_discussion_papers/2013/pdp_1.cfm*.

[116] *See* McPartland, *supra* note 115.

[117] See Budish, *supra* note 115*;* J. Doyne Farmer & Spyros Skouras, "Review of the Benefits of a Continuous Market vs. Randomised Stop Auctions and of Alternative Priority Rules (Policy Options 7 and 12)," Foresight U.K. Government Office for Science, Economic Impact Assessment (2013), available at *http://www.bis.gov.uk/assets/foresight/docs/computer-trading/12-1072-eia11-continuous-market-vs-randomised-stop-auctions.pdf*.

4. Policies and Procedures To Identify ''Related Contracts''

Rule 38.255 of the Commission's regulations require DCMs to establish and maintain risk controls for trading.[118] Appendix B to the Part 38 regulations provides the following guidance on such risk controls: If a contract is linked to, or is a substitute for, other contracts, either listed on [the DCM's] market or on other trading venues, the designated contract market must, to the extent practicable, coordinate its risk controls with any similar controls placed on those other contracts.[119] The guidance contained in the appendix further provides that, to the extent practicable, DCMs should coordinate not only with other DCMs, but national security exchanges as well.[120] These measures could protect against market disruptions cascading from one trading platform to the next.

102. If you are a DCM, please address whether you have (i) identified all contracts that are linked to, or are a substitute for, other contracts either listed on your market or on other trading venues; and, if so, (ii) coordinated your risk controls with any similar controls placed on those other contracts. If you have not identified such contracts and coordinated risk controls on such contracts, please address any other means by which you are addressing risk controls applicable to contracts that are linked to, or are a substitute for, other contracts listed on your exchange or on other trading venues.

103. Please explain whether it would be beneficial for exchanges to develop and document policies and procedures for regularly reviewing contracts on other exchanges in order to identify those that are ''linked to'' or that are ''a substitute for'' contracts listed on its own market.

5. Standardize and Simplify Order Types

This Concept Release inquires about the possible standardization and simplification of order types that have complex logic embedded within them. A proliferation of order types, both within and across exchanges, can result in a similar increase in both the expected and unexpected responses of automated systems to order and trade signals. As of November 2012, for example, it was reported that BATS Global Markets alone listed more than

2,000 order types.[121] A review of current and proposed order types could be performed with the goal of consolidating and simplifying order types.[122] A proliferation of complex order types leads to complex testing scenarios. Therefore, it is possible that consolidation of order types could reduce the potential for instability resulting from unexpected interactions of multiple ATSs using multiple means of execution within the order book.[123]

104. Please explain whether the standardization and simplification of order types that have complex logic embedded within them would reduce the potential for instability and other market disruptions. If not, what other measures could achieve the same effect?

105. If the Commission were to consider the standardization and simplification of order types in a future rulemaking, please identify who should conduct this review (*i.e.,* the Commission, trading platforms, or other parties).

G. General Questions Regarding All Risk Controls Discussed Above

Finally, the Commission requests comment on the following general questions, with respect to each of the risk controls discussed above:

106. For each of the specified controls described above [*see* sections III.C–F], please indicate whether you are already using the control on customer and/or proprietary orders. If applicable, please also indicate how widely you believe the control is currently being used in the market, and how consistent the application of the control is among firms.

107. If possible, please indicate specific costs associated with implementing each of the risk controls

described above [*see* sections III.C–F]. Please include detailed estimates, distinguishing between the cost of developing the functionality, the cost of implementation, and the cost of ongoing operations.

108. Please describe the specific benefits associated with each of the risk controls. Where possible, please indicate the market participant category(ies) to which the benefit would accrue.

109. Please comment on the appropriate order of implementation and timeline for each risk control, including any distinctions that should be made based on the category of registrant or market participant implementing the same or similar control, whether the market participant is using DMA, and whether implementation is already in place for certain categories.

110. Are any of the risk controls unnecessary, impractical for commercial or technological reasons, or inadvisable? If so, please note the control and provide reasons why.

111. A number of the pre-trade risk controls contemplated above are similar protections at distinct points in the life of an order.

a. Please comment on the utility of redundant pre-trade risk controls and the desirability of risk control systems in which controls are placed at one or more than one focal points.

b. If pre-trade risk controls should reside at one or more than one focal point, then please identify, for each risk control, what that focal point should be?

112. Are there risk controls that should be implemented across multiple entity types? If so, which controls and for which types of entities should they apply? Also, please comment generally on the factors the Commission should consider when determining the appropriate entity(ies) upon which to place a risk control requirement that could pertain to more than one entity.

113. Are there controls that should not be considered for overlapping implementation across exchanges, clearing members and market participants? If so, please explain which ones and why.

114. Each of the risk controls is described in general, principles-based terms. Should the Commission specify more granular or specific requirements with respect to any of the controls to improve their effectiveness or provide greater clarity to industry participants? If so, please identify the relevant control and the additional granularity or specificity that the Commission should provide. Are any of the controls, as

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[118] *See* 17 CFR 38.255.

[119] *See* DCM Final Rules, 77 FR at 36718.

[120] *See id.*

[121] *See* Peter Chapman, ''Too Many Order Types, Traders Fret,'' Traders Magazine (Nov. 2012), available at *http://www.tradersmagazine.com/ issues/25_344/order-types-equities-structure-110515-1.html.*

[122] The SEC is currently in the process of reviewing order types within securities markets. *See* Scott Patterson & Jean Eaglesham, ''Exchanges Retreat on Trading Tools,'' Wall St. J. (Oct. 24, 2012) (quoting former Chairwoman of the SEC, Mary Schapiro: ''I worry about the complexity in the market, I worry about the profusion of order types, I worry about the fragmentation.''), available at *http://online.wsj.com/article/SB10001424052970203400604578074963881803302.html. See also* SEC Roundtable Transcript, *supra* note 2, at 96–99.

[123] *See* SEC Roundtable Transcript, *supra* note 2, at 96 (''It is the proliferation of all these order types and the complexity of these order types that is adding unnecessary complexity to the market, which is already an extremely complex system as it is . . . when you have complex order types, it leads to extremely complex testing scenarios, and you are not going to pick up all the things you could or should because you don't know what that actual matching engine logic is in general.'').

currently drafted, inadequate to achieve the desired risk-reduction?

115. To the extent that there is any need to standardize or provide greater specificity regarding any measures discussed in this Concept Release, including those that reflect industry best practices, please describe the best approach to achieve such standardization (*i.e.,* through Commission regulation, Commission-sponsored committee or working group, or some other method).

116. How should risk control monitoring be implemented? Should compliance be audited by internal and external parties? For each control, please identify the appropriate entity(ies) to monitor compliance with the control. Also, please describe what an acceptable compliance audit would entail for each control.

117. Are there additional controls that should be considered, or other methods that could serve as alternatives to those described above [*see* sections III.C–F]? If so, please describe the control, its costs and benefits, the appropriate entity(ies) to implement such control, and whether there is any distinction to be drawn in the case of DMA.

118. Would any of the risk safeguards create a disincentive to innovate or create incentives to innovate in an irresponsible manner? If so, please identify the control, the concern raised, and how the control should be amended to address the concern. Responses should indicate how an amended risk control would still meet the Commission's objectives.

119. Should the Commission consider any pre-trade risk controls, post-trade reports, or system safeguards appropriate exclusively to market makers or to ATSs used by market makers? If so, please describe such controls or safeguards.

120. Should the Commission or Congress revisit its approach to issuing civil monetary penalties for violations of the Act, particularly as they relate to automated trading environments? Currently, the maximum civil monetary penalty the Commission may issue is capped at $140,000 ''per violation.'' Is such a civil monetary penalty sufficient to deter acts that constitute violations of the Act, given that an individual violation could impose costs to the market and the public well in excess of $140,000?

121. Please describe the documentation (or categories of documents) that would demonstrate that a market participant operating an ATS has implemented each risk control addressed in this Concept Release, including, for example, computer code,

system testing results, certification processes and results, and calculations.

122. Would a fee (collected by, for example, the DCM or SEF) on numbers of messages exceeding a certain limit be more appropriate than a hard limit on the number or rate of messages?

123. Should such a penalty be based on a specified number or rate of messages or on the ratio of messages to orders filled over a specified time period?

124. Recent disruptive events in securities markets illustrate the importance of effective communication between exchanges' information technology systems. The Commission requests public comments regarding relevant systems in its regulated markets, including both DCMs and SEFs. What data transfers or other communications between exchanges are necessary for safe, orderly, and well-functioning derivatives markets? What additional measures, if any, would help promote the soundness of such systems (*e.g.,* testing requirements, redundancy standards, etc.)?

IV. List of All Questions in the Concept Release

Listed below are all questions raised in the preceding sections of this Concept Release.

High Frequency Trading

1. In any rulemaking arising from this Concept Release, should the Commission adopt a formal definition of HFT? If so, what should that definition be, and how should it be applied for regulatory purposes?

2. What are the strengths and weaknesses of the TAC working group definition of HFT provided above [*see* section II.A.1]? How should that definition be amended, if at all?

3. The definition of HFT provided above uses ''recurring high message rates (orders, quotes or cancellations)'' as one of the identifying characteristics of HFT, and lists three objective measures ((i) cancel-to-fill ratios; (ii) participant-to-market message ratios; or (iii) participant-to-market trade volume ratios) that could be used to measure message rates. Are these criteria sufficient to reliably distinguish between ATSs in general and ATSs using HFT strategies? What threshold values are appropriate for each of these measures in order to identify ''high message rates?'' Should these threshold values vary across exchanges and assets? If so, how?

4. Should the risk controls for systems and firms that engage in HFT be different from those that apply to ATSs in general systems? If so, how?

Reductions in Latency

5. Discussions on latency often focus on the how quickly an exchange processes orders, the time taken to submit orders, and how quickly a firm can observe prices of trades transacted on the exchange. The Commission is interested in understanding whether there are other types of messages transmitted between exchanges, firms and vendors wherein differences in latency could provide opportunities for informational advantage. Recent press reports have highlighted such advantages in the transmission of trade confirmations by a specific exchange. Are there other exchanges and trading venues where similar differences in latency exist? The Commission is interested in understanding whether the extent of latency in any such message transmission process can have an adverse impact on market quality or fairness. Should any exchanges, vendors and firms be required to audit their systems and process on a periodic process to identify and then resolve such latency?

Financial Integrity of the DCO

6. Are there distinct pre-trade risk controls, including measures not listed below, or measures in addition to those already adopted by the Commission, that would be particularly helpful in protecting the financial integrity of a DCO?

Risk Controls Applicable in the Case of DMA

7. Are there distinct pre-trade risk controls, including measures not listed below [*see* section III.C.], or measures in addition to those already adopted by the Commission, that should apply specifically in the case of DMA?

Message and Execution Throttles

8. If, as contemplated above [*see* section III.C.1], maximum message rates and execution throttles were used as a mechanism to prevent individual entities or accounts from trading at speeds that are misaligned with their risk management capabilities, how should this message rate be determined?

9. Message and execution throttles may be applied by trading firms (FCMs and proprietary trading firms), clearing firms, and by exchanges. The Commission requests public comment regarding the appropriate location for message and execution throttles.

a. If throttles should be implemented at the trading firm level, should they be applied to all ATSs, only ATSs employing HFT strategies, or both?

b. What role should clearing firms play in the operation or calibration of

throttles on orders submitted by the trading firms whose trades they guarantee?

10. Should the message and execution throttles be based on market conditions, risk parameters, type of entity, or other factors?

11. What thresholds should be used for each type of market participant in order to determine when a message or execution throttle should be used? Should these thresholds be set by the exchange or the market participant?

12. Are message and execution thresholds typically set by contract, or by algorithm? What are the advantages and disadvantages to each method?

13. Who should be charged with setting message rates for products and when they are activated?

14. Would message and execution throttles provide additional protection in mitigating credit risk to DCOs?

Volatility Awareness Alerts

15. The Commission is aware that alarms can be disruptive or counterproductive if ''false alarms'' outnumber accurate ones. How can volatility alarms be calibrated in order to minimize the risk that false alarms could interrupt trading or cause human monitors to ignore them over time?

Self-Trade Controls

16. What specific practices or tools have been effective in blocking self-trades, and what are the costs associated with wide-spread adoption of such practices or tools?

17. Please indicate how widely you believe exchange-sponsored self-trading controls are being used in the market.

18. Should self-trade controls cancel the resting order(s)? Or, instead, should they reject the taking order that would have resulted in a self-trade? If applicable, please explain why one mechanism is more effective than the other.

19. Should exchanges be required to implement self-trading controls in their matching engines? What benefits or challenges would result from such a requirement?

20. Please explain whether regulatory standards regarding the use of self-trading control technology would provide additional protection to markets and market participants.

21. If you believe that self-trading controls are beneficial, please describe the level of granularity at which such controls should operate (e.g., should the controls limit self-trading at the executing firm level? At the individual trader level?) What levels of granularity are practical or achievable?

22. If you believe that self-trading controls are beneficial, please explain whether exchanges should require such controls for market participants and identify the categories of participants that should be subject to such controls. For example, should exchanges require self-trading controls for all participants, some types of participants, participants trading in certain contracts, or participants in market maker and/or incentive programs? What benefits or challenges would result from imposing such controls on each category of participant?

Price Collars

23. The Commission is aware that some exchanges already have price collars in place for at least a portion of the contracts traded in their markets. Please comment on whether exchanges should utilize price collars on all contracts they list.

24. Would price collars provide additional protection in mitigating credit risk to DCOs?

Maximum Order Sizes

25. Are such controls typically applied to all contracts and customers, or on a more limited basis?

26. Do exchanges allow clearing members to use the exchange's technology to set maximum order sizes for specific customers or accounts?

27. Would additional standardization in the capabilities of this technology or more uniform application of this technology to all customers and contracts improve the effectiveness of such controls?

28. To what extent are clearing firms and trading firms conducting pre-trade maximum order size screens? Please explain whether firms are conducting such screens by utilizing: (1) Their own technology; (2) the exchange's technology, or (3) a combination of both.

29. Would regulatory standards regarding the use of such technology provide additional protection to the markets?

Trading Pauses

30. Trading pauses, as currently implemented, can be triggered for multiple reasons. Are certain triggers more or less effective in mitigating the effects of market disruptions?

31. Are there additional triggers for which pauses should be implemented? If so, what are they?

32. What factors should the Commission or exchanges take into account when considering how to specify pauses or what thresholds should be used?

33. How should the re-opening of a market after a trading pause be effected?

Credit Risk Limits

34. What positions should be included in credit risk limit calculations in order to ensure that they are useful as a tool for limiting the activity of a malfunctioning ATS? Is it adequate for such a screen to include only those positions entered into by a particular ATS or should it include all the firm's positions?

35. Should pre-trade credit screens require a full recalculation of margin based on the effect of the order?

36. In light of your answers to the previous two questions, where in the lifecycle of an order should the credit limits be applied and what entity should be responsible for conducting such checks?

37. If credit checks are conducted post-trade, what should be done when a trade causes a firm to exceed a limit?

38. Please describe any technological limitations that the Commission should be aware of with respect to applying credit limits.

39. The Commission is particularly interested to receive public comment on the ''hub'' model and its applicability to different types of pre-trade risk controls. What are the strengths and weaknesses of this approach relative to other pre-trade or post-trade approaches to checking trades against credit limits? How would the latency between the ''hub'' and the exchanges be managed to provide accurate limits for high frequency ATS?

40. If you believe that post-trade credit checks would be an effective safeguard against malfunctioning ATSs, what is the maximum amount of latency that should be allowed for conducting such checks? What technological or information flow challenges would have to be addressed in order to implement post-trade checks with that degree of latency?

41. With respect to any entity that you believe should be responsible for applying credit risk limits, please describe the technology necessary to implement that risk control and the cost of such technology.

Order, Trade and Position Drop Copy

42. What order and trade reports are currently offered by DCMs and DCOs? What aspects of those reports are most valuable or necessary for implementing risk safeguards? Please also indicate whether the report is included as part of the exchange or clearing service, or whether an extra fee must be paid.

43. If each order and trade report described above were to be standardized, please provide a detailed list of the appropriate content of the

report, and how long after order receipt, order execution, or clearing the report should be delivered from the trading platform to the clearing member or other market participant.

Trade Cancellation or Adjustment Policies

44. Is a measure that would obligate exchanges to make error trade decisions (*i.e.,* decisions to cancel a trade or to adjust its price) within a specified amount of time after an error trade is reported feasible? If so, what amount of time would be sufficient for exchanges, but would be sufficiently limited to help reduce risk for counterparties to error trades?

45. Should exchanges develop detailed, pre-determined criteria regarding when they can adjust or cancel a trade, or should exchanges be able to exercise discretion regarding when they can adjust or cancel a trade? What circumstances make pre-determined criteria more effective or necessary than the ability to exercise discretion, and vice versa?

46. Do error trade policies that favor price adjustment over trade cancellation effectively mitigate risk for market participants that are counterparties to error trades? Are there certain situations where canceling trades would mitigate counterparty risk more effectively? If so, what are they and how could such situations be identified reliably by the exchange in a short period of time?

47. Should error trade policies be consistent across exchanges, either in whole or in part? If so, how would harmonization of error trade policies mitigate risks for market participants, or contribute to more orderly trading?

Order Cancellation Capabilities

48. The Commission's discussion of kill switches assumes that certain benefits accrue to their use across exchanges, trading and clearing firms, and DCOs. Please comment on whether such redundant use of kill switches is necessary for effective risk control.

49. What processes, policies, and procedures should exchanges use to govern their use of kill switches? Are there any different or additional processes, policies and procedures that should govern the use of kill switches that would specifically apply in the case of DMA?

50. What processes, policies, and procedures should clearing firms use to govern their use of kill switches when using such a safeguard to cancel and prevent orders on behalf of one or more clients?

51. What objective criteria regarding kill switch triggers, if any, should

entities incorporate into their policies and procedures?

52. What benefits or problems could result from standardizing processes, policies, and procedures related to kill switches across exchanges and/or clearing firms?

53. Please explain how kill switches should be designed to prevent them from canceling or preventing the submission of orders that are actually risk reducing or that offset positions that have been entered by a malfunctioning ATS.

54. The Commission requests comment regarding whether kill switches used by clearing firms already have or should have the following capabilities: (a) Distinguish client orders from proprietary orders; (b) distinguish among orders from individual clients; and (c) cancel working orders and prevent additional orders from one or more of the clearing firm's clients, or for all the clearing firm's proprietary accounts, without cancelling and preventing all orders from the clearing firm.

55. The Commission is aware of proposals that would enable FCMs to establish credit limits for customers that are stored at a central ''credit hub'' for the purpose of pre-trade credit checks. If such a model were implemented, is it possible that it could also be enabled with kill switches that cancel existing working orders and prevent additional orders from being submitted by one or more market participants? Should such an approach be designed to complement kill switches that are controlled by exchanges, clearing members, and trading firms, or to replace these kill switches? What benefits and drawbacks would result from each approach?

ATS Testing

56. Please describe the necessary elements of an effective ATS testing regime, in connection with both the initial deployment and the modification of an ATS.

57. With respect to testing of modifications, how should the Commission and market participants distinguish between major modifications and minor modifications? What are the objective criteria that can be used to make such distinctions? Should any testing regime applicable to ATS modifications distinguish between major and minor modifications, and if so, how?

58. What challenges or benefits may result from exchanges implementing standardized procedures regarding the development, change management and testing of exchange systems? Please describe, if any, the types of

standardized procedures that would be most effective.

Crisis Management Procedures

59. Should basic crisis management procedures be standardized across market participants? If so, what elements should be addressed in an industry-wide standard?

60. Are there specific, core requirements that should be included in any crisis management procedures? Similarly, are there specific types of crisis events that should be addressed in any crisis management procedures? If so, please identify such requirements and/or crisis events and the level of granularity or specificity that the procedures should have with respect to each.

Self-Certification and Clearing Firm Certification

61. How often should a market participant certify that their pre-trade risk controls, post-trade reports and other measures, and system safeguards meet the necessary standards?

62. Which representative of the market participant should be required to attest that the certification standards have been met? Should it be the market participant's chief executive officer, chief compliance officer, or similar high-ranking corporate official, or some other individual?

63. Which entity(ies) should receive certifications from market participants? For example, should it be the market participant's clearing firm, its designated self-regulatory organization (if applicable), one or more trading platforms, a registered futures association, the Commission, or other entity?

64. Should DCMs, SEFs or clearing member firms be required to audit market participant certifications? What would be covered in an audit and how often should these audits occur? Should the same entity that receives the certification be required to perform the audit?

Risk Event Notification Requirements

65. Do commenters believe that risk event notifications would help to better understand and ultimately reduce sources of risk in automated trading environments? What information should be contained in a risk event notification to maximize its value?

66. What types of risk events should trigger reporting requirements, and what entities should receive risk event notifications from market participants operating ATSs?

67. Which entities should receive risk event notifications?

ATS or Algorithm Identification

68. Should the Commission define ATS or algorithm for purposes of any ATS identification system that may arise from this Concept Release? If so, how should ATS or algorithm be defined? Should a separate designation be reserved for high frequency trading algorithms and if so, what is the threshold difference?

69. What are the existing practices within trading firms for internally identifying ATSs or algorithms and for tracking their performance, including profit and loss? What elements of existing practices could be leveraged in any ATS or algorithm identification system proposed by the Commission in the future?

70. The Commission understands that an ATS may consist of numerous algorithms, each of which contributes to a trading decision. If an algorithm-based identification system is proposed, which of the potentially multiple algorithms that constitute an ATS should carry the ID? In addition, what degree of change to an algorithm should necessitate the use of a new ID, and how often does this change typically occur? What is the appropriate definition of ''algorithm'' for purposes of an algorithm identification system?

71. If the identification system resides at the ATS level, how should such IDs be structured to ensure that they are nonetheless sufficiently granular to identify components that may be leading or have led to unstable market conditions?

72. What message traffic between an ATS and a trading platform should include the ATS or algorithm ID (all messages, orders only, etc.)?

73. What relationship should this ATS ID have to the legal entity identifier (LEI)?

Data Reasonability Checks

74. Please describe existing practices in the industry concerning how and the extent to which ATSs use (1) market data; and (2) news and information providers, including social media, to inform trading decisions.

75. The Commission requests comment regarding any risk controls, including reasonability checks, currently being used by market participants operating ATSs to review market data and news and information providers, including social media. Please describe the risk control, including the purpose of the control, the extent of its use among derivatives market participants, and any other aspects of the risk control that you believe would be helpful for the Commission to understand.

76. The Commission requests public comment concerning the lock-up process for government economic reports, and any additional measures that might be taken to protect against inappropriate disclosure.

77. Please describe the extent to which potentially market-moving data from non-governmental economic reports can be obtained prior to its public release for a fee. Are there specific reports or types of reports for which early disclosure should not be permitted? What process should be used for identifying non-governmental economic reports whose early release should not be permitted? Should the data release process for such reports be similar to the data lock-up process implemented for the release of government economic data?

Registration of Firms Operating ATSs

78. Should firms operating ATSs in CFTC-regulated markets, but not otherwise registered with the Commission, be required to register with the CFTC? If so, please explain.

79. Please identify the firm characteristics, trading practices, or technologies that could be used to trigger a registration requirement.

80. Should all firms deploying ATS be required to register, and should there be different standards for firms deploying HFT strategies? What are the appropriate thresholds levels below which registration would not be required?

81. Since the floor trader distinction only addresses proprietary traders, please explain whether there is any other category of market participant, such as those deploying ATS or HFT strategies and trading on behalf of clients (aside from market participants already subject to Commission jurisdiction, such as Introducing Brokers and FCMs) that the Commission should consider with respect to potential registration requirements.

82. Should software firms providing algorithms be required to register, and under what authority? What standards should apply to such firms?

83. Please identify the functionalities discussed in this Concept Release that could be applied to floor brokers that operate ATSs. Are there any other controls not mentioned in this Concept Release that should be under consideration?

84. Please supply any information or data that would help the Commission in deciding whether firms may or may not meet the definition of ''floor trader'' in § 1a(23) of the Act.

85. Do you believe that the registration of such firms as ''floor traders'' would effectuate the purposes of the CEA to deter and detect price manipulation or any other disruptions to market integrity?

86. Considering the broad deployment of automated trading systems across both equities and derivatives markets, the Commission seeks to understand the appropriate level of coordination between itself and the SEC in defining and applying possible standards to the ATS and HFT trading space. How closely should the CFTC and SEC coordinate on possible rules and requirements for trading firms? The Commission also seeks public comment on the appropriate level of coordinated oversight between itself and relevant Self-Regulatory Organizations such as National Futures Association and FINRA.

87. Using the Flash Crash as an example, is it important to have identical definitions and remedies in the case of ATS and HFT registration requirements or do the existing market controls, such as circuit breakers, provide the necessary market protections in both the equities and derivatives markets? If the rules are not coordinated, what impact would this have on market interaction and oversight?

88. If trading venues apply mandatory functionalities to access derivatives markets, what benefit would a registration requirement provide to the Commission?

Market Quality Data

89. What market quality indicators are in place today? Please describe the metrics, how and where they are deployed, and how market participants access these indicators and at what cost.

90. What value would each of the market quality metrics described above [*see* section III.F.2] provide to market participants receiving them? If possible, please be specific about how each market quality measure could be used to enhance reliability and risk management of ATSs.

91. Conversely, could any of the market quality metrics described above [*see* section III.F.2] be used by market participants to manipulate the order book, to identify competitors' trading strategies, or to engage in other trading activities that do not contribute to effective risk management and efficient discovery the traded asset's economic value? If so, please provide specific information regarding how such information could be misused. If possible, please provide recommendations regarding steps the Commission could take to prevent misuse.

92. Are there additional market quality metrics that the Commission should contemplate requiring exchanges to provide? If so, what value would they provide and how would they be used?

93. If the Commission determines that measures should be calculated in the same way by various exchanges in order to provide comparable measures of market quality, then how, specifically, should each of the above mentioned metrics be calculated in order to ensure that they are most valuable to market participants?

94. What timing and mode of dissemination is appropriate for each metric? For example, should measures be provided as daily averages?

95. Does the liquidity of a given market impact which market quality metrics would be reliable and useful when calculated for that market? If so, which metrics are inapplicable in less liquid markets, and why? What liquidity measures and thresholds are relevant to determining which metrics should apply to a given market?

Market Quality Incentives

96. Should exchanges impose a minimum time period for which orders must remain on the order book before they can be withdrawn? If so, should this minimum resting time requirement apply to orders of all sizes or be restricted to orders smaller than a specific threshold? If there should be a specific threshold, how should that threshold be determined?

97. The Commission seeks to understand where time-weighted Pro Rata trade allocation is currently being utilized and what the effects have been. Please note examples from exchanges and, to the extent possible, please comment on the impact that such matching algorithms have had on the amount of time resting orders are left in the order book, as well as on other aspects of market quality.

98. If exchanges aggregated multiple, small orders entered by the same entity with the intent of abusing rounding conventions to gain a disproportionate share of allocations, what criteria should exchanges use to distinguish such orders from those that are entered by the same legal entity for legitimate trading purposes? Are there empirical patterns that could be used to reliably identify such manipulative intent?

99. Would batched order processing increase the number of milliseconds that are necessary for correlations among related securities to be established? If so, what specific costs would result from this change and how do those costs compare to the potential benefits described in recent research?

100. What costs and benefits result from providing market participants with real-time access to information about the order book that extends beyond aggregate size available at a limit price? Is there a legitimate economic benefit that results from market participants (both human participants, and ATSs) accessing such information? Is it possible for market participants to use such information to manipulate the order book?

101. The Commission seeks to understand whether any of the recommendations above [*see* section III.F.3] are inapplicable or irrelevant to markets subject to the CEA. If so, please indicate which recommendation(s) and what makes it inapplicable or irrelevant to those markets.

Policies and Procedures To Identify "Related Contracts"

102. If you are a DCM, please address whether you have (i) identified all contracts that are linked to, or are a substitute for, other contracts either listed on your market or on other trading venues; and, if so, (ii) coordinated your risk controls with any similar controls placed on those other contracts. If you have not identified such contracts and coordinated risk controls on such contracts, please address any other means by which you are addressing risk controls applicable to contracts that are linked to, or are a substitute for, other contracts listed on your exchange or on other trading venues.

103. Please explain whether it would be beneficial for exchanges to develop and document policies and procedures for regularly reviewing contracts on other exchanges in order to identify those that are "linked to" or that are "a substitute for" contracts listed on its own market.

Standardize and Simplify Order Types

104. Please explain whether the standardization and simplification of order types that have complex logic embedded within them would reduce the potential for instability and other market disruptions. If not, what other measures could achieve the same effect?

105. If the Commission were to consider the standardization and simplification of order types in a future rulemaking, please identify who should conduct this review (*i.e.,* the Commission, trading platforms, or other parties).

General Questions Regarding All Risk Controls

106. For each of the specified controls described above [*see* sections III.C–F],

please indicate whether you are already using the control on customer and/or proprietary orders. If applicable, please also indicate how widely you believe the control is currently being used in the market, and how consistent the application of the control is among firms.

107. If possible, please indicate specific costs associated with implementing each of the risk controls described above [*see* sections III.C–F]. Please include detailed estimates, distinguishing between the cost of developing the functionality, the cost of implementation, and the cost of ongoing operations.

108. Please describe the specific benefits associated with each of the risk controls. Where possible, please indicate the market participant category(ies) to which the benefit would accrue.

109. Please comment on the appropriate order of implementation and timeline for each risk control, including any distinctions that should be made based on the category of registrant or market participant implementing the same or similar control, whether the market participant is using DMA, and whether implementation is already in place for certain categories.

110. Are any of the risk controls unnecessary, impractical for commercial or technological reasons, or inadvisable? If so, please note the control and provide reasons why.

111. A number of the pre-trade risk controls contemplated above are similar protections at distinct points in the life of an order.

a. Please comment on the utility of redundant pre-trade risk controls and the desirability of risk control systems in which controls are placed at one or more than one focal points.

b. If pre-trade risk controls should reside at one or more than one focal point, then please identify, for each risk control, what that focal point should be?

112. Are there risk controls that should be implemented across multiple entity types? If so, which controls and for which types of entities should they apply? Also, please comment generally on the factors the Commission should consider when determining the appropriate entity(ies) upon which to place a risk control requirement that could pertain to more than one entity.

113. Are there controls that should not be considered for overlapping implementation across exchanges, clearing members and market participants? If so, please explain which ones and why.

114. Each of the risk controls is described in general, principles-based terms. Should the Commission specify more granular or specific requirements with respect to any of the controls to improve their effectiveness or provide greater clarity to industry participants? If so, please identify the relevant control and the additional granularity or specificity that the Commission should provide. Are any of the controls, as currently drafted, inadequate to achieve the desired risk-reduction?

115. To the extent that there is any need to standardize or provide greater specificity regarding any measures discussed in this Concept Release, including those that reflect industry best practices, please describe the best approach to achieve such standardization (*i.e.,* through Commission regulation, Commission-sponsored committee or working group, or some other method).

116. How should risk control monitoring be implemented? Should compliance be audited by internal and external parties? For each control, please identify the appropriate entity(ies) to monitor compliance with the control. Also, please describe what an acceptable compliance audit would entail for each control.

117. Are there additional controls that should be considered, or other methods that could serve as alternatives to those described above [*see* sections III.C–F]? If so, please describe the control, its costs and benefits, the appropriate entity(ies) to implement such control, and whether there is any distinction to be drawn in the case of DMA.

118. Would any of the risk safeguards create a disincentive to innovate or create incentives to innovate in an irresponsible manner? If so, please identify the control, the concern raised, and how the control should be amended to address the concern. Responses should indicate how an amended risk control would still meet the Commission's objectives.

119. Should the Commission consider any pre-trade risk controls, post-trade reports, or system safeguards appropriate exclusively to market makers or to ATSs used by market makers? If so, please describe such controls or safeguards.

120. Should the Commission or Congress revisit its approach to issuing civil monetary penalties for violations of the Act, particularly as they relate to automated trading environments? Currently, the maximum civil monetary penalty the Commission may issue is capped at $140,000 ''per violation.'' Is such a civil monetary penalty sufficient to deter acts that constitute violations of the Act, given that an individual violation could impose costs to the market and the public well in excess of $140,000?

121. Please describe the documentation (or categories of documents) that would demonstrate that a market participant operating an ATS has implemented each risk control addressed in this Concept Release, including, for example, computer code, system testing results, certification processes and results, and calculations.

122. Would a fee (collected by, for example, the DCM or SEF) on numbers of messages exceeding a certain limit be more appropriate than a hard limit on the number or rate of messages?

123. Should such a penalty be based on a specified number or rate of messages or on the ratio of messages to orders filled over a specified time period?

124. Recent disruptive events in securities markets illustrate the importance of effective communication between exchanges' information technology systems. The Commission requests public comments regarding relevant systems in its regulated markets, including both DCMs and SEFs. What data transfers or other communications between exchanges are necessary for safe, orderly, and well-functioning derivatives markets? What additional measures, if any, would help promote the soundness of such systems (*e.g.,* testing requirements, redundancy standards, etc.)?

V. Appendices (Specific Measures in Bold Font)

A. Pre-Trade Risk Controls

Potential pre-trade risk control	Party(s) to implement risk control	Substance of control
1a. Maximum Message Rate (Message Throttle).	*Market Participants Operating ATSs, Trading Platforms, and Clearing Firms*.	1a. Market participants operating ATSs must establish a maximum message rate per unit time for each ATS. This control should be calibrated to address the potential for unintended message flow (including orders) from a malfunctioning ATS. Market participants' systems must prevent the submission of messages in excess of the specified rate. Trading platforms' systems must prevent the acceptance of messages in excess of their own specified rates and must log instances when each ATS attempted to exceed such limits. Separately, trading platforms must establish systems enabling clearing firms to set rate limits directly at the trading platform. Trading platforms, clearing firms and market participants may set rates independently of each other. In all cases, human monitors must be alerted when limits are breached.
1b. Maximum Execution Rate (Execution Throttle).	*Market Participants Operating ATSs, Trading Platforms, and Clearing Firms*.	1b. Market participants operating ATSs must establish a limit on the maximum number of orders that each of their ATSs can execute in a given direction per unit time. The limit should be unique to each ATS and should be calibrated to address the potential for unintended executions arising from a malfunctioning ATS. Additional orders in excess of the limit should not be submitted or executed. Trading platforms must establish a maximum number of orders in the same direction they will execute per unit time from a uniquely identified ATS, and must prevent execution of trades that would violate this limit. Separately, trading platforms must establish systems enabling clearing firms to set per-customer message rate limits directly at the trading platform. Trading platforms, clearing firms and market participants may set rates independently of each other.

Potential pre-trade risk control	Party(s) to implement risk control	Substance of control
2. Volatility Awareness Alerts.	*Market Participants Operating ATSs*.	Market participants operating ATSs must implement automated solutions to immediately notify system supervisors when the prices of individual or groups of assets relevant to an ATS's trading strategies move either up or down by a given percentage within a predetermined period of time, or when the volume of individual or groups of assets relevant to an ATSs trading strategies over a specific period of time increase or decrease beyond a predetermined threshold. This control should help system supervisors identify market conditions which are not appropriate to the continued operation of a particular ATS or algorithm. The alert should be configurable by contract.
3. Self-Trade Controls	*Trading Platforms and All Market Participants*.	Trading platforms must provide, and all market participants must apply, technologies to identify and limit the transmission of orders from their systems to a trading platform that would result in self-trades.
4. Price Collars	*Trading Platforms and All Market Participants*.	Trading platforms must assign a range of acceptable order and execution prices for each of their products. All orders outside of this range would be automatically rejected, and orders already in the order book but outside of the acceptable range should not be elected by the matching engine.
		All market participants must establish similar product-specific price collars and should implement systems to ensure that orders outside of the collar are not transmitted to the relevant trading platform.
5. Maximum Order Size	*Trading Platforms, Clearing Firms, and All Market Participants*.	Trading platforms, clearing firms, and all market participants must each establish default maximum order sizes for orders submitted, transmitted, or processed by their systems.
		A market participant's systems must prevent the submission of orders in excess of its internally-specified limits. A clearing firm's systems must prevent the transmission of customer orders in excess of its limits for that customer. Trading platforms must prevent their systems from processing or executing orders in excess of the limit specified by the trading platform.
		In addition, for DMA customers, trading platforms must establish similar systems enabling clearing firms to set per-customer order size limits directly at the trading platform.
		Limits set by market participants, clearing firms, and trading platforms may be different from, and operate independently, of each other.
6. Trading Pauses	*Trading Platforms*	Trading platforms would be required to institute trading pauses, similar in nature to stop-logic functionality, but covering a wider array of adverse states of an automated central limit order book.
7. Credit Risk Limits	*Trading Platforms, Clearing Firms and/or Market Participants Operating ATSs*.	While some trading firms and FCMs conduct post-trade credit checks with varying degrees of latency and pre-trade credit risk screens are already required pursuant to Commission regulations, the Commission seeks public comments regarding any additional measures that could help protect the financial integrity of DCOs, as well as additional input from the public regarding the appropriate location and timing in the order lifecycle for credit checks.

B. Post-Trade Reports and Other Post-Trade Measures

Potential post-trade report or measure	Party(s) to implement report or measure	Substance of report or measure
8. Order Report (Post-order drop copy).	*Trading platforms*	Trading platforms must provide a duplicate copy of each order to the originating market participant and to the market participant's clearing firm(s) simultaneously with such order's receipt by the trading platform.
9. Trade Report (Post-trade drop copy).	*Trading platforms*	Trading platforms must provide a duplicate copy of each executed trade to the originating market participant and to the market participant's clearing firm(s) simultaneously with such trade's execution by the trading platform.
10. Position Report (Post-clearing drop copy).	*DCOs*	DCOs must provide net position per maturity per contract to the originating market participant and the market participant's clearing firm(s) as soon as the contract is matched at the clearinghouse.
11a. Uniform Adjust or Bust Error Trade Policies.	*Trading platforms and All Market Participants*.	11a. Trading platforms must establish policies for adjusting the price of trades or breaking trades that have been executed due to an error.
		Policies must favor price adjustments rather than trade cancellation. To the extent possible, policies must require decisions by the trading platform to be made on the basis of readily available objective criteria in order to facilitate rapid or immediate decisions.
11b. Standardized Reporting Window for Error Trades.	....	11b. Market participants must report error trades to the trading platform within five minutes after the trades are executed.
		Trading platforms must notify market participants of a potential adjust-or-bust situation immediately.
		Trading platforms must make a decision and notify market participants of that decision within a specified period of time.

C. System Safeguards

Potential system safeguard	Party(s) to implement safeguard	Substance of safeguard
CONTROLS OVER ORDER PLACEMENT. *Order Cancellation Capabilities*	*Trading Platforms, Clearing Firms, and All Market Participants.*	Trading platforms, clearing members, and market participants must have systems and processes in place to:
12a. Auto-cancel on disconnect.	....	12a. Exchanges should implement a flexible system that allows a user to determine whether their orders should be left in the market upon disconnection. This should only be implemented if the clearing firm's risk manager has the ability to cancel working orders for the trader if the trading system is disconnected. The exchange should establish a policy whether the default setting for all market participants should be to maintain or to cancel all working orders.
12b. Selective working order cancellation.	....	12b. Immediately cancel one, multiple, or all resting orders from a market participant as deemed necessary in an emergency situation.
12c. Kill switch	....	12c. Immediately cancel all working orders, and the ability to prevent submission (market participant), transmittal (clearing member), or acceptance (trading platform) of any new orders from a market participant, or particular trader or ATS of such market participant.
13. Repeated Automated Execution Throttle.	....	13. Market participants operating ATSs must establish a limit on the maximum number of orders that each ATS can submit. When an ATS reaches that maximum it must be automatically disabled until a human re-enables it.
14. System heartbeats (see section III.E.1.a and footnote 90).	....	14. Trading platforms must provide, and market participants operating ATSs must utilize, heartbeats that indicate proper connectivity between the trading platform and the ATS. Such heartbeats must also indicate the status of connectivity between an ATS and any systems used by the trading platform to provide the ATS with market data. If connectivity to any system is lost, the ATS should be disabled, and resting orders should be maintained or cancelled based on the pre-determined preferences of the firm that lost connectivity.
POLICIES AND PROCEDURES FOR THE DESIGN, TESTING, AND SUPERVISION OF ATSs **15a. ATS Design**	*Market Participants Operating ATSs.*	15a. Market participants operating ATSs must properly design their systems to avoid violations of the CEA, Commission regulations, or DCM and SEF rules related to fraud, disruptive trading practices, manipulation and trade practice violations. They must also ensure that their ATSs include all applicable pretrade risk controls and system safeguards as described herein.
15b. ATS Development and Change Management.	*Trading Platforms and Market Participants Operating ATSs.*	15b. Trading platforms and market participants operating ATSs must maintain a development environment that is adequately isolated from the production trading environment. The development environment may include computers, networks, and databases, and should be used by software engineers while developing, modifying, and testing source code. Firms must maintain a source code repository to manage source code access, persistence, and changes. Firms must establish and document procedures for communicating the functionality and requirements of, and changes to, their proprietary software. These procedures must include an audit trail of material changes that would allow them to determine, for each change: Who made it, when they made it, and what the purpose was for the change. Firms must have documented policies and procedures that allow representatives from trading, risk, and software management to approve changes and to verify internal testing before a new or modified trading system can be enable in production.
15c. ATS Testing	*Trading Platforms and Market Participants Operating ATSs.*	15c. Market participants operating ATSs must test each ATS both internally and on each trading platform on which an ATS will operate. Relevant tests include, but are not limited to, unit testing, functional testing (both integration and regression testing), non-functional testing, and acceptance testing. Functional testing must include all applicable pre-trade risk controls, post-trade reports and other measures and system safeguards. Non-functional testing must include testing under stressed market conditions. Market participants must perform such testing on each algorithm prior to initial deployment, and prior to re-deployment, after certain modifications to the algorithm. Trading Platforms must provide test environments that simulate the production trading environment so that market participants may conduct exchange-based conformance testing on their ATSs once they have completed internal testing. Conformance testing must include tests for all ATS risk mitigation controls that are able to be tested by the exchange. Exchange-based conformance testing must be done after certain modifications to the operating code.
15d. ATS Monitoring and Supervision.	*Market Participants Operating ATSs.*	15d. Market participants operating ATSs must ensure that their ATSs are subject to continuous real-time monitoring and supervision by trained and qualified staff at all times while engaged in trading.

Potential system safeguard	Party(s) to implement safeguard	Substance of safeguard
		Appropriate supervision includes automated alerts when ATS order behavior breaches design parameters or when market conditions diverge from program expectations. It also includes automated alerts upon loss of network connectivity or data feeds.
		Monitoring and supervision staff must have the ability and authority to disengage the ATS and to cancel resting orders when system or market conditions require it, including the ability to contact trading platform staff to seek information and cancel orders. They must also have acceptable dashboards and control panels to monitor and interact with the ATS.
		Monitoring and supervision staff must record the time when they assume responsibility for an ATS and the time when they relinquish control to others. Recording must be achieved through distinct log-ins to the required control panel by each staff person. Log-in must also be subject to access controls that ensure the correct staff person is identified.
15e. Training for ATS Monitoring Staff (see section III(E)(2)(b) and footnote 97).	*Market Participants Operating ATSs.*	15e. Firms operating ATSs must develop training for all staff involved in monitoring or designing ATSs. Training must, at a minimum, cover design standards, event communication procedures, and requirements for notifying exchange and commission staff when risk events occur.
		Additionally, each firm must develop, document, and implement training policies that ensure human monitors are adequately trained for each new algorithm that is implemented. Training must include, at a minimum, the economic rationale for the algorithm and mechanics of the underlying process, as well as the automated and non-automated risk controls that are applicable to the algorithm.
15f. Crisis Management Procedures.	*Trading Platforms and Market Participants Operating ATSs.*	15f. Trading platforms and market participants operating ATSs must develop and document procedures that direct the actions of ATS supervisors, exchange trading monitors, and support staff in the event that an algorithm malfunctions or responds to market signals in an unanticipated manner.
		Procedures should direct the process for evaluating, managing, and mitigating market disruption and firm risk. The procedures should also specify people to be notified in the event of an error that results in violations of risk profiles or potential violations of exchange or Commission rules.
SELF-CERTIFICATIONS AND NOTIFICATIONS **16a. Self-Certification and Clearing Firm Certification**.	Market Participants Operating ATSs.	16a. All firms operating ATSs must certify annually that their ATSs individually and collectively (*i.e.* at the algorithm, account, and firm levels) comply with all Commission and trading platform requirements regarding pre-trade risk controls and post-trade reports and other measures, as well as all applicable risk controls.
		Clearing firms must institute reasonable measures to confirm that their client trading firms implement the pre-trade risk controls that are required.
16b. Risk Event Notification Requirements.	*Market Participants Operating ATSs, Trading platforms.*	16b. Market participants operating ATSs must notify the exchange, and the exchange must notify the Commission whenever an algorithm violates its design parameters or whenever risk control technologies or processes do not function as planned even if they do not result in destabilization of the markets. The exchange must also notify the Commission whenever any of its own risk management technologies or processes violate design parameters or do not function as planned.
17. ATS or Algorithm Identification.	*Market Participants Operating ATSs.*	A unique identifier would be assigned to each ATS or algorithm, and all orders submitted by that ATS or algorithm would be tagged with the identifier.
18. Data Reasonability Checks.	*Market Participants Operating ATSs.*	All firms operating ATSs must have "reasonability checks" on incoming market data and other data (including social media).

D. Other Protections

Potential additional protection	Party(s) to implement protection	Substance of protection
19. Registration of All Firms Operating ATSs.	*Market Participants Operating ATSs.*	All firms operating ATSs to trade solely for their own account and not otherwise registered with the Commission must register with the Commission.
20. Market Quality Data	*Trading Platforms*	Trading platforms must provide to all market participants a daily summary of market quality for each product traded on its platform.
		The feeds would include measures of execution quality including: (1) Effective spreads; (2) order to fill ratios; (3) execution speed for different types of orders and different order sizes; (4) aggressiveness imbalance; (5) price impact for given trade sizes; (6) average order duration; (7) order efficiency; (8) rejection order ratio; (9) net position changes versus volume; (10) branching ratios; (11) volume imbalance and trade intensity; (12) Herfindahl-Hirschman Indexes based on market share of open positions under common control; and (13) metrics on the number of price changing trades involving ATSs.

Potential additional protection	Party(s) to implement protection	Substance of protection
21. Market Quality Incentives.	*Trading Platforms*	Trading platforms must implement changes that will limit market participants' abilities to improperly advantage their own orders in ways that do not contribute to efficient price discovery, including, for example: (1) Utilize a trade allocation formula that is an intermediate between a cardinal ranking (time-weighted), Pro Rata allocation formula and a Price/Time allocation formula; (2) Create a new limit order type that would prioritize orders that remain resting in the order book for some minimum amount of time; (3) Require orders not fully visible in the order book to go to the end of the queue (within limit price) with respect to trade allocation; (4) Aggregate multiple, small orders from the same legal entity entered contemporaneously at the same price level and assign them the lowest priority time stamp of all the orders so aggregated; (5) Require exchanges to use batch auctions once per half second at random times rather than use continuous trade matching; and (6) Limit visibility into the order book to aggregate size available at a limit price.
22. Policies and Procedures for identifying "related" contracts.	*Trading Platforms*	Trading platforms must develop and implement policies and procedures for identifying securities or products listed on other exchanges that would constitute "related" contracts to those that are listed on their own exchange.
23. Standardize and Simplify Order Types.	*Trading Platforms*	Trading platforms must work with the Commission to standardize order types across exchanges, and to reduce the overall number of order types that have complex logic embedded within them.

Issued in Washington, DC, on September 9, 2013, by the Commission.

Christopher J. Kirkpatrick,

Deputy Secretary of the Commission.

Appendices to Concept Release on Risk Controls and System Safeguards for Automated Trading Environments

Appendix 1—Commission Voting Summary

On this matter, the following Commissioners voted in the affirmative: Chairman Gensler, Commissioner Chilton (with the concurrence set out below in Appendix 3), Commissioner O'Malia (with the concurrence set out below in Appendix 4), and Commissioner Wetjen. No Commissioner voted in the negative.

Appendix 2—Statement of Support of Chairman Gary Gensler

We have witnessed a fundamental shift in markets from human-based trading to highly automated electronic trading. Automated trading systems, including high frequency traders, enter the market and execute trades in a matter of milliseconds without human involvement. Electronic trading makes up over 91 percent of the futures market. The swaps market also is moving toward electronic trading.

In our oversight of U.S. derivatives markets, both futures and swaps, the Commodity Futures Trading Commission (CFTC) must look to continually adapt our regulations in these changing times. Our mission to promote transparency, ensure for market integrity and prohibit abuses is just as important in the fast-moving world of electronic trading as it was when people traded over the phone, in a pit or on a floor.

The CFTC already has taken a number of important steps to keep pace with rapidly evolving 21st-century markets. We have adopted rules to implement pre-trade risk filters for futures commission merchants, swap dealers, designated contract markets and swap execution facilities. We also have

new rules to prohibit disruptive trading practices and other market abuses.

In publishing this Concept Release, we are seeking public input on what additional risk controls and system safeguards are appropriate given this ever-changing technological environment. Traditional risk controls and system safeguards, many of which were developed according to human speed and floor-based trading, must be evaluated in light of new market realities.

Further, as sure as computers and programs have had technical glitches in the past, we must look to risk controls and system safeguards to protect markets when such glitches inevitably occur again. This Concept Release is intended to stir public discussion and debate on how best to protect the functioning of markets for the benefit of farmers, ranchers, merchants and other end users who rely on markets to hedge risk— particularly in light of the reality that the majority of the market is using automated trading systems.

Appendix 3—Concurrence of Commissioner Bart Chilton

While I concur in the concept release, am most appreciative of the staff work, and am largely pleased at the result, this has taken far too long to come to fruition.

In general, those involved in financial markets seem to have blindly accepted that technology is almost always a good thing. Yet we continue to see major technology problems, like NASDAQ shutting down twice in as many weeks. Last year it was NYSE. In the futures world, we see technology glitches that simply should not occur. I acknowledge that, with the staggering volume of trading, some might simply be astounded that—in the main—it works so well. But it doesn't work well enough if we continue to see aberrations—particularly if they are market missteps that could have been avoided. That's to say nothing of the high frequency cheetah traders who have, some I am convinced intentionally, contorted markets in a manipulative fashion. In addition, there are a shocking number of transactions that

appear to be wash trades—that also has the possibility of impairing the fair and effective functioning of financial markets.

I'm pleased we are moving this concept release forward, but given this environment it has taken way too long. If we continue at this pace, Rip Van Winkle could keep up with any possible action we might take. We need to understand that some of these issues are urgent and need action now. They can't wait another year or more.

At the same time, there is one thing that can be done now. In fact, I suggested this policy shift be included in the concept release, but since it is a larger issue than just a technology-related matter, it was decided to omit it. That's fine, because my suggestion is really an action for the Congress.

As long as we have a puny penalty regime at the CFTC, we are going to see traders risk getting caught because the potential profits are so great. We can only impose a civil monetary penalty (CMP) of $140,000 per violation. That's the law. Furthermore, the case history suggests that a "violation" may be only once per day. In these millisecond markets where we have seen a million change hands in a minute, $140k is a joke— and it's not very funny.

This Agency is hampered by staffing needs due to a lack of funding. We have hundreds of cases being investigated right now. The least Congress can do, so that we can try and keep up—and if need be, cage the cheetahs and others who violate the Commodity Exchange Act—is to increase the CMPs. Specifically, I've suggested increasing the maximum penalty levels to $1 million per violation for individuals and $10 million for firms. That would be a deterrent. That would stop some of the cheetahs and others out there who are tempted to use powerful technologies in unlawful ways.

I look forward to receiving comments, and hope that we let no moss grow on this matter.

Appendix 4—Statement of Concurrence by Commissioner Scott D. O'Malia

During my time at the Commodity Futures Trading Commission ("Commission"), I have

consistently emphasized that the Commission must have a strong understanding of today's highly automated and interconnected trading environments in order to oversee its markets effectively. As head of the Commission's Technology Advisory Committee (''TAC''), I have committed considerable TAC time and resources to strengthening our understanding of automated markets. I am grateful for all the hard work of the TAC members as well as the efforts of the members of the Subcommittee on Data Standardization and the Subcommittee on Automated and High Frequency Trading, who have devoted hours of work on issues related to automated trading systems and pre-trade functionality. I hope that this Concept Release, and in particular the public comments the Commission receives in response, will build on this work.

The Concept Release asks over a hundred questions, which is appropriate given the importance of hearing from all sectors of the industry and benefiting from their knowledge and views of automated trading. I would like to highlight a few questions that I believe it would be particularly constructive to receive feedback from the public on. The first is to establish what current protections are in the market today and the extent to which the technology is deployed, as well as its effectiveness. The second is an overarching question: Whether there is a need for regulatory action with regard to any of the measures currently in the market. In other words, should the Commission federalize any current industry practices/standards? Third, it would be helpful to receive public feedback on the definitions for high-frequency trading and automated trading systems that the TAC, after extensive effort by its Subcommittee on Automated and High Frequency Trading, has proposed. Finally, it would be beneficial to receive feedback on the possibility of a registration requirement for firms operating automated trading systems and not otherwise registered with the Commission. The Concept Release cites the definition of ''floor broker'' as the potential basis for such a requirement; I am interested to get public input on whether this, or any other provision in the Commission's statute or regulations, can serve as a valid foundation for registration.

The Concept Release is far from perfect. For example, it could have provided a more thorough and clear cataloguing of existing industry practices and recommendations; a recent TAC reference document is more clear and concise in compiling existing standards and recommendations in the market today.[124] Nevertheless, I support today's issuance of the Concept Release in order to receive input from market participants on all of the issues contained herein. I look forward to reviewing the comments submitted in response to the Concept Release.

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[124] This document is available at *http://www.cftc.gov/ucm/groups/public/@newsroom/documents/file/tac103012_reference.pdf.*